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UMI
The Enlightenment Cyborg:
Aspects and Origins of the Postmodern
"Man-Machine" Metaphor

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Abstract

Popular media, literature, and theory suggest that technology has induced a newly evolved, posthuman and postmodern (or "post-Enlightenment") cyborg consciousness. I suggest, as an alternative reading to the notion that we are evolving towards a disembodied posthuman state which will revolutionise what it means to be human, that the literature of cyborgs incorporates and reinscribes traditional narratives about human identity.

This project analyses representative tropes of the cyborg in contemporary discourse from an explicitly historical perspective. Although dualisms such as mind/matter or soul/body are recognised in current theorising of the cyborg, little has been written about the historical relationship of mechanism and humanity in the ongoing discussion of cyborg mind/body ontology. The cyborg in much of our literature throughout a wide range of genres is represented by the exaggerated and horrifying effacement of human embodiment to embellish an underlying concern about the consequences to the human spirit when we can be reproduced by technological means. This thesis argues that much of the discourse about the novelty of the "postmodern" human-machine, however, is not unprecedented. Cyborg literature represents themes and concerns regarding the man-machine of the seventeenth and
eighteenth centuries, and continues to reflect a religious debate about the spirit within
the material body.

Beginning with current notions of the supposed obsolescence of the body, this
thesis explores how the contemporary cyborg functions as a device to reflect traditional
(frequently Christian) values. Drawing on eighteenth-century medical philosophy and
the satirical literary responses to mechanist definitions of body and soul, I demonstrate
literary connections between medical and literary metaphors of the Enlightenment man-
machine and the postmodern cyborg in popular media, fiction, and theory. The debate
surrounding eighteenth-century materialism, primarily metaphorical and analogical in its
representation of the body's mechanisms, contributed directly to current notions of
figurative disembodiment and the status of the human soul in contemporary literature. I
conclude that the cyborg as a figure of literature does not indicate a revolutionary
change in social consciousness but repeatedly is a device used to affirm traditional
religious concepts of human reproduction, individual free will, spirit and body, and life
after death.
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Introduction

I sat down close by her, and Maria let me wipe [her tears] away as they fell with my handkerchief. — I then steep'd it in my own — and then in hers — and then in mine — and then I wip'd hers again — and as I did it, I felt such undescrivable emotions within me, as I am sure could not be accounted for from any combinations of matter and motion.

I am positive I have a soul; nor can all the books with which materialists have pester'd the world ever convince me of the contrary.

— Laurence Sterne, *A Sentimental Journey* (1768), 114

In introducing his influential theory of “the making of typographic man” in his 1962 *Gutenberg Galaxy*, Marshall McLuhan suggested that the electric media of the highly literate and technologised man of the twentieth century was renewing the oral tradition of “primitive man” and retribalising the inhabitants of the “global village.” Our electric technology, he explained, has consequences for our most ordinary perceptions and habits of action which are quickly recreating in us the mental processes of the most primitive men. These consequences occur, not in our thoughts or opinions, where we are trained to be critical, but in our most ordinary sense life, which creates the
vortices and the matrices of thought and action. (30)

That is, our technology affects not our rational thought but our bodies themselves, the sensory understanding of the world, and the physiological processes which dictate human thought and action. Insofar as the nervous system extended throughout our bodies and brains is the mechanism responsible for sensory input, the will to act, and finally the act itself, the medical “rewriting” or technological “extending” of our nervous system and brain mechanisms cuts close to our cultural understanding of the free will, morality, or immortal spirit of humankind. It has become a commonplace today to claim that any change in our mental processes due to our technology (the metaphoric “extension” of the nervous system into or by the electronic medium) will affect individual human morals, the nature of humanity, or the indefinable and immaterial soul itself. “Uncertainty in the strivings of the soul,” McLuhan wrote, “is perhaps one of the aptest descriptions of man’s condition in our modern crisis” wrought by “technology, the machine, [which] has spread through the world” (31). McLuhan’s implicitly religious construct of technology’s effect upon the human soul has formed a significant basis for theorising the body and technology in the newly formed genre of cultural studies of the body—much of which makes claims to “postmodernity” but in effect has very close literary ties to the mythos of a much older Christian humanism.¹ The cyborg does not

¹ Mark Krupnick makes a strong case for McLuhan’s work as a religious system heavily influenced by the Jesuit Father Walter Ong’s ideas about rhetoric and religious history. *The Gutenberg Galaxy*, Krupnick writes, “is informed at every turn by Catholic thought, including its theology. ...McLuhan is proclaiming a brilliant new age in which post-Gutenberg technology ushers in a futuristic electronic culture that will restore the oral, medieval Catholic world destroyed by visually fixated typographic literacy. ...Ong [is] a major formative influence on McLuhan’s theory of the media...in the *Galaxy*” (111).
indicate a new phase in human evolution, but merely reiterates well-established clichés about the much-contested grounds of identity and human "nature."

McLuhan suggested that the modern physicist, with a new mode of sensory perception that is more sophisticated than the "conventional habits of Newtonian space" (29) is "at home with" the world view of a pre-literate and primitive society. To demonstrate his point, he quotes the following passage from Werner Heisenberg's *The Physicist's Conception of Nature*:

In this connection it has often been said that the far-reaching changes in our environment and in our way of life wrought by this technical age have also changed dangerously our ways of thinking, and that here lie the roots of the crises which have shaken our times and which, for instance, are also expressed in modern art. True, this objection is much older than modern technology and science, the use of implements going back to man's earliest beginnings. Thus, two and a half thousand years ago, the Chinese sage Chuang-Tzu spoke of the danger of the machine when he said:

"As Tzu-Gung was travelling through the regions north of the river Han, he saw an old man working in his vegetable garden. He had dug an irrigation ditch. The man would descend into the well, fetch up a vessel of water in his arms and pour it out into the ditch. While his efforts were tremendous the results appeared to be very meagre.

"Tzu-Gung said, 'There is a way whereby you can irrigate a hundred ditches in one day, and whereby you can do much with little effort. Would you not like to hear of it?' Then the gardener stood up, looked at him and said,
‘And what would that be?’

‘Tzu-Gung replied, ‘You take a wooden lever, weighted at the back and light in front. In this way you can bring up water so quickly that it just gushes out. This is called a draw-well.’

‘Then anger rose up in the old man’s face, and he said, ‘I have heard my teacher say that whoever uses machines does all his work like a machine. He who does his work like a machine grows a heart like a machine, and he who carries the heart of a machine in his breast loses his simplicity. He who has lost his simplicity becomes unsure in the strivings of his soul. Uncertainty in the strivings of the soul is something which does not agree with honest sense. It is not that I do not know of such things; I am ashamed to use them.’” (29–30)

Perhaps the “real point” of the anecdote, McLuhan explains, “is that it appealed to Heisenberg” (whose sensory perception, modified by contemporary physics, includes the “subtle auditory space of the non-literate world”). In an extraordinary leap of logic McLuhan concludes, “It would not have interested Newton” (30). Whether Newton along with Descartes had a “specialized visual space” due to the priority of print media in their culture is itself a highly problematic claim, as I will further discuss; but the claim as to what would have “interested” Newton is mere conjecture and a rather careless scholarship. Nevertheless, McLuhan’s work has had a significant influence on media studies and related theories of the effects of the machine’s extension of the cyborg consciousness. The tendency to suggest a profound evolution in human consciousness between the time of the early modern Newton and postmodern time-space is a prevalent assumption that owes much to his work.
I should clarify here that consciousness and embodiment share a strange relationship in cyborg literature, where consciousness is understood to be influenced by physical changes to the body but is also paradoxically seen as detachable from the body. “Consciousness” is generally understood to be mental processes, thoughts, and emotional reactions of which an individual is aware, and can also refer to a totality of attitudes and opinions held by an individual or group. Obviously some changes have occurred in generalised opinions, attitudes, or morals since Newton’s time, but the tendency to suggest our relationship with the machine results in permanent physical evolution from the human state to the posthuman one so commonly assumed by cyber-theorists is highly questionable and, as I will argue, the evolution in how we define the mechanisms of our bodies is more pronounced in our cultural texts than is any evolution in fundamental attitudes or morals. Indeed, much of cyborg popular literature, despite its apparently radical nature, tends toward conservatism and reinscription of traditional values in its themes as has been noted by John Christie in “A Tragedy for Cyborgs” and Robert Markley in Virtual Realities and Their Discontents.

I begin my own discussion with Heisenberg’s anecdote as a telling starting-point for a discussion of the literature of the so-called postmodern human-machine entity which we now call cyborg. For McLuhan was instrumental in the formulation of a theory of technology which supposes a drastic change not only to human consciousness but also to human spirit as a result of the shift from the pre-Enlightenment view of the natural world to a more sophisticated and potentially more damaging postmodern one.²

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² McLuhan’s version of technology’s role in human spiritual evolution was more hopeful generally than that of his media theory progeny, Arthur Kroker and Jean Baudrillard. “All of
The point of retelling the anecdote for me, however, is twofold: first, why did it appeal to McLuhan himself? By claiming that the narrative would not appeal to Newton, McLuhan could then embark on his depiction of tribal or primitive man versus modern Gutenberg man and a new contemporary retropolised man: to some extent the depiction of the profound effects of technology on human psyche is built upon a foundational image of the Noble Savage. Second, the point of this anecdote for my purposes, as perhaps it was for Heisenberg's, is not that literate humans lacked such a viewpoint during the early modern phase dominated by print media, but rather that humanity has for centuries been suspicious of the effects of the machine on the value of individual human spirit. On the whole, the cyborg consciousness is a notion that circulates not in the discourse of science or medicine or technology or the labourers who make their living working with cybernetic machines, but in the discourse of those working in the Humanities or drawing upon the themes and metaphors of the traditional western literary canon. The cyborg of medical technology exists in various embodied human forms; the cyborg of literature exists primarily as a popular symbol standing for the effects upon human spirit of the changes to cultural systems of authority effected through technology.³

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McLuhan's fooling around had a specific faith underlying it," writes Gary Genosko, Senior Research Fellow of the McLuhan Program in Culture and Technology at the University of Toronto, "salvation from the fall of literacy might be found in electric technology (McLuhan 1964: 21) with the proviso that a good deal of suffering (Babel) would be concomitant with the electronic spirit of Pentecost" (13).

³ By the term literature I mean "literary" as opposed to "scientific" texts, and include within this category the traditional literary canon as well as academic criticism, popular literature, and media (which is of course written/scripted before it is archived as image), as well as heavily theorised performance art.
The changes that have occurred as a result of the development of our material
technology are obvious in the actual, material changes to our machines and to our
landscape; they are also obvious in the means by which we move from place to place,
organise our communities, and communicate with one another. But has their presence
indeed induced a new consciousness increasingly labelled as not only postmodern but
also posthuman? What does the human-machine relationship mean in terms of what we
say to one another, in terms of our ontology, in terms of the expression of our
humanity? If we have evolved or are evolving a new posthuman consciousness, our
cyborg literature should reflect not only new material technologies but also newly
wrought themes specific to posthuman nature. I argue that the literature of cyborgs
reflects not so much a new ontology as a new material technology as prop for the latest
iteration of a long literary tradition dealing with the same old, and still compelling,
questions about human nature: What does it mean to be human? What is the difference
between good and evil? What is the relationship between human reproduction and
human spirit? What is heroic? What is the relationship between human reproduction
and human spirit? Can we weak humans be saved from our petty sins of the flesh? And
perhaps foremost, can our spirit live on without the machinery of our bodies?

If we compare the epigraph above from Sterne’s early modern Sentimental Journey
to William Gibson’s postmodern Mona Lisa Overdrive, both commenting on the
relationship between material mechanisms of the body and the immaterial and possibly
immortal soul, would we find a discernible ontological difference? Sterne’s character
Yorick proclaims defensively that he has a soul which can not “be accounted for from
any combinations of matter and motion.” Gibson’s portrayal of the aleph, a soul-catcher
machine that enables an afterlife of the emotional being as a repository of memories, "longing, jealousy, frustration, and rage" (306) as well as love, suggests that the machine might be a tool for "saving" the soul as immaterial electronic data. Essentially, both postulate a mind-body separation that seems very Cartesian. While our technology has changed over two hundred years, the affirmation of the soul as separate from the material body is not so very different: in Sterne's novel travel is by horse and carriage while in Gibson's horses are extinct and travel is by brute horsepower, virtual flight—or virtual horseback (268); but both novels are working out the existence of an immortal spirit alongside a mechanical understanding of the human being. Although Gibson's depiction is troubled by some ambiguity (the "immortality" is not Heaven, though it does suggest a form of spirituality with a system of gods, and it lasts in its current form only as long as a power source is available), common to both authors is the representation of soul transcending body, a spirit which is not merely resulting from the mechanical workings of the body, a spirit that will live beyond the death of the body.4

Theorists, both radical and conservative, and representing a wide spectrum of political affiliations, have nevertheless agreed that as humans we are about to be, or have already been, utterly and irrevocably changed: "We cannot go back ideologically or materially," Donna Haraway suggests in her influential "Cyborg Manifesto" (162). Sherry Turkle writes in her concluding chapter to Life On the Screen: Identity in the Age of the Internet that "As we stand on the boundary between the real and the virtual, our experience recalls what the anthropologist Victor Turner termed liminal moment, a

4 This theme is by no means unique to Gibson and occurs in the work of other cyberpunk authors such as Rudy Rucker, Pat Cadigan, and Bruce Sterling.
moment of passage when new cultural symbols and meanings can emerge” (268), such as the “multiple viewpoints [which] call forth a new moral discourse” (268). Sven Birkerts laments rather more apprehensively that electronic technology will result in physical metamorphosis from what it means to be human:

Could it be that we are changing, evolving, and beckoning that future toward us? …Maybe we are ready to embrace the pain of leaving the book behind; maybe we are shedding a skin; maybe the meaning and purpose of being human is itself undergoing metamorphosis. …But evolution is evolution, and no amount of nostalgia can temper its inexorability. ("The Fate of the Book," 190)

Bruce Mazlish similarly (though optimistically) argues in The Fourth Discontinuity: The Co-evolution of Humans and Machines that “humans are on the threshold of decisively breaking past the discontinuity between themselves and machines” (6), a process that is related to “evolving human nature. …an evolving identity, secured in the process of adaptation to ‘nature’” (7). The prevalence of the tacit assumption that due to our technology we have evolved to a radically “new” consciousness and system of morals ranges throughout cyborg discourse, from the conservative outrage of scholars such as Birkerts to the revolutionary post-gender theory of Haraway and her followers, or the appreciative and occasionally uncritical narratives of scholars who are themselves in the fields of science and technology.

In the following pages I argue against such notions of our biological evolution into something other than human—that we are not “disembodied” by technology, as so many theorists have claimed. I suggest, rather, that it is not our embodied selves that
have become increasingly merged with the mechanical so much as our language for
machine and human has become increasingly similar. That is, the cyborg of literature is
highly metaphorical, an idea derived from literary convention which does not address
the actual experiences of already living, still embodied, still human, cyborgs of medical
technology. I suggest as an alternative reading of the cyborg that while our
understanding of nature and the human body has become increasingly specific and thus
has changed the means by which humans can predict, control, or even re-write the
“Book of Nature,” many of our conversations and concerns about the machine in our
midst are not unprecedented by the themes and concerns of Newton’s time, and in fact
reflect a timeless religious debate about body and soul.

One of the most influential voices in the past twenty years in the conversation
about humans and cybernetic machines (or humans as cybernetic machines) has been
the French theorist Jean Baudrillard, whose name appears almost as a stamp of
authenticity in any bibliography for cultural studies of human and machine. Baudrillard’s
work must be taken into account in any examination of cyborg literature since it is both
highly speculative and highly influential within this genre. As Gary Genosko has pointed
out in McLuhan and Baudrillard: The Masters of Implosion, Baudrillard’s theories have been
adopted enthusiastically by both the theorists and practitioners of cyberpunk. Both
McLuhan and Baudrillard, Genosko remarks, “are looked upon as figureheads in the
emergence of virtual reality technologies and infobahns” (79). Baudrillard’s influence
ranges past the relatively limited readership of theory and cyberpunk fiction, however,
and has surged into the mainstream of popular culture: the recent movie The Matrix
(1999) starring Keanu Reeves and Laurence Fishburne as hackers in a post-apocalyptic
future where humans have been enslaved by sentient machines, for example, is based on the ominous predictions for contemporary society that appear throughout Baudrillard’s œuvre. In the simulated world of the Matrix, in fact, a hollowed-out copy of Baudrillard’s book *Simulacra and Simulations* is used to hide contraband computer disks (see chapter one for a more thorough discussion of the relationship between Baudrillard’s work and the popular film). The human-machine as a sign of impending doom has become part of a cultural vocabulary that is as far reaching as American film—that is, world wide—and cyborg literature and film are colonising world wide literatures with ominous projections, heavily influenced by Christian myth, of the demise of humanity due to the sin of knowledge: “Electrocuted, lobotomized, the soul has become but a cerebral convolution,” writes Baudrillard (*The Ecstasy of Communication*, 50). “From a biological, genetic and cybernetic point of view, we are all mutants. Now, for mutants there can no longer any Last Judgement, or the resurrection of the body, for what body will one resurrect?” (51) Any hope for the future is effectively nullified with dire predictions of the loss of our souls when we incorporate the “unnatural” machine into our “natural” bodies—based upon a narrow view of how world and humanity, matter and spirit, ought to co-exist.

Both influenced by and contributing to current cyberpunk literature, cyborg theory displays an overwhelming assumption that technology has induced a new, posthuman, cyborg consciousness where the “real” and the “false” are not merely indistinguishable but are equivalent. The themes and plots of cyborg literature, however, circle around ancient questions and assumptions: the value of the human spirit within the labouring human body; the baseness of the physical aspects of our selves; the
transcendence of the human spirit; the separation of body and mind. Furthermore, cyborg consciousness is regularly characterised as "unfeeling." If we have built our notion of what is "human" on the basis of metaphor, however, the danger is that we will thus label what we conceive as "inhuman" on the basis of metaphor.\footnote{At the other extreme, feminists following Haraway tend to see the cyborg as a utopian myth, a potential engine of emancipation, while certain hypertext theorists such as Landow, Bolter, Lanham, etc., see the interaction of human mind with computer space as a potentially democratising influence.}

This project analyses representative tropes of cyborg and cyberspace in contemporary literature and academic discourse from an explicitly historical perspective. The following is not a linear history but rather a history of origins. Because the cyborg is frequently presented as a postmodern or post-Enlightenment creature, I limit this study to comparing postmodern representations of the cyborg to the early modern representations of man-machine and thus, while such nineteenth-century works as Shelley's *Frankenstein, Or, the Modern Prometheus* (1818) or the works of Karl Marx play a role in the history of cyborg, they will not comprise a central focus in this study. Neither will I be able to address in great detail the obvious relationship of the military development of intelligent weapons from the 1940s with the apocalyptic visions of human killing-machines. The vestiges of the particular "man-machine" metaphor in our literary versions of the cyborg that I will be exploring have to do with material body and ethereal spirit particular to definitions of the human body established during the Enlightenment. While Jonathan Sawday has attempted to define a version of "Renaissance cyborg," there has been little written about the historical relationship of mechanism and humanity in the ongoing discussion of mind/body ontology that has
culminated in the apocalyptic visions of posthuman cyborg. Beginning with current notions of the supposed obsolescence of the human body, I explore how the figure of the cyborg functions as a highly politicised metaphorical device in the contemporary popular fiction and cultural theory which has appropriated the human-machine figure to represent an unprecedented product of the evolution of human consciousness. By examining the early modern texts that form a significant part of the cyborg origin story, I attempt to demonstrate that the cyborg figure does not herald a new age but is in fact a symbol instilled with the messages of longstanding literary and religious traditions concerning the nature of humanity. Drawing on eighteenth-century medical philosophy and the satirical literary responses to mechanist and materialist definitions of body and soul, I demonstrate the literary connection between metaphors of the man-machine of the Enlightenment and of the cyborg of Postmodernism. I conclude that the debate surrounding eighteenth-century materialism, primarily metaphorical and analogical in its representation of the body's mechanisms, contributed directly to current notions in contemporary literature of figurative disembodiment and the status of the human soul.

The cyborg (from "cybernetic organism") is generally theorised in terms of two distinct but somewhat interdependent states: that of the body merged with the prosthetic machine, or that of the mind merged with the imaginary dimension created through computer technology, called cyberspace—that is, the cyborg is composed of "hardware" (visible mechanical components such as metal or plastic prosthetics internally or externally meshed with the body) and/or "software" (invisible written components that augment functions of thought, emotions, or cellular reproduction: these might be comprised of a database or programmed as a feedback loop, and/or
injected as a compound defined by the molecular structure of its components). Another way to describe the two aspects of the cyborg body/mind would be that cyborg hardware is analogical—in literary terms, a comparison or correspondence between things otherwise dissimilar: the limbs function like rotational hinges and levers, so artificial limbs are created as a system of rotational hinges and levers. Cyborg software is symbolical, where body function is removed from the realm of direct comparison and into the realm of arbitrary signs. Body processes might be rewritten in this case as numerical formulae or programming code that would describe, for example, organic molecules, myoelectric control of a prosthetic limb, or the sequence of proteins in nucleic acid (that is, symbols such as $\text{H}_2\text{NCONH}_2\text{H}_2\text{O}$; on/off; +/−; 0,1,2,3…; or AGCTCTTCTC). Generally speaking, hardware corresponds to the visible while software corresponds to the invisible in depictions of the posthuman—much as do body and mind in depictions of the human. Cyborg literature is characterised by the problematic relationship between cyborg hardware (the body itself as the site of action) and cyborg software (the writing of body-mind functions including thoughts and emotions, and the will to act—thus inextricably linked to notions of the human soul).

To some degree, the question of the cyborg is a problem of language: the cyborg is the convergence of definitions of human and machine as much as it is the convergence of material body and machine. To the extent that a language without precise terminology is analogical, it is not a particularly unique practice to compare the human mind and body to human tools, and if the first human tool was the Promethean gift of fire, so too was one of the first definitions of the soul (mind) as fire. The word vessel for lymph or blood vessel derives from the word to describe a household tool for carrying
liquids, the usage dating at least as far back as the thirteenth century \((OED)\). In his 1621 *Anatomy of Melancholy* Robert Burton (1577–1640) described the "vegetal" aspect of the soul—the part that enables growth—as acting like a loadstone, a lamp, the flame of a torch, a pot boiling \(155-6\). Indeed, as the prevalence of complex machines grew throughout Europe and the understanding of their physical principles grew more complex, it is not surprising that the human body and mind were depicted more frequently in terms of the machines built to replace and augment human physical and mental processes.\(^6\) Seventeenth-century writers such as Burton and Thomas Hobbes in *Leviathan* would thus describe the unlearned mind as a *tabula rasa*, reflecting the older technology of writing that still informed their own metaphoric systems. Towards the end of the century John Locke would describe it as a sheet of blank paper. And the infamous materialist doctor Julien Offray de la Mettrie (1709–1751) in 1747 would declare in *L'homme machine* that "judgement, reason and memory are only parts of the soul which are in no way absolute but are veritable modifications of that sort of medullary screen on which the objects painted in the eye are projected as in a magic lantern" \(^7\) (La Mettrie 15). That is to say, whatever mechanism we might have for

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\(^6\) Otto Mayr, for example, has suggested in *Authority, Liberty, and Automatic Machinery in Early Modern Europe* that the material forms of technology might determine or at least shape our expressions of how the mind itself functions.

\(^7\) Harris’s *Lexicon Technicum* (1704) defines a *magick-lantern* as "a little Optick Machine; by the means of which are represented on a Wall, in the Dark, many Phantoms and terrible Apparitions. ...This Machine is composed of a Concave Speculum, reflecting the Light of a Candle, which passeth through the little Hole of a Tube, at whose End there is fasten’d another Glass: Between these two are successively placed many small Glasses, painted with different Figures ...so that all these Figures may be represented at large on the opposite Wall."
inscribing, remembering, and displaying our ideas will tend to contribute to a materialist explanation for how the mind works. Our own twentieth-century projections of our brains as complex computing devices are part of a centuries-old metaphoric tradition.

This study proceeds from the observation that despite all claims to the contrary, humans do not seem to be becoming more machine-like (we continue to be emotional, irrational, loving, hating, reproducing, and excreting organisms); but our definitions of both body and machine have become increasingly alike. The notion expressed in much of cyber-literature that we are losing our “natural” bodies, or being “absorbed” and changed by the machine physically or intellectually (figures I.1 and I.2) is as much a matter of language and the history of the metaphors for the human body as it is a physical reality. That is, it is our tropes and definitions of “natural” and “artificial” or “machine” and “human” that are blurring, perhaps in a more culturally invasive way than are our physical bodies with the machine.
Figure I.2. *The Matrix* (1999). The bodiless cyborg as enslaved mind: here the virtual entity Thomas Anderson, employee of the software development company Meta CorTechs—"one of the top software companies in the world because every single employee understands that they are part of a whole" (Wachowski 287; page 15 of the script)—waits in an interrogation room where he is about to be accused of independent thought ("computer crime") by agents Smith, Brown, and Jones (machine avatars posing as human beings within the artificial world of the computer Matrix).

The imagined figure of the cyborg has produced in our popular literature and critical theory both positive utopian versions of the future and, more prevalently in mass market fiction and film, anxious dystopian speculations upon the precariousness of free will, our future autonomy, and our future humanity. We know, however, that the brain and the computer chip function differently—that their processes are profoundly different, that the results of those processes are profoundly different. Computers calculate mathematical functions more accurately and quickly than do humans; the mind is infinitely more complex, capable, and adaptable than a machine's random access memory. Why, then, are we threatened and astounded when a machine somewhat anthropomorphically called by name (Deep Blue) is programmed to make a series of
calculations based upon the rules of the highly mathematical game of chess? We know that, while industrialised nations face significant environmental dilemmas due in part to the types of machines and chemicals used in large-scale production, we have also benefited from technology. Not only do prosthetic devices greatly enhance the quality of life for individuals whose bodies have, in various ways, ceased to function, but large numbers of the world’s population, even in developing countries, have benefited from applications of medical science and various forms of technology. Why is the increased presence of the machine, then—or the reach of the human body extended by the machine—such a portentous prospect? Why is the notion that the machine is intricately connected with a perceived change to human identity so prevalent in our literature, extending through fiction, film, critical theory, and cultural commentary? Obviously, our technology determines certain subtle expressions of our subjectivity, but have we actually lost—or are we about to lose—our humanity?

Certainly, from the time Norbert Wiener coined the word cybernetics in 1948 to describe the new scientific field examining control and communication in machines and

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This is not to say that concerns about environmental degradation occurring at a rate unsurpassed in human history, about mechanised production replacing human workers, or about our efficiently lethal military technology, are inappropriate. All of these circumstances are undoubtedly effected through the machine; but there is a surprising lack of acknowledgement in cyborg literature that humans, not machines, bear the responsibility; that the explosion of human population itself has had a devastating impact on the environment, on competition for resources, and on demand for raw materials, material production, and territory. The unimaginable number of human bodies (over six billion) that has resulted in the diminishment of territories and resources, as well as large numbers of willing human soldiers and concentration of populations into small areas vulnerable in wartime, are outcomes of “natural” human reproduction which is to blame as much as any “unnatural” technology for the world’s current social conditions.
living organisms, our literature has exhibited an “ontological nausea” (Dery) at the perceived loss of the “natural” body. One outcome of the fusion of technology and organism in biotechnology and nanotechnology is wide-ranging musing about how the boundaries between postmodern human subjects, their bodies, and the “real” or “natural” world are being radically reconfigured. Cultural analysts either deplore an increasing inhumanity—the inhuman in the guise of the human form—or celebrate and mythologise the “posthuman” as a utopian vision. Narratives in fiction, theory, and film repeatedly emphasise that boundaries between human and machine, inner self and exterior environment, the real and the virtual, are now more permeable in a postmodern, posthuman world.

Aspects of cyborg identity, however, arguably go back to the first use of prosthetic devices to enhance the human body’s appearance, ability to work, and means of communication. Albeit the cybernetic (steered) organism is more than mere body modification or prosthetics, just how “post” is the postmodern, posthuman cyborg? The discourse of cyberculture reiterates a Cartesian dualism of material being versus immaterial consciousness (intellect or soul) as well as the late seventeenth-century

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9 The difficulty in defining the term postmodern is indicative of its problematic use in cyber-theory. While “post” might imply a “a continuation of” it also implies “a break from” the modern. My suggestion that the cyborg as a literary figure represents the past rather than the future of humankind is qualified by acknowledging that some theorists argue for a vision of postmodernity that is not chronologically circumscribed but rather a social-spiritual category. The predominant treatment of the twentieth-century cyborg either as a sign of our advancing beyond “modern” narratives of progress or as an apocalyptic critique of the present or future outcome of such narratives would suggest a chronological framework. Even so, whether the modern and postmodern are contiguous world-views, the unasked question remains as to the connections between the cyborg and previous manifestations of the man-machine.
doctrine of the Oxford neuroanatomist Thomas Willis (1582–1666) that the soul is actually extended through the body’s nervous system (see chapter 3). Thus the thematic exploration of the body being made obsolete or redundant at the site of imagination known as cyberspace, the notion that bodily modification will actually have an influence on the soul, and the thematic exploration of the body being physically absorbed by union with mechanical components, are very much rewordings of the same old philosophical questions of mind and body. In either case the human subject as metaphorically disembodied or grotesquely reconfigured is seen to be responsible for creating a new, posthuman identity.

The posthuman identity, however, would appear to be as much a product of literary and cultural theory as it is of technology. Sherry Turkle, for example, writes in *Life on the Screen: Identity in the Age of the Internet* that:

More than twenty years after meeting the ideas of Lacan, Foucault, Deleuze, and Guattari, I am meeting them again in my new life on the screen. But this time, the Gallic abstractions are more concrete. In my computer-mediated worlds, the self is multiple, fluid, and constituted in interaction with machine connections; it is made and transformed by language; sexual congress is an exchange of signifiers; and understanding follows from navigation and tinkering rather than analysis. And in the machine-generated world of MUDs, I meet characters who put me in a new relationship with my own identity. (15)

The problem with such analyses of the posthuman identity is that they do not take into account the fact that any act of writing, narrating, re-creating the self through text has throughout history been a process of making fictionalised multiple and fluid selves; that
is, the "self" created online is a fictional character as much as any other written self.\(^\text{10}\)

Regardless of how quickly manipulable are networked electronic texts such as MUDs (multi-user dungeons/dimensions), the proliferation of fictional personae within a single consciousness through textual exchange is nothing particularly new. Why does the exchange of text through the networked machine make the creation of fictionalised self a significantly different experience than its creation through an exchange of letters? Certainly in MUDs sexual congress is an exchange of signifiers, but an alternative reading of this notion of the creation of self is that the text of the MUD is different from reading handwritten letters only insofar as the electronic text is published rapidly enough to represent a "real time" experience of communication. Does this create a multiple self? Or merely a fictional character that is published and perceived more quickly? Indeed, such multiplication of fictional personae is common to any communications tradition, whether oral, codex, or electronic. As soon as publishing became a widely used technology in the West, it became a form of defining identity—from Locke's investigations of individuality to epistolary novels such as Smollett's numerous "selves" in The Experiments of Humphry Clinker or Samuel Richardson's inhabiting the character of Pamela writing "to the moment." Any act of creative writing or storytelling has arguably always been a process of examining and creating new relationships within or amongst the author's own identity(ies), as well as with his or her readers. This issue seems not to be the relatively unquestioned assumption of multiple

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\(^{10}\) Greenblatt in his Renaissance Self-Fashioning, Goldberg in his Writing Matter, and Porter in his Rewriting the Self, among others, have suggested a longstanding connection between written text and the constitution of self throughout the history of publishing in western Europe.
identities, then, nor even of "fracturedness" but to some extent the rate of publication. The authored self is still mediated by text; so is the response of the reader—but it is the text only, the communication and not the self—that is constituted in interaction via machine connections. The self, arguably, is mediated only through the text, and that is not new to machine-mediated communications. I would argue thus that merely creating a multiplicity of characters through text is not specific to postmodernity as Turkle and others suggest; while many scholars from Innis on have tended to focus on the notion of human identity being shaped by the media of textual communications, I suggest instead that the significantly new form of "writing the self" in the twentieth century occurs when the text (program) physically modifies our cyborg body systems (not our fictional systems).

The focus that literary scholars place upon the text as opposed to the body as site of subjectivity and identity is worth noting here. Rather than exploring the cyborg as a living body, there is a tendency in cultural and literary studies to explore the cyborg as proof of or resistance to a mind/body dilemma that has significantly shaped a conversation in literature and philosophy ongoing since the seventeenth century (or since Plato/or since writing began to cement notions of what constitutes the human). Descartes’ "discovery" of the polarity of mind and body—the inner world of the subject separate from the world of the object—thus informs the literature of the cyborg, that creature which once and for all threatens the primacy of human thought, human expression in literature and art, and the tacit understanding that the products of the human mind are in a higher realm than the products of the human body. For Descartes, whose interpretation of the mind was a careful endorsement of the Church's view of
human will and action, all God's creation was gross res extensa with the exception of the human res cogit. Although he was condemned by the Church, Descartes' dualism was informed by and also attempted to legitimate both the Catholic faith in the age of the clockwork universe where atheism and scepticism were increasingly possible, and the new science which described the world as matter in motion governed by the laws of mechanics. The so-called mind-body problem continues to inform debates about the cultural meaning of the cyborg, long after McLuhan declared that we are essentially continuous with the electric technology by which our nervous system is "extended and exposed" (resulting in the "numbness" that characterises this "age of the unconscious and of apathy" [Understanding Media: The Extensions of Man, 47]). The image of mind or spirit extended through technology and dissociated from the body is taken up by de Kerckhove, for example, in Connected Intelligence: The Arrival of Web Society. "We are given little choice by electronic technologies," he remarks,

but to include in the intimate recesses of our sensory apparatus larger, more distant, more complex, and more diffuse realms of experience. Electricity blurs the boundaries between our inner and outer experiences by being at the same time in the body as nerve impulses, and out of it as the energy supporting our technological interactions. Simultaneously, as labor-saving devices and automated processes transmute so many of the hardware realities of life into software processes, those of us who remain unaware of our proprioceptive sensations become angel-like, minds without bodies... (39)

The notion of "extension" is a metaphor that comes into play in various ways depending upon the critical point of view in question. David Brande, for example,
writes in “The Business of Cyberpunk” that the cyborg is a “trope for the dissolution of the Cartesian subject” and thus is “symptomatic of consistent and isomorphic shifts in all areas of socio-symbolic activity, all the ‘modes of symbolization,’ in Jean-Joseph Goux’s terms—economic, subjective, philosophical” (510). For Macauley and Gordo-López, whose “From Cognitive Psychologies to Mythologies” appears in The Cyborg Handbook, however, the cyborg is an affirmation of the Cartesian subject:

Although [the Australian performance artist] Stelarc’s abandonment of the body can be seen as a individualistic act, it would be unfortunate to forget the historical textuality of his meta-physical suspensions. The Cartesian Family (grandfather Plato, Descartes and progeny: Cybernetics, Cognitive Sciences, Artificial Intelligence, Robotics and Cyberpunk tales) has been telling us best-selling stories for a long time: minds without bodies, mental skills rather than embodied and situated collective performances. ...the validity of the Family’s premises are verified. In other words, we are imprisoned in the cave of our body. Instead of replacement, the apparent abandonment of the body is akin to the technological refurnishing of the cave: “Suspended in computer space, the cyborg leaves the prison of the body and emerges in a world of digital sensation” (Heim, 1991: 64). (437)

Also citing Michael Heim’s suggestion in The Metaphysics of Virtual Reality that “at the computer interface, the spirit migrates from the body,” Catherine Waldby suggests somewhat inaccurately that “the impulse towards the supernatural which haunts the cybernatural is clearly locatable within the same Cartesian dualism which informs medicine’s ideas of life and death” (The Visible Human Project: Informatic Bodies and
Posthuman Medicine, 153). Claudia Springer, however, argues in Electronic Eros that
the idea of the cyborg is simultaneously a culmination of Descartes's separation
of reason from emotion and a supersession of that opposition. At the same
time that the cyborg represents the triumph of the intellect, it also signifies
obsolescence for human beings. ...the cyborg appears to rest on a dichotomy
between mind and body, but it actually supersedes the dichotomy and makes it
anachronistic in a new vision of fusion and symbiosis with electronic
technology. (19)

In his article "You are Cyborg" for Wired magazine on the cyberfeminist theory of
Donna Haraway, Hari Kunzru writes that "Ever since Descartes announced, 'I think,
therefore I am,' the Western world has had an unhealthy obsession with selfhood," and
suggests that "A cyborg perspective seems rather sensible, compared with the weirdness
of the doubting Cartesian world" (158).

It would seem that the Enlightenment period that initiated the separation of
both church and philosophy from medicine left non-medical/scientific discourse
perpetually recycling the artefact of Descartes' text on mind-body polarity, while the
practitioners of medicine and science (studying the body itself) increasingly depicted the
mind as co-extensive with the body (see chapter 3). Whatever political scaffolding the
"Cartesian subject" is used to uphold, the discourse of cyborgs is haunted by the literary
history that assumes that material (res extensa) is separate from mind (res cogito) and that
accordingly the arrival of cybernetic machines/humans not only changes how
subjectivity is defined but actually distorts what and who we are as embodied subjects
who are "extended" by the machine and therefore no longer "human."
The professional reader or writer of literature is biased towards interpreting events through textual contexts, however, and tends to devise a notion of identity based to a large extent upon literary figures and traditions while ignoring the complexities of embodied cyborg identity. With an almost blind faith in such aphorisms as Horkheimer and Adorno's "A technological rationale is the rationale of domination itself," there is a tendency in some of our current theory to blame science and technology for an escalation in "evil" in our postmodern society, without attention to the obvious fact that evil is traditionally defined in terms of bodily desires, and (to oversimplify matters drastically) the more bodies there are on earth the more potential evil there is to go around. Indeed, the huge human population itself has enabled and to some extent necessitated mass production of *and* by the machine. Adequate food, for example, is difficult to produce in concentrated populated areas; machine production is not feasible without labouring bodies to desire material goods, to design and run machine mechanisms, or to gather, buy, transform, and sell products. Making use of technology, even incorporating technology into our bodies, merely augments the ancient human activities of eating food and owning and exchanging artefacts, of moving from place to place, of communicating with others, of fighting and exploiting, of loving and nurturing.

The revised human body as cyborg, however, represents a theoretical intersection between technology and nature, nature and culture, "artificial" and "real."\(^{11}\)

\(^{11}\) The notion, however, that humans are somehow outside of nature—that human culture and human material construction is somehow artefact and less natural than, for example, the social interaction of termites and their creations of huge and intricate city-like architectures—is a very old and characteristically arrogant one placing human the human kingdom on a different hierarchical plane than the animal.
The ability to re-write nature, to give birth to new selves through physical augmentation or mental reconfiguration, while not unprecedented in human history, has played a significant role in triggering much theorising upon the role of technology, artifice, or simulation in cultural studies of the body.

The potentiality of the cyborg is not so much that the machine will replace humans but that humans can replace human creative thought/mind/spirit through processes of technological conception. I argue, finally, that the one aspect that has continued to indicate what “humanity” is through many centuries of fluctuating notions of human identity has been the creative or rational or moral expression of our intelligence: when the human body-mind metaphorically becomes indistinguishable from the material machine as communications system, not only our humanity, but our Humanities are threatened. This work, then, is to some extent an expression against the particular form of academic posture (whether conservative, such as that of Baudrillard, Kroker, and Birkerts, or feminist such as that of Haraway) which is typified by panic, pessimism, despair, and/or disapproval of the science and technology that have demolished traditional forms of authority over the body and mind (i.e. the realms of religion and humanist education increasingly challenged by medical-scientific discoveries about the human consciousness).

To summarise, the frequent claim that our technology affects human morals, the nature of humanity, or the indefinable and immaterial soul itself to create an irrevocable evolution to “postmodern” or “posthuman” cyborg consciousness is a claim that disregards the history of the cyborg. The supposed cyborg consciousness is presented across a wide range of discourse, from literary and cultural studies to popular film and
fiction, in terms of conventional literary and religious narratives. Marshall McLuhan was instrumental in formulating a theory of technology that supposes drastic revisions to human consciousness and spirit in the shift from a print-based to electric-based communications medium, but the literature of cyborgs reflects a longstanding literary tradition dealing with very old and still compelling questions about human nature, human spirit, and human bodies. I argue that we have not evolved biologically and that what has changed far more drastically than human embodiment or human consciousness is the language used to describe both humans and machines. The literature of cyborgs reflects and reiterates a very old religious debate about body and soul that was as much a part of Enlightenment controversy over the meaning of the man-machine as it is a part of the Postmodernist controversy over the meaning of the cyborg; and in fact there are demonstrable literary connections between the materialist representations of the workings of body and mind and present-day notions of cyborg disembodiment.

The interplay between questions of human and machine, body and text, and natural and real, and the arts and the sciences, are explored in the next three chapters as follows:

Chapter 1. The Literary Cyborg: Constructions of Posthuman Identities

The defining characteristic of the contemporary cyborg is not that we see our selves as machines but that we see our selves as being as manipulable and “manufacturable” as our machines. We replace our material parts with organic or inorganic materials; we re-write our own cellular code or “genetic blueprints”; we
modify our "selves"—our moods and passions—by inserting different chemical
compounds into our bodies. Thus cyberpunk and cyborg literature almost invariably
includes a predominance of bodily and genetic modification, as well as a preponderance
of mood-altering drugs both legal and illegal. The body is characterised by such diverse
authors as Marshall McLuhan, Jean Baudrillard, Arthur Kroker, and William Gibson as
obsolete, even actually disappearing, as a result of technology and thus the questions
raised are inevitably concerned with the nature of humanity and the reproduction (or
production) of the human body and spirit.

Haraway's myth notwithstanding, in the popular imagination, the cyborg is
frequently represented as a cold and emotionally unresponsive version of humanity:
what was once human is almost obscured by an elaborate exoskeleton of high-tech
plastics and steel (see Robocop, figure I.1). Or if the machine component is metaphoric
cyberspace, the once-human face of the cyborg may be depicted as distant,
"mechanical," unmoving, emotionless. Whether the cyborg is protagonist or antagonist,
however, a general trend in this genre is the conflict ultimately between that indomitable
spark of individual human spirit—irrational, intelligent, creative, emotional, and
complex—and the unresponsive, unfeeling, soulless, debilitating, and amoral machine
that lacks autonomy as much as it does emotion.

The question of what will happen to attributes of the soul—free will, morals,
ethics, emotions, creative intelligence, our very humanity—if our "natural" bodies
become redundant runs throughout cyberpunk and cyborg fiction. It permeates the
genre, from forerunners such as Aldous Huxley's 1932 Brave New World and Philip K.
Dick's 1968 Do Androids Dream of Electric Sheep? to the various works of William Gibson.
It is dominant in pop-cult media such as the quintessential cyberpunk films *Blade Runner* (1982) and *Johnny Mnemonic* (1996), or any of the numerous *Star Trek* films and television shows featuring the monolithic machine species known as Borg. The question of how the soul fares in the technologically engineered human is also prevalent in more recent films such as *Virus* (1999), or *The Matrix* (1999). This chapter argues that both theoretical and literary depictions of the obsolescence or disappearance of the human body, however, are ultimately framed not by technology but by literary tradition, and as such tend to disregard actual human embodiment while favouring abstract notions of the soul, morality, or human spirit.

**Chapter 2. The Electronic Page and the Archived Body: Text, Machine, and Human Spirit**

An increasingly specific understanding of human bodies (and nature) also means an increasingly specific understanding of how to build machines to mimic the processes of human bodies. The human and the machine are both natural systems. Accordingly, the language used to describe both is increasingly similar: at the level of levers and hinges and toothed gears, only some of the mechanisms bear direct similarity to human bodies; at the level of carbon dioxide, electronic "charge," or binary systems, the mechanisms and the language to describe those mechanisms are precisely the same. To some degree, the specificity of language we can now use to identify bodily structures is what makes us cyborgs. The codes for the human body in scientific discourse have evolved over several hundred years from metaphor and simile (the nerves are like a river; the heart is like a pump; the body is like a machine) to alphanumeric symbol
(precise measurement of constituents of blood; or cellular DNA, which has become text, A, G, C, and T, the architecture of which is determined mathematically). The human body has been increasingly encoded as text, as copyrightable material (for example, US Patent No. 5,397,696 on a cell line from a Hagahai person from Papua, New Guinea), and as technological discovery.

Two archives of the human body in the National Library of Medicine's electronic holdings (the Human Genome Project and the Visible Human Project) attest to the continuity of metaphors of the human body as The Book of Nature. However, the fact that the body is seen increasingly as a product of human technology rather than the Book of God feeds the hyperbole of such critics as Kroker and Weinstein, who claim that “the virtual class possesses a new body type modelled on the requirements of life in the age of the post-human” (*Data Trash*, 109). Their claim that the body has become a “passive archive to be processed, entertained, and stockpiled” (“Global Algorithm 1.4,” n.p.) reiterates a prevalent anxiety over the perceived loss of the human soul—along with the loss of the natural body itself—resulting from the convergence of the signs for human body and machine in the electronic environment of the computer. Metaphors of the human body as computer text/archive/code (abstractions several removes from the “truth”) drive theoretical and literary metaphors of actual, physical disembodiment in cultural critique such as that of Kroker and Weinstein, Birkerts, and Baudrillard, and cyberpunk fiction such as Gibson’s cyberspace trilogy. Again, the representation of disembodiment is not so much “postmodern” as it is part of an ongoing debate about truth, morality, and spirituality.
Chapter 3. Loco-Motive Powers and Spasmodic Affections: The Enlightenment Cyborg

"It is no accident that the modern has become postmodern as human changes to cyborg," write Gray, Figueroa-Sarriera, and Mentor in their introduction to The Cyborg Handbook (7). Claudia Springer writes, "At the same time that the cyborg represents the triumph of the intellect, it also signifies obsolescence and the dawn of a posthuman, post-Enlightenment age" (19). Similarly, Sven Birkerts writes that

given the transformations that have been wreaked upon society by electronic media, among other things, the novelist has found it all but impossible to render inwardness coherently. We are fractured and fragmented, dissolved and distracted. The term 'sensibility,' standing for a coherent inwardness, had slipped from usage. . . .[W]e also measure our distance from humanism, that once-grand growth that had its roots in the Renaissance, that took man as the measure of all things, and the looked forward to the marriage of reason and spirit. (Gutenber Elegies, 180–1)

This chapter demonstrates that theory of the cyborg does not demonstrate "post-Enlightenment" consciousness, but that current humanistic notions of sensibility, reason, and the soul in the human-machine are a perpetuation rather than a rejection of Enlightenment medical definitions of the human body and soul.

Through the influence of earlier philosophers, notably Descartes (1596–1650) and Hobbes (1588–1679), the burgeoning sciences of the human body throughout the Enlightenment contributed to, perhaps even gave birth to, a specific rhetoric of selfhood and embodiment that shapes current discourse, both medical and fictional, of
the “technologised” human being. The questions I am asking, of the stance we self-
consciously have labelled postmodern in explicit distinction from the modern, can
perhaps be best explored by examining the literature by early modern writers. This
period encompasses the birth of the machine as an industrial-cultural force of
tremendous influence in western society. In medical science the period oversaw the
revision and the cementing of a particular form of medical and eventually overriding
cultural definition of the human body (mechanically not spiritually motivated;
numerically definable; and eventually writeable, revisable). The period witnessed at the
cusp of the Industrial Revolution the first dangerous statement by La Mettrie in *L’homme
machine* (1747) that man—*both* in terms of his body and his soul/will/imagination—is a
mechanical being and therefore to a certain extent lacks free will. All these elements
contribute to my decision to excavate the pervasive metaphor of human-machine in the
period known as the Enlightenment.

While they nod to Descartes, current analyses of the cyborg subject largely
neglect the important historical evidence for the representation of and resistance to the
conception of human body and mind as mechanical entities. Obviously, current
representations of the human-machine are contingent upon particular forms of
advanced technology. However, I suggest that the thematic concerns underlying and
bolstering the figure of the cyborg in literature and theory are not particular to the
postmodern identity. Rather, inherent in the cyborg (both the figurative and “real”
merging of human body and technological device) are elements of the early modern
which suggest that, rather than characterising a break with the past, the cyborg as a
metaphorical sign of humanity’s future in fact represents many of the same hopes and
fears for our fate that were expressed centuries ago regarding the view of human as machine.

I locate the introductory discussion in the Enlightenment defining of body systems, including the early versions in the philosophy of René Descartes and the nascent neuroanatomy of Thomas Willis in the late seventeenth century, as well as La Mettrie's later *L'homme machine*—the first declaration that both human body and mind (soul) function mechanically. The response to these depictions of the human machine in the literature of the age—in the works of Swift, Arbuthnot, and Sterne, among others—anticipates the themes that will recur throughout later literature dealing with the human-machine interface (simply stated, materialism threatens the soul). This section will point out the obvious historical differences of the human-machine and cyborg metaphors, as well as expose instances of cultural continuity made apparent by these works.
Chapter 1
The Literary Cyborg: Constructions of Posthuman Identities

1.1 Of Shit and the Soul; or The Cyborg and the Obsolescence of Bodies

In September 1960 the journal *Astronautics* published “Cyborgs and Space” by Manfred E. Clynes and Nathan S. Kline, wherein the authors speculated upon what they called a “cyborg” or cybernetic organism, a self-regulating human-machine system that employed various homeostatic mechanisms to enable a human being to exist in outer space. It was, not surprisingly, an article very much concerned with the body’s material intake and excretion: regulation of body temperature, “human ‘fuel’ consumption,” cardiovascular control, pressure, and perceptual problems were all briefly considered as some of the “psycho-physiological problems” of the cyborg in outer space. Fluid could be balanced, they suggested for example, by a shunt from the ureters to the venous circulation, while “sterilization of the gastrointestinal tract, plus intravenous or direct intragastric feeding, could reduce fecal elimination to a minimum, and even this might be reutilized” (32). While the article dealt primarily with the material, grossly physical problems of body machinery, “Cyborgs and Space” was also rather carefully concerned with suggesting that the human spirit would be enhanced and elevated by such
reconstruction of human embodiment. The purpose of the cyborg, the authors explained, is to “provide an organizational system in which such robot-like problems are taken care of automatically and unconsciously, leaving man free to explore, to create, to think, and to feel” (31). The solution to these “technological problems” of overcoming the limitations of the human body, they concluded, “will not only mark a significant step forward in man’s scientific progress, but may well provide a new and larger dimension for man’s spirit as well” (33). Admittedly a reductio ad absurdum, one might nevertheless follow this argument to conclude that the elevation of human spirit thus depends on ridding the subject of its most mundane physical needs to breathe, eat, sweat, evacuate. Stop shitting and you will be one step closer to spiritual enlightenment (or heaven).

I begin with this rather unsavoury comment as a means of highlighting what might be the single predominant theme of cyborg literature: what Clynes and Kline echoed, either consciously or unconsciously, was a theme of spiritual transcendence of the body that has been part of our literary tradition for centuries. Whether in fiction or theory, cyborg discourse is almost invariably embedded in a pseudo-religious construct of immaterial human spirit (as soul, spirit, “humanity,” morality) versus the living materialistic body with all its messy corporeality and base desires. In this regard, the human body has become a contested space in which the figure of the cyborg has played an important role by representing an “artificial” embodiment (or disembodiment) which signifies an evolution of spiritual being increasingly at odds with “natural” embodiment.

Twenty years after “Cyborgs and Space,” Jean Baudrillard wrote of the obsolescence of the natural body and of real geographical space, claiming in “The
Ecstasy of Communication” (1983) that technology had resulted in a “satellization of the real,” in which “each person sees himself at the controls of a hypothetical machine. ...Which is to say, in the exact position of an astronaut in his capsule” (128).

“Electronic ‘encephalization’ and miniaturization of circuits and energy,” he wrote, “this transistorization of the environment, relegates to total uselessness, desuetude and almost obscenity all that used to fill the scene of our lives.” Commenting that it is “well known” that television distorts the real so that the survival of actual human relations becomes questionable, he concludes that “as soon as behavior is crystallized on certain screens and operational terminals, what’s left appears only as a large useless body, deserted and condemned. The real itself appears as a large and useless body” (129).

Indeed, the functions of the body, once signified by “hot, sexual obscenity of former times. ...organic, visceral, carnal promiscuity” he wrote, had been replaced by the “cold and communicational, contactual and motivational obscenity of today” (131). This metaphor of bodily desuetude and obsolescence directly resulting in a form of mental illness (characterised as schizophrenia or multiple identity) has remained a predominant conceptual theme in the discourse of cyborgs. McLuhan’s claim in 1962 that “Schizophrenia may be a necessary consequence of literacy” (Gutenberg Galaxy, 22) is reiterated, for example, by Scott Bukatman’s identification of terminal identity as “an unmistakable doubled articulation in which we find both the end of the subject and a new subjectivity constructed at the computer station or television screen” (9). Bukatman argues that “A new subject has emerged: one constituted by electronic technologies, but also by the machinery of the text” (22). However, such claims obliter ate the significant role of the sensing and feeling body itself in the process of forming individual human
subjectivity, and favour almost exclusively the expression of thought (images, text) as both formative influence on and qualitative proof of our problematic posthuman identities.

Despite the fact that we have not escaped, and quite possibly never will escape, the confines and the most basic needs of our embodiment; despite the tremendous influence of physical touching upon the development of human identity from birth; despite the fact that all the machines in the world and in our bodies have not altered basic human instincts to copulate, eat, sleep, or scratch, or basic human emotions of greed, desire, rage, jealousy, or love; despite the fact that all our medical technology can not completely eradicate physical pain, the literature of the cyborg tends overwhelmingly to proclaim that the human spirit is at the brink of either enrichment or destruction (depending on the author’s political stance and funding sources) due to technology and the body’s resulting “obsolescence.” The supposed obsolescence or erasure of the body described in recent literature and theory has been a process—simple enough in a written version of embodiment—of deleting the matter of the body. As a metaphor (or as data) the cyborg body which represents for so many writers and critics some fundamental change to human spirit never has to acknowledge the physical reality of bodily excretion. Every living cyborg occasionally has to excuse himself from the computer interface now and then in order to address the typical needs of the lived body. Cyborgs are embodied creatures: the cyborg by definition is an organism—a body—modified through means incorporating human-designed feedback devices. Throughout this chapter I ask the following question: why is current literature suffused with the image of the “disembodiment” (which we must acknowledge as a wholly metaphorical abstraction of real bodies) of human as cyborg, and why is this supposed

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disembodiment such a powerful metaphor for a spiritual shift, characterised either by a suprahuman angelic existence (de Kerckhove 39; see also Sterling and Gibson, discussed below) or more frequently by inhumanity, a loss of sensitivity, a dystopian existence in a “mechanical” civilisation largely devoid of human emotion? Whether the subjectivity or identity of the “posthuman” cyborg is depicted in positive or negative terms, the overwhelmingly unquestioned assumption remains that the human spirit struggling to come to terms with its “postmodern condition” has been extensively modified by technological extensions of the human body and brain.

Body modification, of course, is not a new practice in human culture; but the incorporation of feedback mechanisms, structures that mimic or “communicate” with the processes of the brain and nervous system, is a relatively new cultural development. Prosthetics, extreme body modifications, surgery, tattoos, piercings, and other body art have been part of human tradition for centuries. Similar processes, now assisted by computer-aided medical technology in the works of body artists such as Stelarc or Orlan, are seen as unique signifiers of our “evolution” to a posthuman species. The tendency to suggest that technology has changed human subjectivity is ultimately informed by a very old notion about what gives us our “humanity”: the sophisticated technology that mimics, augments, or replaces the processes of our nervous system—the mechanisms for human will (and thus morality) as well as motion and sensibility—cuts close to our notions of what makes humans unique in the natural world. In part, the anxiety (or cautious elation) over our metaphorical disembodiment has much to do with the notion that our minds, as distinct from our bodies, are also now capable of incorporating prosthetics, of being duplicated or artificially enhanced—are, in short, no
longer a sacrosanct indication of our status as a human species above all other species.

The common literary assumption that cyborg modifications of the body and brain have altered human nature itself, however, is a view of human-as-machine that is informed by and biased toward our western (Christian) literary tradition—as opposed to actual embodiment—and is rooted in a long-standing religious debate over the position and status of the human soul within the body.¹

In effect the cyborg of literature, divested of a material body, becomes a sign of the machine’s supposed debilitating/refining effect on the ethereal human “soul.”

Marshall McLuhan, the philosopher of mass media whose potent aphorisms helped initiate the creation of media analysis, recognised very early a relationship between communications technology and the perilous ecstasy of human spirit moving out of the body. While his earlier works embraced the “global village,” of electronic media, he also predicted the body’s obsolescence as a form of injury of which he seemed more critical. “The violence that all electric media inflict on their users,” he wrote in a short article entitled “Violence of the Media” in The Canadian Forum in 1976, “is that they are instantly invaded and deprived of their physical bodies and are merged in a network of

¹ The common assumption that we have “evolved” into a posthuman species is an oversimplification of species evolution: physical changes such as the introduction of working parts into the body, prosthetics, or vaccines, do not change genetic structure; even genetic modification of a few individuals—or a few thousand individuals—would have little effect upon the genome of a human population numbered at over six billion. As Katherine Hayles has commented, “literary studies share...a major blind spot when it comes to the significance of embodiment. This blind spot is most evident, perhaps, when literary and cultural critics confront the fields of evolutionary biology. From an evolutionary biologist’s point of view, modern humans, for all their technological prowess, represent an eye blink in the history of life, a species far too recent to have significant evolutionary impact on human biological behaviors and structures” (How We Became Posthuman, 284).
extensions of their own nervous systems." Furthermore:

As if there were not sufficient violence or invasions of individual rights, the elimination of the physical bodies of the electric media users also deprives them of the means of relating to the programmed experience of their private individual selves, even as instant involvement suppresses private identity.

The loss of individual and personal meaning via the electronic media insures a corresponding and reciprocal violence from those so deprived of their identities; for violence whether spiritual or physical, is a quest for identity and the meaningful. The less identity, the more violence. (9)

The function of television content, he concludes, is so the TV "can perform its work of obliterating all individuality and all privacy" (12). That both individual identity and physical bodies are "eliminated" due to electric media was a belief that would come to dominate literary studies of technology.

McLuhan had written a little less drastically in the earlier and highly influential *Gutenberg Galaxy* in 1962 that technology altered human physical senses and mental processes: "If a technology is introduced either from within or from without a culture," he wrote, "and if it gives new stress or ascendancy to one or another of our senses, the ratio among all of our senses is altered. We no longer feel the same, nor do our eyes and ears and other senses remain the same" (24). "Does the interiorization of media such as letters," he wondered, "alter the ratio among our senses and change mental processes?"

Of course, the questions McLuhan was asking were important ones since, as Harold Innis had already demonstrated, changes in the material technology of communications have affected the social, cultural, and conceptual conditions of societies throughout
history. But to suggest that technology changes mental processes—alters an individual’s identity in a physiological way—as much as it alters cultural literatures, trends, norms, and biases, is a highly problematic claim. I would suggest that in the conversation about the human-machine interface, the prevalent bias of humanist scholars in privileging the human spirit or mind (or soul) and its creative representations of the world has resulted in a tradition biased against the body’s own authority.

When McLuhan suggested that the ear was the predominant sensory apparatus of oral cultures and the eye the predominant sensory apparatus of literate ones, he was privileging the perceiving of literature, as if the importance of three-dimensional vision in such physically labourious activities as hunting (that is, feeding the body rather than nurturing the spirit) were irrelevant. “Far from being the normal mode of human vision,” wrote McLuhan, “three-dimensional perspective is a conventionally acquired mode of seeing, as much acquired as is the means of recognizing the letters of the alphabet, or following chronological narrative” (16). He concludes, “It is the sense of sight in deliberate isolation from the other senses that confers on man the illusion of the third dimension” (16). Certainly it is accepted that the interpretation of retinal images by

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2 It has been demonstrated that different sensory processes use different parts of the brain; but as to whether using the eye more than the ear permanently alters ratios of sensory experience, as opposed to mere fluctuations in active and non-active areas of the brain, is another question that McLuhan does not address (or, for that matter, whether we did indeed use the eye more than the ear in the literate, print-oriented culture prior to radio and television).

3 In the tradition of literary studies, “I saw...” does not carry as much weight as “McLuhan wrote...” Indeed, tradition is to obliterate the relevance of the sensory experience of the “I” in favour of the citation of authorities in an unconvincing semblance of objectivity.
the brain into three-dimensional perception is a learned skill; but like most predatory animals who need binocular vision and depth perception in order to feed themselves, human eyes are located on the front of the face: the ability to view the world as threedimensional space is due to an evolutionary physical adaptation that occurred long before man was literate, or even "human."¹ Mistaking the intellectual expression of what space is for the actual physical perception of it, McLuhan scoffs:

Today, when the role of phonetic literacy in the creating of the techniques of enunciation of propositions ('formal logic') is well known, it is still supposed, even by some anthropologists, that Euclidean space and three-dimensional visual perception is a universal datum of mankind. (25)

The crucial point of this anecdote in terms of cyborg "disembodiment" is McLuhan's collapsing of the expression of perception and bodily physical perception itself, which lends later writers credence for suggesting that the representation of three-dimensional space in the computer environment is equivalent to the actual virtualisation of the human body itself.

Much of McLuhan's analysis of the effects of technology on human consciousness revolves around such generalisations as "'primitive' drawing is two-dimensional, whereas the drawing and painting of literate man tends towards perspective" (43): he offers by way of proof the "three-dimensional" viewpoint of King

¹ Evolutionary anthropologists speculate that the emergence of the prosimian primate was marked by the eyes moving close together on the front of the face, providing the overlapping fields of vision that result in stereoscopic vision. This development, prior to the development of language, is considered important for both predatory behaviour and for the accurate depth perception required by tree-dwelling primates. (See, for example, Boyd and Silk on human evolution).
Lear and the absence of “Euclidean space and three-dimensional visual perception” in “native art.” McLuhan argues that “Civilization gives the barbarian or tribal man an eye for an ear and is now at odds with the electronic world” (25–6), which is true insofar as our culture tends to value visual information over aural (see for example Steven Shapin’s Social History of Truth)—but it seems to me an oddly unfounded assumption to mistake creative artistic or intellectual representation for physical perception.

McLuhan’s influence upon the discourse of cyborg is profound, but nevertheless the validity of his claims was flawed by uncritical research shaded with a distinctly biased notion of both bodily perception versus creative representation (mind versus body again), and of the illiterate “savage” versus the literate “civilised” postlapsarian man slowly evolving toward a new version of Edenic tribalism. In order to demonstrate that “Literacy affects the physiology as well as the psychic life of the African” (33), for example, McLuhan quotes J.C. Carothers quoting an article from the Kenya newspaper the East African Standard, “How Civilization Has Affected the African.” The author of the article, identified only as “a missionary doctor,” argues that the “high qualities of the African untouched by missions or education” (for which he pays the “penalty” of being “incapable of filling any skilled post”) are distorted when he is educated “(using this term for even the comparatively low standard achieved by the average African schoolboy).” This “different mentality,” the missionary writes,

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5 McLuhan uses the term civilization “technically to mean detribalized man for whom the visual values have priority [over the aural] in the organization of thought and action.”

6 See also Goldberg’s critique of Ong and Goody in his Writing Matter, which deals with the idea of “noble savage” in discussions of literacy.
may show itself in a shirking of work, trouble over food or in a desire to have his wife living with him however difficult for the employer. The reasons are clear; the African’s whole capacity for interest, pleasure and pain are immensely increased through even a little education. ... The new generation...[deserves] a more sympathetic knowledge of their difficulties and their far greater temptations. African parents need to be taught this before it is too late so that they may realize that they are dealing with finer bits of mechanism than they themselves were. (33–4)

This is an astonishing piece of writing, presented uncritically by McLuhan, which encapsulates a variety of themes important to the study of cyborgs: the assumption that (Christian) education and literacy makes a person more “sensitive” (a greater capacity for interest, pleasure, and pain)?; the supposed effect of technology on morality (that is, bodily versus “higher” desires); the always-present bodies labouring manually on behalf of the dominant (more highly technologised or literate) culture; and the notion of human mind as “mechanism” of varying degrees of refinement. To reiterate, the notion that sensory perception and physiology actually change due to literacy—that the educated man or woman feels more but is also therefore tempted more—reveals a bias toward a Christian myth of the “Tree of Knowledge,” which both elevates humankind to a higher mental-spiritual state and inclines them toward bodily evil. This is the same myth that tells us that as sophisticated, technologically literate cyborgs, we carry the

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? What we term “sensitivity” today is heavily influenced by Enlightenment “sensibility” which itself was partially a reaction against the medical depiction of the human body-mind as machine (see chapter two for the relationship of sensibility to cyborg; see Vila for a more complete examination of eighteenth-century sensibility).
spiritual destruction of humanity ever nearer—unless we can inscribe Christian morals into the mechanism at the same time (usually through a “white” hero figure). More frequently in literature than in theory, as in Gibson, Sterling, or any of a number of cyborg films, the near destruction of humankind is prevented just in time, with a resulting revolution to a higher plane of existence for mankind. Or, in the case of Haraway’s myth, the hero saviour is the (white?) woman of privilege and wealth—it is the cyborg woman without gender (that is, masculinised through rejecting motherhood) who can save humanity from the brink of too much tech-knowledge.

Cyborg literature is characterised by the denial of embodiment, portrayed as either a good or an evil depending on the writer’s stance with regard to present hierarchies of control over labouring bodies (in the quotation above, the labouring bodies betray their presumably white, literate employers through the desire not to overtax their bodies to accomplish the employers’ ends; the desire for food; the desire for the presence of a sexual partner). Simultaneously, in much of cyborg literature dealing with the escape of spirit from body through technology, there is a disregard for the manually labouring bodies necessary to produce the environment for developing the “written” (programmed) spirit. (In general cyborg literature is more critical of labour issues than McLuhan seems to be, but almost exclusively it concerns itself with labouring minds of the “Information Age” and not the labouring bodies still necessary to produce the hardware, build the circuitry, lay the cables, or maintain the networks;)

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8 See for example Johnny Mnemonic, the hero of which is a data courier who has erased his own memory in order to upload, transport, and deliver large quantities of corporate data. Cyborg literature characteristically explores the terrifying prospect of the control of minds by corporations (rather than by church or democratic rule)—but it tends to
cyborg literature is generally in keeping with the body-mind/spirit questions of
the Christian mythos which influenced McLuhan's work and privileges
intellectual work/writing over physical work). Finally, to a great extent, the
continued notion that morals are compromised by technology's presence is a
version of the Edenic myth wherein the "natural" state of God's paradise,
represented by the still untainted "Noble Savage," is threatened by eating the
fruit of knowledge. These thematic nodes are all prevalent in the more recent
literature of cyborgs, which as we will see in later sections of this chapter,
presents the denial or diminishment of "natural" embodied desires in favour of
"virtuality" (which might be seen as spiritual rebirth or spiritual death)—the
escape of the spirit from the body through the increasingly refined "mechanism"
of human understanding (the material environment of which is mass produced by
embodied creatures at the margin of the narrative), and the dark dystopian world
of too much knowledge.

The Noble Savage metaphor informs in subtle ways the metaphor of the
cyborg: the notion of a once-pure culture of face-to-face orality being
irretrievably lost due to the corruption of writing is a pervasive one in the
writings of early theorists of literacy such as Walter Ong. It obviously informs

privilege the intellectual worker as hero instead of the manual labourer. The supposed
move from industrial to postindustrial labour ignores the fact that we still need people
to dig holes and trenches for our communications systems, to build roads, to raise
cattle, poultry, vegetables, and grains to feed the bodies of the intellectual workers. The
assumption is one of the highly privileged academic and media intelligentsia, who rely
on bodily labour of others to arrive at their work of researching, writing, and preaching
their texts each day.

9 See, for example, Goldberg 15–21 for a brief discussion of this history in the works of

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McLuhan's *Gutenberg Galaxy* which uses this anecdote as part of the "proof" of the changes to the pure "Savage," both morally and physiologically, due to the introduction of writing to human culture. The cyborg as programmed body and communications device, then, represents for many writers the outcome of a literacy out of control, the Word wrested from a divine plan for human good whether Christian or feminist by the supposedly amoral purposes of the coding and programming of science and technology.

By the 1980s, cyborgs had formed the basis of the new science fiction genre of cyberpunk, wherein the dominant theme centred upon technological modifications of both body and spirit: as described by Bruce Sterling in his introduction to *Mirrorshades: The Cyberpunk Anthology*. The genre is characterised, he explains, by both

body invasion: prosthetic limbs, implanted circuitry, cosmetic surgery,

genetic alteration...[and the] more powerful theme of mind invasion:

brain-computer interfaces, artificial intelligence, neurochemistry—

techniques radically redefining the nature of humanity, the nature of the self. (xi)

In William Gibson’s 1984 novel *Neuromancer*, for example, the first book of the trilogy which made the term *cyberspace* common currency, the data cowboys who make their living as avatars in computer networks display a "relaxed contempt of the flesh." The body is merely "meat" and much of the narrative action

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Ong and Jack Goody.
accordingly takes place in cyberspace, where the characters’ virtual bodies work and interact. At the novel’s outset, the main character Case (read the exterior shell of a computer, which might contain hardware and software—or might be utterly empty), who’d once “lived for the bodiless exultation of cyberspace,” has fallen despairingly into the “prison of his own flesh” after his nervous system is deliberately damaged by mycotoxins administered by previous employers. Gibson depicts a futuristic, technologically advanced and dystopian society where multinational corporations own, manipulate, monitor, and sometimes in retribution destroy the bodies and minds of their workers. Any semblance of democratic freedom has been erased in a society comprised of an unfeeling and murderous corporate hierarchy, where previously existing patterns of familial or social obligations have been obliterated by faceless corporate authority, materialism, hedonism, and greed. The hive-like multinationals, themselves cyborgs composed of the networked minds and bodies of their workers, function through the willing sacrifice of employees’ individual autonomy:

Power, in Case’s world, meant corporate power. The zaibatsus, the multinationals that shaped the course of human history, had transcended old barriers. Viewed as organisms, they had attained a kind of immortality. You couldn’t kill a zaibatsu by assassinating a dozen key executives; there were others waiting to step up the ladder, assume the vacated position, access the vast banks of corporate memory. (203)

Networked communications technology, uniting the minds and the memories of labouring bodies, in such futuristic visions has built a vast society of evil and corruption
where social relations in the "real" world are characterised by wary combat, suspicion, and unstable personal relationships. There is an ambivalence in Gibson's work concerning the nature of "meat" body versus pure mind, but there is no mistaking the potential corruption of technology melded with human that is depicted in this series. The corrupting influence of knowledge/technology is perhaps more obvious in Gibson's later screenplay for the film *Johnny Mnemonic* where too much information can result in death, through either the plague-like Nerve Attenuation Syndrome or, in Johnny's case, too much data physically stored within the brain.

A related example of the conjectured damage wrought by human consciousness interfaced with the machine is Captain Jean Luc Picard's assimilation by the alien humanoid machine-species known as Borg in the 1991 season finale of the television series *Star Trek: The Next Generation* (figure 1.1). When Picard claims that human conviction in "freedom and self determination" means they would rather die than be
absorbed by the Borg, the collective and multi-voiced reply by the amalgamated consciousness of worker droids is: "Freedom is irrelevant. Self determination is irrelevant. ...Death is irrelevant." The effacement of Picard's individuality and independence is signified by the partial obliteration of his facial features, implying that while technology guided by the intelligence and nobility of the Star Fleet crew is an enormously powerful force for the "good," the spectre of networked machine consciousness actually melding with that of the human represents a tremendous risk for spiritual degeneration and bodily obsolescence. Here again, the individual bodies make up mere component parts of the societal body of the Borg. The modifications to individual bodies, especially the head and face, underscore the horrifying aspect of the loss of personal identity: in this scenario "resistance is futile" against the numbing spread of universal consciousness in the networked minds of a corporate society.

Academic studies of the cyborg have reflected the literary trend to postulate a disembodied existence through technology: in 1991 Donna Haraway appropriated the image of the cyborg as an emblem for her "ironic political myth faithful to feminism, socialism, and materialism" ("Cyborg Manifesto," 149), and since that time the cyborg has held an increasingly important position in literary and cultural theory. In Haraway's myth, in which we are all cyborgs, technology creates "our" ontology and gives us "our" politics (149). ¹⁰ She concludes that cyborgs, which have to do with "regeneration" rather

¹⁰ In the following pages I question elements of Haraway's political myth—not because I ultimately disagree with the need to resist the dispassionate inflexibility of rationalised capitalism that can guide corporate, government, and militaristic power structures—but because any utopian myth founded upon generalisations of gendered beings, of history, and of human embodiment, is as potentially dangerous as any other.
than reproduction, are "suspicious of the reproductive matrix and of most birthing."
Adopting her own moral stance as an alternative to "the moral majority within" (149),
Haraway suggests that the cyborg might signify a better future: "We have all been
injured, profoundly," she writes. "We require regeneration, not rebirth, and the
possibilities for our reconstitution include the utopian dream of the hope for a
monstrous world without gender." Here again is an example of a conceptual
disembodiment in our theory which has nothing to do with real bodies, where gender
identity is at least in part an outcome of biological embodiment, and where the majority
of cyborg and "natural" bodies are continuing to reproduce through old-fashioned
male-female sex. While Haraway celebrates the potential of woman's escape from an
embodiment destined for carrying offspring in the womb, at the opposite extreme Jean
Baudrillard laments the end of an idealised society composed of family units of mother,
father, and child. He depicts a society teetering at the very brink of disaster while
individual body-identities disappear. Exploring the notion of the "cybernetic prosthesis"
in terms of cloning an organism from a single strand of DNA, he writes that

when prostheses are introduced at a deeper level, when they are so completely
internalized that they infiltrate the anonymous and the micro molecular core of
the body, when they impose themselves upon the body itself as the body's
"original" model, burning out all subsequent symbolic circuits in such a way
that every body is now nothing but an invariant reproduction of the prosthesis:
this point means the end of the body, the end of its history, the end of its
vicissitudes. It means that the individual is now nothing but a cancerous
metastasis of his basic formula. (The Transparency of Evil, 119)
Baudrillard’s paranoia about the “end of the body” and “invariant reproduction” seems influenced not so much by any understanding of physical reproduction as by fictionalised accounts of cloning, especially when one considers that “natural” identical twins and triplets are clones who share identical copies of DNA without damage to their individual identities. Baudrillard’s account recalls such dystopian works as Aldous Huxley’s 1932 novel *Brave New World* with its society of malleable and unthinking laboratory-grown clones, to which I will return in the next section. The notion of the “copy” is heavily influenced by machine technology which does indeed make possible the production of objects virtually indistinct from one another. However, naturally cloned organisms, influenced by many factors throughout their lives, have resulted in unique individuals throughout centuries of natural human reproduction.\(^{11}\) Moreover, successful cloning of mammals has yet to be achieved and even in the unlikely event that the procedure would be used for human reproduction, there is little evidence that a few cloned individuals within the enormous population of the world would have an effect on human bodies or spirits as a whole. The “end of the body” with its metaphorical burnt-out circuits is wordplay of a high order but has little to do, in fact, with real bodies, and much to do with literature.

“Baudrillard’s body is *thought* always as an object and never *lived* as a subject,”

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\(^{11}\) This is not to suggest that deliberate (artificial) cloning does not have serious ethical implications—a significant one being that both the surrogate mother and the cloned embryos risk physical health problems as a result of the complicated process of making a tissue cell stop its current processes and become a different type of cell. Technologically-induced clones have a high rate of developmental abnormalities leading to neonatal death or death soon after birth, as well as possible premature ageing and higher risk of developing cancer if they do live.
writes Vivian Sobchack. Where is Baudrillard’s body? she wonders, and concludes that “The man’s lived-body...its material facticity, its situatedness, finitude and limitations—had been transubstantiated through textualization into the infinite possibility and irresponsibility and receptivity and legibility of the ‘pure’ sign” (“Beating the Meat,” 206–7). Though I would disagree with her characterisation of Baudrillard’s work as expressing an “erotic technophilia” (quite the reverse, rather a technic paranoiphilia), Sobchack’s comment emphasises how the textualised, written bodies created by postmodern theorists and cyberpunk storytellers are—as much as are the depictions of medical-scientific version of bodies as “pure data”—belied by the lived experience of human technologised bodies, which have feelings, and eat, drink, and reproduce.

Even Haraway’s more positive version of the cyborg as an ironic mythic structure, claiming that machines are “an aspect of our embodiment,” involves a partial disembodiment of the female into a non-gendered being, refuting the female reproductive organs as “(once upon a time) female embodiment [which] seemed to be given, organic, necessary; and...seemed to mean skill in mothering and its metaphoric extensions” (“Cyborg Manifesto,” 180). “Liberation rests,” she argues, “on the construction of the consciousness” (149). And yet, Haraway’s denial of sexual, reproductive embodiment in favour of “constructing” consciousness is a very old notion of mind and spirit overcoming the imperative of bodily “nature.” In this way, her utopian feminist dream could seem very “Christian.” Interestingly enough, Haraway’s “effort to contribute to socialist-feminist culture and theory in a postmodernist, non-naturalist mode and in the utopian tradition of imagining a world without gender” also recalls Huxley’s Brave New World in which test-tube babies are deliberately produced as
freemartins since their reproductive capabilities are unnecessary, and the word mother is the most offensive smut imaginable: “Utopias appear to be much more realisable than was formerly believed,” reads the novel’s epigraph. “And we are currently posed with a distressing question of a different sort: How to avoid their final realisation?” Haraway’s cyborg metaphor of the “construction of consciousness” en route to a brave new world utopia condones the deliberate architecture of human minds with socialist-feminist blueprints and suggests that human spirit should be improved through human engineering and the denial of (most) bodies’ natural imperative to reproduce sexually.

Obviously this is a rather extreme reading of Haraway’s ironic myth, and one that would undoubtedly repel her: my point is that cyborgs as disembodied creatures represent utopian or dystopian versions of the world that tend to be based on the notion of spiritual improvement; but utopias and dystopias are Janus-headed versions of the same story. If it is possible to push Haraway’s utopia to a potential imaginative possibility coming to rest very close to Huxley’s more deliberately repulsive version of the union of humans with technology, the implication would seem to be that there is no middle ground for the theoretical cyborg between the liberating utopia or terrifying dystopia postulated for human consciousness/mind/identity when the body and brain are understood as machines.

The theoretical construct of the cyborg is thus characterised by extreme versions of the body’s supposed obsolescence, irrelevance, or disappearance and the resulting distortion/expansion of human spirit, consciousness, or identity. The material cyborg construct is engendered both by our ability to reconstruct, rebuild, or genetically “rewrite” the material components of the human body, and by our ability to create new
extensions of the mind (as three-dimensional simulations of the physical world in which our bodies may be represented by avatars in “virtual reality” environments, or as the will and ability to manipulate remote body parts such as the “Canadarm” space arm). The cyborg is thus a reconfigured body or extended mind/will and is typically defined through the lens of that very old dichotomy between body and mind. As in Gibson’s cyberpunk novels, the cyborg might be depicted as both embodied meat with mechanical components and as pure data but rarely does the “action” encompass both at the same time. The cyborg acts either in the imaginary realm of cyberspace or the material realm of the physical world, and indeed frequently cyberpunk fiction depicts the body of the “jacked-in” character as helpless, precariously abandoned in a state of senseless and passive vulnerability while the mind explores, experiences, and even feels the cyberspace world (see for example Gibson’s *Idoru*). In the cyberpunk genre the death of the avatar in cyberspace results in the death of the embodied subject, while the death of the body does not signal the end of the spirit/subject/avatar living in the world of data (see for example Pat Cadigan’s “Pretty Boy Crossover” or Gibson’s *Mona Lisa Overdrive* which both depict the death of the body for the sake of uploading the mind to the computer network). The mind-body dichotomy prevalent in both the theoretical and popular culture discourses of the “disembodied” cyborg suggests simultaneously that the machine interface with the body will ultimately reconfigure the human spirit, even while the body’s supposed irrelevance is inherent in the spirit’s newly wrought ability to exist beyond the realm of the physical body in cyberspace.

N. Katherine Hayles has commented on the tendency to characterise cybernetic subjects by the supposed obsolescence of the body, suggesting that the so-called
disembodiment of the cybernetic organism arguably is "a feature common to both the liberal humanist subject and the cybernetic posthuman" (How We Became Posthuman, 4). This is true in part but there is another side of our historical constructions of human identity which connects the rational soul with the physical body. In fact, as I will argue, the supposed mind-body split is only a part of the story of humanism and cyborgs. As much as the humanist subject as rational mind depends to a certain extent upon disdaining the body as physical entity, there is also an important tradition wherein the explicitly non-labouring body itself (male or female, usually white, physically weak, and "nervous") is a marker of high order intellectual and spiritual subjectivity. As I will discuss in chapter three this tension between the mind-body split as a marker of humanity governed by moral authority, and the physically weak and "sensitive" body as indicator of a higher order of mind and authority, emerged in the early modern period when anatomists and medical doctors increasingly depicted the brain as continuous with body. The contradiction between these two opposing interpretations of mind and body is a recurring paradox in cyborg literature, which characterises the mind as both separate from the body and vulnerable to the condition of the body. In either case, a certain fiction about the mind-body relationship rests upon a denial of the base aspects of the body itself, which in contrast could be described first as an organic machine evolved to efficiently absorb material and excrete the waste, and only second, after these needs are fulfilled, as a rational being.

The single dominant trait of the cyborg as a textualised (disembodied) identity is that while it might experience bleeding, fluttering, palpitations, stinging, or while it might cry salty tears, it does not excrete. It is as true in William Gibson's fictional world
of "data made flesh" where an afterlife of sorts is realised as computer-generated avatars, as it is in Arthur Kroker's theoretical depiction of the "flesh-eating 90s."

Somehow the reality of mucus, faeces, urine, and sweat, all operations intrinsic to any cyborg body, and indicative of its most base material nature, are left largely in the domain of the physical sciences and the physically labouring body. In cyborg theory, the subject is summarily denuded of its "obsolete" body in order to examine the as yet undemonstrated spiritual effects of our advanced technology upon our humanity.

The image of the cyborg or the human-machine amalgam as indicator of our own biological obsolescence which has become increasingly prevalent in our literature over the past number of years has contributed to the rise of Body Theory in recent cultural and literary studies. Yet, while there is much writing on the cyborg as a theoretical entity which demonstrates the twentieth-century postmodern condition, there is a surprising gap in our literature where we might acknowledge or explore the use of the cyborg as metaphoric construct in our own theoretical discourse. Why is the cyborg such a powerful symbol almost invariably used to represent some aspect of human spirit, ethics, morality? The literary figure of the cyborg functions as a metaphorical device, both in popular fiction and film, and in cultural theory. As much as the cyborg is a direct result of the material body interacting with the material machine, however, an overwhelming tendency on the part of cultural and literary theorists has been to focus on a highly theoretical version of subjectivity, to focus upon a "disembodiment" that is purely metaphorical and in fact privileges the spirit or the soul while claiming to address the aspect of the living body. Hayles argues that "to the extent that the posthuman constructs embodiment as the instantiation of
thought/information, it continues the liberal tradition rather than disrupts it” (How We Became Posthuman, 5). It is also true that while the cyborg itself is a construct of technology, the construct of cyborg as “posthuman” identity is largely a humanist one, predominant in the discourses of the visual and performing arts, cultural studies, and literary theory, but notably absent from the texts of medicine or computer sciences or labourers. As such the cyborg in our theoretical discourse is a highly useful creature that symbolises whatever political schema we might wish to propose in response as artists or “humanists” to what is characterised as an arrogant hubris of science and technology run amok.

But what does “cyborg” mean in terms of real bodies? In 1965 D.S. Halacy wrote that “A man with a wooden leg is a cyborg. So is a man with an iron lung. More loosely, a steam shovel operator or an airline pilot is a cyborg. As I type this page I am a cybernetic organism, just as you are when you take pen in hand to sign a check.” More recently, Hayles has pointed out that:

Cyborgs actually do exist; about 10% of the current U.S. population are estimated to be cyborgs in the technical sense, including people with electronic pacemakers, artificial joints, drug implant systems, implanted corneal lenses, and artificial skin. A much higher percentage participates in occupations that make them into metaphoric cyborgs, including the computer keyboarder joined in a cybernetic circuit with the screen, the neurosurgeon guided by fiber optic microscopy during an operation, and the teen gamerplayer in the local videogame arcade. (“The Life Cycle of Cyborgs,” 322)

Gray, Figueroa-Sarriera, and Mentor similarly argue:
There are many actual cyborgs among us in society. Anyone with an artificial organ, limb or supplement (like a pacemaker), anyone reprogrammed to resist disease (immunized) or drugged to think/behave/feel better (psychopharmacology) is technically a cyborg. The range of these intimate human-machine relationships is mind-boggling. It's not just Robocop, it is our grandmother with a pacemaker. (2–3)

As I will discuss in more detail in chapter two, it is significant that all these definitions include extensions of the human body both in terms of machine technology extending the functions of the body, and writing technology extending the functions of mind.

Most definitions of the cyborg today do not include solely the use of a prosthetic device such as a wooden leg (as Halacy reassuringly described the cyborg in 1965) but also an element of the written. The cybernetic organism technically is an organism with the addition of an artificial feedback loop or program. The cyborg is a textual entity, and this is a large part of its significance for humanist discourse, as we will see in chapter two on the body as either God's or Science's Book of Nature.

The actual, living, material cyborg is the human body retooled, reproduced,
Figure 1.3. Orlan: Carnal Art through computer enhanced self portraits and surgery. From Orlan, Self-Hybridations (above) and Orlan: This Is My Body...This Is My Software = Ceti Est Mon Corps...Ceti Est Mon Logiciel (left). Note that these compelling images of Orlan are not actually, however, of her body at all: it is the face, closely associated as it is with human expression, emotion, or intelligence as "the window to the soul"; would we consider Orlan to be cyborg or "posthuman" if she were changing the natural conformation of her feet through the foot-binding techniques of ancient Chinese custom? Orlan's "carnal" modifications highlight a common feature of postmodernist "body theory" today which purports to address the body but nevertheless frequently privileges the humanistic priority of the head/mind over the body.

rewritten, or reprogrammed by human intervention, a discomfitting reality that seems on the verge of undermining individual autonomy and free will. Nevertheless, as cyborgs ourselves, we are all beneficiaries of the human-machine interface. The cyborg is the human being whose mind is interfaced with the computer as prosthetic memory, prosthesis for enhanced visualisation, or reality simulation device. It is also the human whose independence is vastly improved by an artificial limb controlled and manipulated by myoelectric feedback devices (figure 1.2), whose menstrual cycles are regulated by birth control pills, whose moods have been modulated for better or worse by chemical therapy. The cyborg is famously represented by the much theorised performance art of
such renown as Orlan’s “Carnal Art” (figure 1.3) as “inscriptions” in the flesh, or Stelarc’s various demonstrations of “electronic extrusions” of the “obsolete” biological body (Stelarc 116; figures 1.4, 1.5, 1.6); but the cyborg is also more quietly instantiated by the human whose interior has been examined with invasive scopes or by magnetic resonance imaging, who has been treated with anti-infective drugs, hooked up to various monitoring machines, rendered unconscious for the surgical construction of an artificial anus at the surface of the abdomen, and fitted with a prosthetic bowel, or colostomy bag.

There is a distinct difference between the cyborg of literature, art, and theory, and the living cyborg. In our literature, the cyborg is invested with meaning that centres most consistently upon the re-production of humans, whether mental or material, as a

\[12\] Orlan defines Carnal Art (L’Art Charmel) in her “Carnal Art Manifesto” as “self-portraiture in the classical sense, but realised through the possibility of technology. It swings between defiguration and refiguration. Its inscription in the flesh is a function of our age. The body has become a ‘modified ready-made’, no longer seen as the ideal it once represented; the body is not anymore this ideal ready-made it was satisfying [sic] to sign.”

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scaffolding for the optimistic or pessimistic speculation upon the effects of such artificial reproduction on human spirit/subjectivity. As much as it is the interface of human and machine, however, the cyborg is also the interface of base bodily functions with what was once our most elevated sense of human identity: the expression of our creativity in the form of the visual, literary, and philosophic arts. The cyborg is human being as human artifice. The cyborg, at the interface of Art and Science, represents the infiltration of the physical sciences (both a mathematical and manual distortion of physical bodies) into the arts, the traditional realm of the human spirit; it represents a discomfitting melding of high art (technique/technology) and the “natural” or “god-given” material structures of the human body.

The cyborg also represents a shift, then, in the media used for the arts (in a reversal of God’s creation of Adam, the body has become the clay for human artistry). The figure of the cyborg challenges traditional notions of the arts as opposed to the sciences, of what art is, and of what literacy is. The discussion of texts in the humanities seems impossibly complicated by the body itself as text. How do we talk about the human body as product of human creativity? The traditional humanist enterprise until fairly recently has been to teach a specific canon of literature and art as a means of educating and refining the souls of working-class bodies.\footnote{Terry Eagleton, for example, recounts in his history of literary theory that “As religion progressively ceases to provide the social ‘cement’ [in Victorian England], affective values and basic mythologies by which a socially turbulent class-society can be welded together, ‘English’ is constructed as a subject to carry this ideological burden from the Victorian period onwards. The key figure here is Matthew Arnold, always preternaturally sensitive to the needs of his social class. … The urgent social need, as Arnold recognizes, is to ‘Hellenize’ or cultivate the philistine middle class… by transfusing into them something of the traditional style of the aristocracy, who as Arnold shrewdly perceives}
of the lived human body—and mind—then a significant transformation must occur in our cultural understanding of humanity as "natural," and its creations as "art," our tacit understanding that our bodies are the most base aspect of human experience, and that our creative expression, our rational thought, our spirituality, is the highest realisation of it. The collapsing of human body into human art form creates a contested space between the traditional "keepers" of the body, the scientific and medical community, and the traditional "keepers" of the soul, the arts, the humanities, and western European Christian religions.

If we are going to pretend to be talking about the real, material, living human body in cultural studies of the body, however, we might well acknowledge the fact that, despite myriad conversations about how technology has changed the organic body, how we have "evolved" into a state called "posthuman," how human bodies are now in fact obsolete, archived, bloodless data, that despite all these lofty musings wrought by the privilege of paid intellect, the vast majority of the world's populace, including those of us who study the body primarily as an imaginary textual entity, nevertheless share the daily experiences of hunger pangs roiling beneath the rib cage, of dripping and oozing mucal secretions, of the insistence of that imperative erectile tissue in our genitalia, of the sometimes pleasurable and urgent necessity to shit.

Rather than the spirit transcending the body as our culture once imagined it to

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are ceasing to be the dominant class in England, but who have something of the ideological wherewithal to lend a hand to their middle-class masters. State-established schools, by linking the middle class to 'the best culture of their nation', will confer on them 'a greatness and a noble spirit, which the tone of these classes is not of itself at present adequate to impart.' The "true beauty of this manoeuvre," Eagleton suggests, "lies in the effect it will have in controlling and incorporating the working class."
do in death or, however briefly, through the transcendent/ecstatic experience of art or religion, the cyborg spirit of the latter twentieth century has been hijacked by technology and medical science (see chapter two): this has caused significant upheaval of traditionally established notions of identity, expressed in the writings of those who have built their own identities and careers upon older corporate structures represented by the traditional literary canon of Western patriarchy, and those who revel in the possibility of such structures' crumbling.

Arthur Kroeker, one of postmodernism's most extreme prophets of paranoia concerning the supposed obsolescence of the human body, writes for example of the fateful discovery in contemporary physics that ninety percent of the natural universe is missing matter, just disappeared and no one knows where it has gone (physicists most of all). ...with the triumph of science and technology as the real language of power in postmodern culture...ninety percent of contemporary society is also missing matter, just vanished and...no one knows where it is gone (sociologists most of all). (Panic Encyclopedia, 15–16)

"Panic" in the postmodern scene, for the authors of The Panic Encyclopedia, is a "two-fold freefall" where both the external standards of public conduct, and the internal foundation of identity, or ego, have disappeared: the self, they claim, is "transformed into an empty screen of an exhausted, but hyper-technical, culture" (16). The claims being made here are not unique, though they are extreme versions of the rhetoric of posthuman cyborgs. The merging of human and machine represents a disembodiment signalled by a paradigmatic switch from the early modern Newtonian world view to the postmodern Einsteinian one: "If the Newtonian law of gravity could postulate a real
body whose objectivity is established by its mass,” Kroker, Kroker, and Cook write, “the (quantum) law of postmodernity eclipses this body by flipping suddenly from mass to energy.” They explain:

When mass disappears into energy, then the body too becomes the focus and secretion of all of the vibrations of the culture of panic noise. Indeed, the postmodern body is, at first, a hum, then a “good vibration,” and, finally, the afterimage of the hologram of panic noise. Invaded, lacerated, and punctured by vibrations (the quantum physics of noise), the body simultaneously implodes into its own senses, and then explodes as its central nervous system is splayed across the sensorium of the technoscape. No longer a material entity, the postmodern body becomes an infinitely permeable and spatialized field whose boundaries are freely pierced by subatomic particles in the microphysics of power. Once the veil of materiality/subjectivity has been transgressed (and abandoned), then the body as something real vanishes into the spectre of hyperrealism. Now, it is the postmodern body as space, linked together by force fields and capable of being represented finally only as a fractal entity. The postmodern self, then, as a fractal subject—a minute temporal ordering midst the chaotic entropy of a contemporary culture which is winding down, but moving all the while at greater and greater speeds. (Panic Encyclopedia, 155)

This view of our future is a reiteration of McLuhan’s notion of “extension,” as well as almost comically accepting the fantastic futures depicted in cyberpunk fiction such as
Sterling’s “Spider Rose” in which Rose, a two-hundred-year-old Mechanist\(^{14}\) lives in an outer space habitat orbiting Uranus. Rose’s own body is almost useless, controlled artificially by hormones and drugs, and extended by her polycarbon spiderweb. Having “mashed” her emotions “with a cranial injection” (Sterling 259), Rose exists primarily as the static observational central node in a web of communications devices and monitors, watching the external world through eight telescopes whose images are fed directly into her brain through a “nerve-crystal junction at the base of her skull” (258). Her “survival mechanism” to defeat boredom consists of crouching in the center of the mental web, clean euclidean weblines of rationality radiating out in all directions, hooked legs alert for the slightest tremble of troubling emotion. And when she sensed that feeling tangling the lines, she rushed there, gauged it, shrouded it neatly, and pierced it cleanly and lingeringly with a spiderfang hypodermic…. (259)

The implications are clear, and clichéd: to detach body from mind, to extend oneself through the networked communications of machines is to become mechanical oneself: it is to trade a mechanical sensory existence for human emotions and feeling. Kroker’s is perhaps the most extreme non-fiction version of the obsolete (technology-enhanced) body, suggesting along with his various co-authors that the “(natural) body in the postmodern condition has already disappeared, and what we experience as the body is only a fantastic simulacra of body rhetorics” (Kroker and Kroker 22). Describing

\(^{14}\) Mechanists, as opposed to the Shapers who have changed the human form through centuries of genetic manipulation, incorporate mechanical components into their bodies.
American research on “virtual pilots” in the entry “Panic Pilots,” the authors of the
Panic Encyclopedia write of the disappearance of the “body deficient”:

No longer real vision, but computer-generated optical scanning images. No
longer real visual landmarks, but a closed circuit electronic feedback network for
indicating velocity and spatial location. Not even real touch but the virtual
touching of a point in empty space. . . . And certainly not real fingertips, but
’sensors, which can be located precisely as his hand moves through a magnetic
field flux in the cockpit.’ And the pilot’s head? That, too, has disappeared into
the organon of a virtual helmet. (178)

Under the entry for “Panic Cyberspace,” they write, almost antithetically, of the third
stage of human evolution as both disfigured/reformatted body living in outer space, and
as disembodied mind living in cyberspace (on earth). The “postmodern American body
(which is to say everyone’s body . . . .)” they write, is “half-flesh, half cyberspace. . . . a body
fit for exiting Planet One with radiation-proof skin, large globular eyes for spatialized
existence, and no legs (this is a floating body at zero gravity)” (78). Finally, in
cyberspace, they conclude,

you can have multiple personalities: designer heads with wired hands

interacting on a schizoid basis, with multiple personalities projected outwards
simultaneously. Human beings, then, at the end of the world: chip nerves,
spectral vision, with floating personalities fit for cyberspace. (79)

This entry in the aptly named Panic Encyclopedia manifests the pervasive,
unacknowledged paradox of cyborg literature: that the spirit/consciousness is
simultaneously separable from the irrelevant body, capable of breaking free of the
body’s limitations to be uploaded to the computer matrix, and at the same time so deeply entrenched in the body’s physical makeup that technological changes to the body will damage or modify the spirit.

The images included with this entry are from two performances by the Australian performance artist Stelarc who is well-known in academic theory of cyberculture for his repeated declarations of the “obsolescence” of the body. One of these, *Event for Amplified Body/Laser Eyes and Third Hand* (figure 1.5), exhibits a terrifying version of the human body apparently dominated by the machine, but also an interplay between normal unconscious or conscious physiological processes and “machine enhancement.” The mechanisms of motion, sound, and light enacted through the performing body are stimulated by the body’s own processes: electrical discharges of the body, its blood flow, its movement and position, all tracked by various sensors and transducers, are converted to a mechanical “choreography of controlled, constrained, and involuntary motions” (Stelarc 118). In this case of cyborg fusion with the machine,
the human body is necessary as the dominant interface with gross machine structures which to some extent control the body’s actions, while the conscious mind willingly plays a secondary role in determining how the event unfolds. The movements of the machine-body amalgam are “involuntary” only insofar as the artist suspends his will to control the machine: he can disengage from it at any time he chooses.

The body’s obsolescence is implied by the technology’s reconfigurations of its motions. “Can we re-evaluate the body without resorting to outmoded Platonic and Cartesian metaphysics?” Stelarc asks in his preliminary remarks on “BEYOND AFFIRMATION INTO ERASURE” (116), but interestingly enough, the tendency again is to separate demonstrations of the machine-body interface: either the mind willingly giving up some of its control over the body’s actions to the machine as in Amplified Body or Exoskeleton (figure 1.6); or the machine-mind interface where the body is—metaphorically at least—abandoned by the self. Under the category “PHANTOM BODY/FLUID SELF,” for example, Stelarc writes that while images are immortal, bodies are ephemeral: the body, he suggests,
finds it increasingly difficult to match the expectations of its images. In the realm of multiplying and morphing images, the physical body's impotence is apparent. THE BODY NOW PERFORMS BEST AS ITS IMAGE. Virtual Reality technology allows a transgression of boundaries between male/female, human/machine, time/space. The self becomes situated beyond the skin. This is not disconnecting or a splitting but an EXTRUDING OF AWARENESS. What it means to be human is no longer being immersed in genetic memory but in being reconfigured in the electromagnetic field of the circuit IN THE REALM OF THE IMAGE” (123).

Images are immortal and bodies ephemeral; “the body now performs best as its image”; “what it means to be human is no longer” body but image: while writing the rhetoric of the newly and utterly transformed posthuman, Stelarc merely reaffirms old literary versions of the artistic self living on through image and text after the death or loss of the body. Under the heading “ABSENT BODIES” Stelarc writes that “We are at the limits of philosophy, not only because we are at the limits of language. Philosophy is fundamentally grounded in our physiology,” and concludes, under the heading “ARTIFICIAL INTELLIGENCE/ALTERNATE EXISTENCE” that:

Electronic space generates intelligent and autonomous images that extend and enhance the body’s operational parameters beyond its mere physiology and the local space it occupies. What results is a meshing of the body with its images and machines in ever-increasing complexity. The significance of interfacing with is [sic] that they culminate in an ALTERNATE AWARENESS THAT IS PAN-HISTORIC AND POST-HUMAN. (123)
Nevertheless, despite the presupposition of this alternate awareness due to the body’s obsolescence or absence, all of Stelarc’s art to date has required the presence of Stelarc’s own willing body fleetingly attached to the machinery—not impotent so much as wilfully enacting a carefully contrived (barely involuntary) action for a set period of time; not posthuman so much as performance. It is a significant difference: Stelarc’s consciousness of himself extended into the machine is an individual intellectual exercise and demonstrates nothing of an overall change to human consciousness.

What is so frequently assumed, and ill-defined at best, in the postmodern explication of cyborg identity is what “human awareness” was prior to this age of technology. What is the nature of humanity, and of the self? What was it? And why are so many in the arts, in literature, and in theory proclaiming that it has radically changed? Is it human “selfhood” that has changed, or the literary and artistic depictions of it? Obviously, our understanding of nature and our ability to manipulate it is constantly reforming our explication of human identity; but it seems plausible to suggest that the changes to human subjectivity are at least as much a literary, artistic metaphoric production as they are material technological reformatting of what it means to be human. As I will discuss in the following sections dealing with specific examples of the cyborg figure in popular culture and theory, the meaning of cyborg arises in part from a demonstrable literary tradition of symbolic images of body, spirit, and machine which are closely tied to a Christian view of mortal (moral) body and disembodied immortal spirit.
1.2 Of Sex and the Soul; or, The Cyborg and the Obsolescence of Semen

The semen is a drop of brain containing hot vapor within it; and this, when brought to the womb, throws out from the brain lymph, fluid and blood whence are formed flesh, sinews, bones, hairs and the whole of the body, while soul and sense come from the vapour within.

—Diogenes Laertius, *Life of Pythagorus*, 28

If we were to consider a secretion spectrum, from the most base to the most highly valued bodily excretions, the highest forms of material emanating from the human body and the only ones that have consistently been considered sacred in the western Christian tradition are semen and immature human bodies. These multi-cellular sloughings might be composed of base matter, but they are no mere waste products: they are the material production of humanity itself and thus carry within them some nascent form of the human spirit. Based as it is in its irrefutable corporeality and spiritual profundity, the process of sexual reproduction has long crouched in an uneasy and furtive relationship with the holy realm of God. The sexual act and the act of giving birth are both securely centred in animal embodiment, animal pleasure, animal pain, and yet, what has been interpreted fairly consistently throughout our history as the “sin” of physical pleasure is also the creation of a new human being endowed with consciousness, identity, intelligence, a soul. It is a question we never tire of asking in our literary tradition: how is a human made? For Haraway, reproductive sex is suspect and consciousness is to be constructed; for Baudrillard, crucial aspects of the human identity are imparted only through male-female sexual reproduction.

Since ancient times, western culture has assigned a direct link between sexual
reproduction of the body and the production of the human soul. The tradition of the etherial spirits of the soul or mind being distilled in the brain and piped via the spinal column and nerves to the penis, whence it is ejaculated as semen thus providing the newly formed child with a soul goes back at least to the Greek philosophers. Plato described the process in the *Timaeus* (Jowett, II, 66–7), and the association was commonly held through the Renaissance. Ambroise Paré, Leonardo da Vinci, and René Descartes all reiterated the account in their treatises of the human body.\(^5\) The explanation of a direct link between the etherial product of the mind and the material product of the sexual act was accepted in various forms up until the late seventeenth century when physiologists such as Reinier De Graaf (1641–1673) in *Tractatus* (29–32) and Thomas Willis (1621–1675) in “The Anatomy of the Brain” began to characterise the spiritous seed as a distillation of the blood occurring in the testes, as the etherial spirits of the mind were purified from the blood in the ventricles of the brain.\(^6\) Willis described the blood as carrying that “sublimated” mysterious and etherial vital spirit to the testicles in the same manner as the “spiritous liquor” is delivered to the brain (Willis 172–3). That is, the indefinable and non-material animal spirits that give us our will and intelligence are just like those that produce other little humans with will and intelligence: a purely mechanical or materialist description of how the human body is made was

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\(^5\) For a discussion of theories of the subtle spirits of the soul being transmitted to the offspring via the semen, see also Clara Pinto-Correia’s *The Ovary of Eve: Egg and Sperm and Preformation* and Giulia Cissa’s “Subtle Bodies.”

\(^6\) I owe these observations on the presumed relationship between the products of brain and testicles to Raymond Stephanson, who provides a brief history in his forthcoming work on Alexander Pope and Eighteenth-century constructions of male creativity.
avoided by the conservative Willis, since such explanations would certainly have
challenged religious doctrine concerning ensoulment. Over time, of course, the
authority of the Church has had less dominion over interpretations of how the body
functions; but the creative mind/soul connection with the reproductive organs was by
no means eradicated.17

Rather, the semen-soul connection has been continuously revised in various
forms to the present day, and this trope is discernible in the works of Jean Baudrillard,
who has claimed that what he sees as a prevalent concern with defining how our brain
and reproductive systems work is unique in our "age of simulacra": "this body, our
body often appears simply superfluous, basically useless in its extension," he wrote in
"The Ecstasy of Communication" (1983), "since today everything is concentrated in the
brain and in genetic codes, which alone sum up the operational definition of being"
(128–9). What he did not say then he asserted more boldly in his 1988 The Ecstasy of
Communication, arguing that we have figuratively obliterated the soul from our definitions
of being through replacing sexual reproduction with written reproduction of the human
form:

Electrocuted, lobotomized, the soul has become but a cerebral convolution.

...The religious, metaphysical or philosophical definition of being has given
way to an operational definition in term of the genetic code (DNA) and cerebral
organization (the informational code and billions of neurons). We are in a

17 Recall, for example, Gilbert and Gubar's discussion of writing in the nineteenth
century as a predominantly male pursuit linked explicitly to male sexuality. With the pen
metaphorically construed as penis, and ink as semen, male procreative capacities
figuratively paralleled their creative ability to write.
system where there is no more soul, no more metaphor of the body—the fable
of the unconscious itself has lost most of its resonance. (50–1)

In an authoritative sleight of hand, Baudrillard immediately twists this notion of the
transformation of our textual definitions of body and soul to the notion that when the
body of the newly conceived individual is re-produced without the natural sexual act
(that is, the body configuration or DNA has been artificially rather than sexually
programmed), the body-soul connection is literally obliterated:

...there are no more individuals, but only potential mutants. From a biological,
genetic and cybernetic point of view, we are all mutants. Now, for mutants
there can no longer be any Last Judgement, or the resurrection of the body, for
what body will one resurrect? It will have changed formula, chromosomes, it
will have been programmed according to other motor and mental variables, it
will no longer have any claim on its own image. (51)

Baudrillard reiterates this religious imagery in his 1990 La transparence du mal (translated
in 1993 as The Transparency of Evil), where he writes in “The Hell of the Same” that to toy
with traditional sexual reproduction is a process leading to Hell, where bodies created or
re-created by either genetic formulae or biochemical influences are “definitively
removed from any possibility of resurrection” (121). That is, the existence of spiritual
rebirth is nullified because there is “no more mother, no more father: just a
matrix...which is destined to ‘give birth’, from now till eternity, in an operational mode
from which all chance sexual elements have been expunged” (115).

This presupposed obsolescence of our bodies as the source of human generation
and regeneration in cyborg literature plays into certain categories of our literary
tradition, with an older historical language of good/evil; sex/sin; romance/marriage; and hero/virgin/family. There is in fact a predominant vein in cyborg literature of a conservative heroic narrative that displays a profound discomfort with the notion that humans can create or re-create themselves through the antiseptic and clinical conditions of the laboratory, surgery, and computer simulation rather than through sanctified marriage. The unspoken outcome in our popular literary and longstanding religious tradition of romance concluding with marriage is the act of reproduction. It is a story characterised by the highest order of human spirituality: love. That is, one perpetually popular human mythic structure has been a comedic formula: the rise of the hero from humble origins, who shows great nobility of spirit, who acts as a saviour, who falls in love with a beautiful woman, and after the “climax” and denouement, marries her to love happily ever after. Perhaps the question never phrased in our cyborg literature is not actually the extreme conjecture that our bodies are obsolete, but rather a romantic query posed as cynicism: i.e., Is love obsolete?

While the works questioning the notion of the human as machine, artifice, or technology are unique due to the material and theoretical restraints of a particular period’s dominant technologies, the thematic issues repeatedly concentrate on human sentiment, emotions, love, nobility of spirit. The repeated focus is how we make humans, that is, if we recreate the human body artificially, or procreate the human form mechanically by “unnatural” (asexual) means, then is the human spirit lost? We no longer believe that the soul is carried to the fetus via the spirituous liquor of the semen, but there is nevertheless a profound concern with the transfer of human spirit or soul—the part that makes the mechanical organism human—if reproduction can indeed occur
without sex (and to some extent in the clinical aseptic laboratory without emotions, 
without love). Thus Mary Shelley’s *Frankenstein or, The Modern Prometheus* (1818) used the 
still new technology of electricity to question the humanity of man as much as to 
question whether the human-made organism could exhibit an emotional, moral, spiritual 
humanity. One of the first depictions of the mass production of human identity as 
reproduction by machine was Aldous Huxley’s *Brave New World* (1932), not 
coincidentally also one of the first literary depictions of human bodies as “meat” 
machines. If *Frankenstein* epitomised the concerns attendant with a society identifying 
vital forces of human motion and will with a manipulable force of nature in the 
experimental stage of the lab, Huxley’s novel is concerned with the mass production 
that followed on the heels of experimental proof of nature’s mechanisms.

In Huxley’s dark view of the future for technologised humanity, humankind is 
not so much melded with machine components as it is organic machines: humans are 
created solely in factories, where harvested eggs are fertilised in vitro, placed on 
assembly lines, transferred to bottles lined with sow’s peritoneum, incubated, and 
moved along a conveyor at the rate of thirty-three and a third centimetres per hour 
through The Social Predestination Room before finally being decanted. The mass 
production of standardised lower caste workers involves “bokanovskification” wherein 
fertilised eggs are budded to create up to ninety-six identical twins, which are, after 
bottling, deprived of oxygen to keep the embryo intellectually and physically “below 
par” (“The lower the caste...the shorter the oxygen” explains the Director of the 
Central London Hatchery and Conditioning Center [29].) Identity in this society is 
horrifyingly stable, with babies emerging fully socialised, as the ruddy young Mr. Foster

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explains to a group of touring schoolboys, “as either Alphas or Epsilons, as future
sewage workers or future...Directors of Hatcheries” (29). After birth, emotions are
manufactured: an all-encompassing happiness is induced through universal distribution
of the drug soma.

In a no-less disturbing reversal of what some contemporary writers have come
to accept as the “fractured identity” of human-machines, Huxley ironically portrays the
mass production of workers as an instrument of social stability through mass identity:

Standard men and women; in uniform batches. The whole of a small
factory staffed with the products of a single bokanovskified egg.

“Ninety-six identical twins working ninety-six identical machines!” The
[Director’s] voice was almost tremulous with enthusiasm. “You really know
where you are. For the first time in history.” He quoted the planetary motto.

“Community, Identity, Stability.” (23).

The juxtaposition at the tour’s end of the Director’s lecture with the bland materialism
voiced by the factory workers and the stirring of critique in one physically stunted
Alpha-Plus summarises Huxley’s own critique of the place of body and soul in a
materialist and over-technologised society:

“There was a thing, as I’ve said before, called Christianity.”

“Ending is better than mending.”

“The ethics and philosophy of under-consumption...”

“I love new clothes, I love new clothes, I love...”

“So essential when there was under-production; but in an age of machines and
the fixation of nitrogen—positively a crime against society.”

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“Henry Foster gave it me.”

“All crosses had their tops cut and became T’s. There was also a thing called God.”

“It’s real morocco-surrogate.”

“We have the World State now. And Ford’s Day celebrations, and Community Sings, and Solidarity Services.”

“Ford, how I hate them!” Bernard Marx was thinking.

“There was a thing called Heaven; but all the same they used to drink enormous quantities of alcohol.”

“Like meat; like so much meat.”

“There was a thing called the soul and a thing called immortality.”

“Do ask Henry where he got it.”

“But they used to take morphia and cocaine.”

“And what makes it worse, she thinks of herself as meat.” (65)

Huxley’s “brave new world” is a society that has sacrificed art, creative science, and religion for sensual pleasures, and it is only briefly upset by the novelty of the appearance of “the Savage,” who is brought from the squalid “natural” New Mexican Reservation to live amongst them. John is the white European son of the Director himself and a Beta-Minus woman whom he had left behind at the reserve when on holiday years before. Steeped in the deeply religious consciousness of the Reservation’s mixture of Christianity, Zuñi, and Athapascan religions, and further influenced by the works of Shakespeare, John’s moral separation of body and spirit is distinctly at odds
with the new world where sensual pleasures are paramount, and tantamount to universal happiness. He can no more understand their “amoral” sexuality as the route to joy than they can understand his “noble” self-denial in chastity, his passion, or his mortification of his own flesh as a means to higher spiritual awakening.

For Huxley, the human-as-machine signifies not so much the obsolescence of the body as its debasement. The elevation of high art versus pure sensuality (mind versus body) is implicitly understood by Huxley’s 1930s audience, which we assume would have largely agreed with John that the “feelies”—moving images combined with sensations, sexual, sensual, or even briefly painful—is “base” or “ignoble” (171) compared to the works of William Shakespeare, bastion of English intellectual culture. When John finally has the opportunity to ask someone who will understand his question as to why Shakespeare is prohibited, the World Controller’s reply is:

that’s the price we have to pay for stability. You’ve got to choose between happiness and what people used to call high art. We’ve sacrificed the high art. We have the feelies and the scent organ instead. …works of art out of practically nothing but pure sensation. (219)

The world of machines is a world where tragedy cannot be understood because the people are ignorant of passion, love, and liberty (219). “God isn’t compatible,” says the Controller, “with machinery and scientific medicine and universal happiness. You must make your choice. Our civilization has chosen machinery and medicine and happiness” (232).

Huxley depicts his Noble Savage as a failed saviour figure. “Why couldn’t they let me be the sacrifice?” John demands after a bloody and violent religious rite at the
reservation (123); he later tells Bernard Marx how he had once stood against a rock in
the sun, his arms outstretched like Jesus’ on the cross, to “know what it was like being
crucified” (143). His naïve principles and spirituality lead to his ignoble suicide and we
are to believe that this deeply spiritual man who, as a result of reading the works of
Shakespeare has developed a highly wrought sensibility, morality, and intelligence utterly
foreign to his world, has no place in either the savage drunken primitivity of the reserve
or the shiny and efficient and loveless society of machine production. The novel ends
with the suggestion that salvation is no longer possible: John, depicted as the one truly
moral character in this terrible society, savagely kills the woman he loves after refusing
to, as he would see it, debase himself and her by indulging in casual sexual intercourse.
His suicide by hanging seems to deliberately contrast the heroic crucifix hanging at the
Eastern apse of the cross-shaped cathedral: the last image of the novel is his body
turning slowly within the round of a lighthouse tower:

   like two unhurried compass needles the feet turned towards the right; north,
north-east, east, south-east, south, south-south-west; then paused, and after a
few seconds, turned as unhurriedly back towards the left. South-south-west,
south, south-east, east... (255)

The death of this hero is an aimless one: Huxley’s is an uncompromising portrait of
technology and the human spirit. The obsolescence of the body’s reproductive
capacities in light of the exaggerated efficiencies and standardisation of machine
production is depicted here—much as it is in later cyborg literature—as rendering
human passions and emotions obsolete as well. In *Brave New World*, the emphasis on the
mechanical reproduction of both body and identity, the constant, unerring, and
“mechanical” fulfilment of physical desires, renders the individual’s emotional existence stunted and incapacitated. In Huxley’s version of the future, human characteristics that we tend to value—empathy, thoughtfulness, regret, love, commitment, nobility, heroism—all are lost when humans are produced as machines and their emotions regulated by biotechnological means.

As the technical means of creating or re-creating humans artificially became increasingly sophisticated, popular literature increasingly depicted dark, emotionless societies of future humanity where humans, dulled by technology and haunted by near-apocalyptic war, are as emotionless as the machines they have created. Philip K. Dick’s 1968 novel Do Androids Dream of Electric Sheep? which inspired the early cyberpunk film Blade Runner (1982) used the basis of androids manufactured with “humanoid” organic bodies and artificial intelligence to explore the question of whether artificially created replicas of human beings were “human.” In this futuristic novel, androids are exposed as such through the Voigt-Kampff Empathy Test: they are unable to feel or exhibit human emotions, passion, or morality (at least this is assumed of the models built prior to the Nexus-6 brain unit). Androids, “no matter how gifted as to pure intellectual capacity, could make no sense out of the fusion which took place routinely among the followers of Mercerism” (31), a transcendent religious experience using an “empathy box.” As in Shelley’s Frankenstein, however, it is the humans, emotionless creatures themselves with their reliance upon and faith in science, who are found wanting. Here in the year 2021 (post World War Terminus), where animal life has been virtually destroyed by radioactive fallout, humans themselves have grown mechanical while their machines have grown increasingly human. Humans use a machine for dialling their own
emotions or moods and sexual desire; their spirituality is a machine-induced virtual reality experience of “physical merging—accompanied by mental and spiritual identification—with Wilbur Mercer,” a Christ-like figure who has died, sunk down into the tomb world, and is waiting for animal life to reappear on earth before he himself can ascend to life again (22–5). The novel’s protagonist Rick Deckard is unable to love his human wife; it is the android Rachael Rosen who reawakens some vestige of his own deadened empathy and his love (223).

Rather than contrasting human-made organisms with “natural” humankind, treatments of the human as machine influenced by the cyberpunk of the 1980s tended to create a literal fusion of human body with mechanical or computer devices. These self-consciously posthuman figures however continued to be devices for questioning whether humanity is possible in the world of re-production of humans by and as machines. The film based on William Gibson’s “Johnny Mnemonic,” for example, features Keanu Reeves as a data courier who uses his own brain as a hard drive for storing and transporting data too sensitive to be transferred through the global network. As a cyborg his identity has been utterly erased: in order to store computer data, he has cleared his brain of his own memories. Johnny’s capacity to function in this society is not through personal growth, knowledge, or awareness of his own past and identity, but through his machine-memory, his ability to store other people’s knowledge. He has been re-made as machine and his value depends on whether he has been “upgraded” (Johnny Mnemonic, 4). Johnny’s mother, we eventually discover, is Anna Kalmann, founder and former CEO of the multinational Phamakombinat Industrie. Six years dead, her consciousness lives on with Swiss citizenship as a “persona” of Pharmokom’s
“neural-net installation” (88), and continues to advise the current board. While her son has become cyborg by recreating his physical body, she has become cyborg by abandoning hers and artificially recreating her own identity. She appears as a “ghost” throughout the film, attempting to right some of the wrongs done by her company: “I am sent by conscience,” she says. “In the name of memory” (38). Where she is, she explains, there is only memory and the play of conscience. “If there was never such a thing as hell before, we surely invented it,” she claims.

The film is, again, dominated by Christian symbolism and fairly conventional notions of male heroism that reinforce rather than recreate new moral paradigms. The enemy here is technology itself, embodied by an evil anti-Christ figure known in the script only as “Street Preacher,” who is hired to pursue Johnny and cut off his head for the data it contains. In his first appearance in the film the preacher, a cyborg enhanced to superhuman strength by surgical implants, clutches an inverted cross while proclaiming to his congregation “I stand before you naked in the house of God, whole and strong! I, who was as you are! And I was made...posthuman” (Johnny Mnemonic, 54). Again, the evil that he represents is directly related to the fact that he has been artificially created:

J-BONE: Look at that son of a bitch. Doesn’t have a natural bone left in his body. So jacked up he oughta squeal when he walks. Takes that collection plate money and has himself shot up with Brazillian fetal tissue...

YOUNG LOTEK #1: He really a preacher, J-Bone?

J-BONE: Motherfucker’s got God and technology ass-backwards. (66)

The message is clear: the plague of disease which threatens this future society is NAS
(Nerve Attenuation Syndrome), characterised by palsy and imminent twitching death and caused, as the "flesh mechanic" Spider explains to Johnny by the technological recreation of humanity:

He starts grabbing things: computer screens, disk drives, light bulbs, a vid-phone…

SPIDER: This causes it…this causes it…(grabs Johnny) You cause it…I cause it…Information overload. All the electronics around you, poisoning the airwaves. Technological fucking civilization! But we still have all this shit, ’cause we can't live without it. (81)

Johnny, however, in true heroic fashion will find a beautiful girlfriend and save human civilisation from its corrupting disease up in "Heaven," the makeshift town underneath a bridge which is inhabited by the Loteks.

The Loteks become Johnny's allies in this duel-to-the-death of resistance to the hierarchical and unforgiving domination of human lives by corporate rule. Johnny comes close to dying when the dangerously large amount of data he is carrying—the cure for NAS owned by Pharmakom—is extracted from his brain and uploaded to the computer network. It is the god-like voice of his mother, Anna, existing only in the corporate computer mainframe, that resurrects him: "I built a world," she says, and at the sound of her voice Johnny is "pulled back from the grave" (139). Her erasure and second "death" along with Johnny’s cleansing and rebirth signals a final triumph over the evil of technology. This conflict over human spirit and individual autonomy in the face of tradition-bound corporate structure permeates cyberpunk fiction; but it is also the retelling of an old story of the heroic figure, often an orphan or born in remarkable circumstances, fighting impossible odds, resisting rote laws, demonstrating the triumph
of human nobility, courage, love (it is also, after all, the story of Jesus Christ).

The cyborg figure in popular culture is repeatedly characterised by radical recreation through new technology, alongside the repeated question of how the loving, caring, human aspects of humanity can be transferred into the mechanism of the body if it is reproduced by or as a machine. Ultimately the themes are conservative: the one thing that can triumph over dehumanising machine reproduction is the old story of heroism triumphing over evil (women play a prominent role in this heroism but most often the hero who saves the world is male, frequently Christ-like, while women play the role of mother to or love interest of the saviour). In the movie The Terminator (1984), for example, the future hero John Connor who eventually will lead the resistance against the machine attempting to annihilate humankind is the offspring of a twentieth-century woman, Sarah, and the man who travels back in time to rescue her from the deadly cyborg sent to kill her. Here again, the creation of the human-machine produces beings devoid of empathy, love, and soul, intent on eliminating the human race. Cyborg creatures such as the Terminator, machines with human skin, have been created by a Defence Network computer which, given intelligence without morality, perceives all humans as a threat and endeavours to annihilate them through nuclear war. The message, again, is one of good (human) versus evil (technology), a caricature without nuance of man's hubris in playing God by recreating human intelligence "artificially." We are reminded throughout of this moral: the cyborg appears in one scene, machine guns blazing, against a lit sign for a night club called Technoir (black/evil technology). A glimpse of the future shows a few survivors living in the burnt-out remnants of a concrete building, perhaps an underground garage. The camera pans past a woman

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sobbing and holding a child, gazing at the television set in front of her; as the point of view shifts behind her, we see the screen has been smashed out. She gazes at a small fire lit inside, a pointed suggestion of our destiny when our hearths are replaced by the television set, when we passively allow our identities and our communities to be recreated through technology.

Bruce Sterling's *Schismatrix* (1985), which helped to found the genre of cyberpunk literature with its futuristic portrait of posthumans in space, displays many of the same thematic concerns as Huxley's earlier novel. Here we encounter a more refined technology—humans are not only laboratory-produced but are also augmented by mechanical grafts and a range of sophisticated drugs targeted for more highly specific purposes than the soma of *Brave New World*. Moreover, the matter of the body is depicted more clearly as the product of intellectual property. The posthuman race known as Shapers systematically copyrights and controls the reproduction and combination of its DNA. The sexual act here, as in *Brave New World*, is not procreative but rather mere physical and only occasionally emotional pleasure; posthuman reproduction occurs at the cellular level. *Schismatrix* depicts a combat between factions of Mechanists (human-descended creatures augmented by mechanical components) and Shapers (engineered beings produced by cloning or DNA combination and manipulation, who consider the word *born* "a deadly insult" [283]). One of the more powerful characters in this novel is Kitsune, a Shaper, "with a Shaper's unnatural resilience and genius" (38). She is not merely highly intelligent as are her fellow Shapers: her extreme potency is enabled by the fusion of sexual pleasure and rationality without love or pregnancy: "They gave me to the surgeons," she tells her lover Lindsay. "They
took my womb out, and they put in brain tissue. Grafts from the pleasure center, darling. I'm wired to the ass and the spine and the throat, and it's better than being God” (34). Kitsune eventually reconfigures herself into an enormous building of smooth and voluptuous skin and sphinctered doors, complete with female pheromones and “erototechnology”—beds of flesh for male visitors’ “comfort and pleasure”—with the stipulation that “male ejaculations become the property of the recipient...[which is] an ancient feminine principle” (205).

The trade-off for such genius designed and produced by human technology is the loss of all those attributes of emotion and empathy that have been called the soul, or simply, humanity:

[Kitsune] knew there was a realm of mental experience, taken for granted by humanity, that was closed to her.

Shame. Pride. Guilt. Love. She felt these emotions as dim shadows, dark reptilian trash burnt to ashes in an instant by searing ecstasy. She was not incapable of human feeling; it was simply too mild for her to notice. It had become a second subconscious, a buried, intuitive layer below her posthuman mode of thought. Her consciousness was an amalgam of coldly pragmatic logic and convulsive pleasure. (38)

Lindsay is an older Shaper model that is almost indistinguishable from humans, and thus he is prohibited from reproducing. As human, he is susceptible to emotion, and to love. Sterling twists the traditional hero narrative by placing Lindsay's forty-year marriage to his true love Nora in the middle of the story (though true to heroic tradition the narrative skips the mundane recounting of the details of married life). As the novel's
hero, Lindsay will eventually realise the dream of posthumans returning to a natural organic state. This is accomplished through terraforming, a process of building a new ecosystem filled with natural living creatures from the earth's seas, and settled by surgically transformed aquatic posthumans called Angels. That is, the implied heaven is an organic ecosystem: because each Angel is self-sufficient and draws "life, warmth, everything from the water," Lindsay claims these creatures are "not forced to" sin as are the Mechanists and Shapers (232). (Reproduction is possible, in genetic labs, but not necessary since Angels "last out centuries"). Significantly, one of the first converts from posthuman Shaper to Angel is Lindsay's own daughter, who was created illegally without his knowledge from his own genes and those of his first love as a gift of reparation from his boyhood friend and enemy throughout adulthood.

The image cluster of knowledge, intelligence, sexual reproduction, and the soul occurs repeatedly in cyborg literature where technology—especially the technology that artificially produces or augments aspects of the human body—almost invariably is depicted in cyborg fiction as resulting directly in a loss of the attributes of humanity. The artificial re-production of the human body is repeatedly characterised in cyberpunk literature and film, and in certain schools of media theory, as a process that threatens the souls of humanity.¹⁸ The cyborg by implication has divorced sexual pleasure from

¹⁸ Obvious exceptions are certain feminist writings such as Haraway's. Sandoval suggests that Haraway's cyborg "provides new metaphoric grounds of resistance for the alienated white male subject under first world conditions of transnationalization and thus the metaphor 'cyborg' represents profound possibilities for the twenty-first century" (409). However, even such hopeful claims as these to some extent rest on the assumption that the evils of post-Enlightenment technology rather than reiterations of human greed has produced the conditions that have made appropriation of the cyborg necessary ("the tradition of progress; the tradition of the appropriation of nature as resource for the
human emotion, and replaced the loving sexual act with rational intelligence in the process of human reproduction. The knowledge that enables artificial reproduction threatens an ancient literary tradition of love and romance culminating in marriage. The sacred union in love, the begetting of a new generation upon virgin territory, all that traditional understanding of the sacred male seed, is irrelevant to cyborg reproduction. Such representations, of course, presuppose an idyllic time before technology and knowledge, when humankind lived in peace and plenty, and when sex was for the purposes of loving procreation and not merely unbridled eros. At the crux of cyborg literature is knowledge, sex, and evil (very much pre-posthuman themes): cyborg literature is the marriage of Eve and Prometheus.

Let us return briefly, then, to Baudrillard’s notion of “evil” in “The Hell of the Same.” Baudrillard’s critique of cloning from an “individuated organism” revolves around the notion that it “allows us at last to dispose of the other” required for sexual reproduction; it allows for a “sole genitor” and impels us to “deny all otherness” (114). “No more mother, no more father,” he writes (115). It is unclear whether Baudrillard means a biological mother and father at the cellular level or the idealised mother-father family unit which would care for the growing child. If the latter, then he would be conveniently forgetting the ancient matter of single mothers who have parented a child alone from the moment sperm met egg. If the former, Baudrillard is mistaken: the cells of a cloned individual do have a genetic mother and a genetic father. A cloned cell has the same parental DNA as the cell from which it has been cloned: the theoretical productions of culture” (“Cyborg Manifesto,” 150).
offspring of such cloning would be twins, even if born twenty years apart; but

Baudrillard is tugging at a fairly predictable emotional response to the idea of a child engendered from no human parents. This is an argument tinted by Christian moral outrage. When he tries to acknowledge “true” twins as more “sacrosanct” than deliberate cloning, Baudrillard descends into unintelligibility: “The subject, too, is gone,” he writes of the clone,

because identical duplication ends the division that constitutes him. … We are even beyond the realm of germination here, because true twins have their own specificity as such, and enshrine the particular, and sacrosanct, fascination of the Two—of that which has been two from the start, and has never been One. The only thing cloning enshrines, by contrast, is the reiteration of the same: 1 + 1 + 1 + 1, etc. (115–16)

Baudrillard either deliberately or perhaps ignorantly obscures the fact that a natural clone was not “always” two: both natural and deliberate cloning involve the copying of an individual set of DNA at a cellular level. One important difference is that in natural cloning the DNA divides into identical copies in vivo rather than in vitro. Another is that reproductive cells, the sacred male sperm, are not necessary for artificial cloning.

To suggest that artificial (or deliberate) clones “can only accumulate, and if that is so it is precisely because they have not been sexually engendered and are unacquainted with death” (115) is a highly disputable claim, but to suggest that “A clone is not a child, not a twin, not a narcissistic reflection; rather it is the materialization of double by genetic means—in other words, the abolition of all otherness and of the entire imaginary sphere” (116) is belied by the fact that all clones, naturally or
deliberately formed, are the materialisation of doubles by genetic means. "How could all
individuals cloned from individual X be anything more than a cancerous metastasis—
the propagation of a single cell such as may be observed in cancer?" (119) he writes.
"Otherness denied becomes a spectre and returns in the form of a self-destructive
process. This, too, is the transparency of Evil" (122). What Baudrillard preaches and
condones here is a prejudice so severe that any human conceived through means other
than "natural" sexual reproduction between a woman and a man would be well advised
never to reveal the secret.

Baudrillard as prophet of the simulacrum is merely recasting with new
technology an older patriarchal view of the purposes of and social structures for human
reproduction, representing the proliferation of technological reproduction as a viral or
cancerous growth in the once-healthy ("natural") body of society. Baudrillard's
characterisation of the body of human society endangered by disease, in this case
cancerous growth, is a common trope in cyborg literature, particularly in the compelling
visual medium of film, which frequently describes the distortion of human souls by the
technological re-creation of the body through the metaphor of bodily disease.

The 1999 film \textit{Virus}, for example, suggests that the "evil" now threatening
American heroes is not Russia or other traditional American enemies but the alien
sentient machine (the hero's friend, and the first victim of the alien machine that is
melding humans into cyborgs, is Cuban; an African-American is teamed up with a
Southern American who reminisces about 'coon hunting while they search for their as
yet unknown enemy; once the brief period of cooperation between a lone Russian
scientist and the crew of the American salvage tug has been established, she is killed by
the alien force). *Virus* is a compilation of clichés from science fiction and horror films as well as recent literary and popular culture representations of the human-machine interface (figures 1.7 and 1.8). The movie has, in fact, little to recommend it other than the assemblage of these very clichés, which play upon escalating fears of humanity’s imminent self-destruction through sophisticated technology that can reproduce human bodies without sex and can—unlike humans—think without a body.

The movie’s central characters, Captain Everton, navigator Kit Foster, and engineer Steve Baker (played by Donald Sutherland, Jamie Lee Curtis, and William Baldwin) are among the crew of an American salvage tug which, sheltering in the eye of a hurricane, comes across an apparently abandoned Russian research ship. The narrative is based on a traditional honour theme: greed brings the fall. They board the huge vessel filled with sophisticated computers and begin speculating upon their potential profits; but they eventually come to realise that the ship is not abandoned at all: it has been infested by
an alien electrical life form that uses dead human parts as components for building its own hideous offspring (that is, the electrical part of this creature's life cycle is its intelligence and will; it uses steel and human flesh to build the "muscle" components for effecting its will). The sole mission of these creatures is to replicate themselves in order to exterminate the human race.

Possibly the most gruesome cyborg film to date, Virus attempts to ask some serious philosophical questions about the nature of man and of nature itself by confusing the natural disease with the artificial life force: which is the virus in this movie? Is it the electrical alien life form which—like a virus—is a non-organic entity that infects, then mechanically and systematically spreads through its vulnerable host by using the biological material therein to replicate itself; or is it humankind, which the alien force is attempting to eradicate because it considers man to be the virus most threatening to earth's existence?

The alien offspring, grotesque and repulsive cyborgs re-produced from the ship's machinery and its former inhabitants' rotting flesh, retain the ability to reason but lose all human capacity for emotions, love, or sympathy: crew members re-produced as grisly cyborgs turn on their former friends and attempt to butcher them; the captain makes a pact to exchange his humanity for power by willingly joining the alien forces, converting his flesh to machine, and betraying his colleagues. Fortunately, Kit Foster and Steve Baker overcome the evil forces with a bit of wits and gun power, save humankind from spiritual destruction and bodily annihilation by destroying the alien life form, and fall in love (and escape by jumping into a rocket launcher which ejaculates them and a phallic rocket out of the ship of unnatural reproduction—which is by this time engulfed in
flames like a miniature Hell). The moral is explicit: technological re-production of the human body replaces our humanity with a soulless and evil will for self-destruction, but the truly moral and heroic human spirit can resist assimilation into the machine. Man can choose either to embrace soulless fusion with machine technology, or to choose the hero's noble path of pure and unadulterated humanity. *Viruses* reiterates a theme of the technological re-creation of man that has been increasingly present in our literature as machines of production have become increasingly present in our culture.

Over sixty years after Huxley's *Brave New World*, the movie *The Matrix* (1999) presents many of the same philosophical implications of mechanical re-production of human bodies, the same questions of individual autonomy, and the same themes of heroism with explicit Biblical allusions: the most significant adaptations of the story are the changes in the material technology depicted as humankind's downfall, the shift from the antagonist as human corporation to antagonist as machine corporation, and finally the reversion to the uplifting conclusion that humankind can be saved. *The Matrix* is a dire vision of a future where machines artificially reproduce human bodies to exploit the powers of their cheaply available bodies. As in *Brave New World*, the mass-produced workers are happily unaware of (if somewhat bored by) the enslavement of their minds through biotechnological distortions of "reality." As in *Brave New World*, the horror of the human interface with technology is underscored by the gruesome recovery of base material components from dead bodies for later use in the macabre project of machine society (here liquefied and fed intravenously to the machine-produced bodies in the "Power Plant").

The mass-produced human bodies in *The Matrix* are imprisoned throughout
their lives in artificial wombs as generators of bioelectricity and body heat to power the race of machines evolved from an artificial intelligence created in the twenty-first century. Their minds, unaware of the reality of their true physical existence, live and work in the computer-generated "dreamworld" of the Matrix, a three-dimensional rendering of twentieth-century society which keeps the human "batteries" under control. The hacker Neo (Thomas Anderson) lives in this virtual state of rather dull corporate ignorance until he is contacted by Morpheus, the leader of the children of Zion—a small band of hackers attempting to free themselves from the race of machines that destroyed human civilisation in the twenty-first century. Neo’s role is played by Keanu Reeves, whose expressionless and wooden demeanour has made him the poster boy for the emotionless human mind melded with the machine (see also his robotic portrayal of the title character in *Johnny Mnemonic*). Morpheus believes Neo is "the One," the saviour of humanity.

The religious allusions throughout are heavy-handed: Zion (the City of God) is referred to as "the last human city." The submarine-like hovercraft that Morpheus commands is named the Nebuchadnezzar. Neo’s name recalls both the New Testament of Christ, and the New Jerusalem referred to by Christ. The name of Neo’s love interest, who was also recruited by Morpheus as a potential saviour, is Trinity, referring to the three Persons of the Godhead in Christianity; and it is Trinity who brings Neo back to life at the film’s climax (Christ-like, in bringing salvation to humankind he dies and is resurrected).

Before Neo can be freed from the machine that pipes an alternate reality into his brain, he must be detached from the virtual reality program which is his world. Neo
agrees to swallow a pill containing a “trace program”—a decision that means the irreversible death of his present numbed existence, and the possibility of the literal death of his body. He does in fact come close to death as his virtual self reaches out to touch a mirror after the program begins to take effect, only to discover it has transmogrified into a silvery liquid screen that sticks to his fingers. The dangerous screen separating virtual reality and the real is an obvious reference to Baudrillard’s notion that our culture no longer mirrors basic reality but creates “hyperreal” matrices at the scene of the screen (see “The Ecstasy of Communication” [129–30] and “The Precession of Simulacra” in Simulations [3]). The danger is, of course, that the simulated mirror of the computer program can endanger one’s life, both smothering and absorbing, as it does Neo, until the last tears the body cries are of mercury.

Having barely escaped death in the program introducing him to the real world and his real body, Neo wakes (or is reborn) to find himself encased in an artificial womb (figure 1.9), with an enormous coaxial cable plugged into the back of his skull. His “death,” from the world of simulacra, his descent down a massive pipe (a waste disposal
system for the organic materials of dead bodies), and his re-entry into the "real" physical world reinforce in obvious ways the Christian myth of Christ's death, descent into Hell, and bodily resurrection. After the rebuilding of his atrophied muscles, Neo is reintroduced to the simulacra. Morpheus plugs a coaxial line in the jack at the back of Neo's head, placing him in "the Construct" that he has been living in all his life, here displayed as an empty void of white cyberspace, with two leather chairs in front of a large-screen television. Morpheus tells Neo "You have been living inside a dreamworld, Neo. As in Baudrillard's vision, your whole life has been spent inside the map, not the territory" (Wachowskij310; page 38 of the script; c.f. Simulations, 2). He changes the channel to show on its screen a terrifying scene of darkened sky and wasteland of scorched earth. "This is the new world as it exists today," Morpheus explains. The viewing audience then "enters" the television scene along with Morpheus and Neo to view the ruins of a city "protruding from the wasteland like the blackened ribs of a long-dead corpse" (Wachowskij310): "...The desert of the real," comments Morpheus (310), quoting Baudrillard (Simulations, 2).

How does technology make a human? If God's or Nature's plan for humankind to "go forth and multiply" through natural sexual reproduction has been subsumed by the human technology which can simulate human bodies in three-dimensional space, which can "extend" the physical body and mind through wireless communications, and which can actually reproduce bodies without natural conception occurring in vivo, are human bodies indeed obsolete? Obviously not: most of our world population continues to reproduce (naturally) at a rate that is rapidly threatening the resources of our ecosystem, and a high percentage of the world population continues to experience birth,
life, sickness, and death without recourse to more than minimal medical technology. To declare the obsolescence of the body at a time when there are more humans alive on earth than ever before in our history is a gross misrepresentation of actual human lives and actual human embodiment.\footnote{According to Canada's International Development Research Centre, world population will increase by fifty percent in only fifty years, from 6 billion at the end of 1999 to almost 9 billion in 2050.}

A significant portion of our cyborg literature not only betrays its non-posthuman faith in mythic Christ-like heroes; it also betrays a dread of the obsolescence of sex, the obsolescence of the immaterial component in the material of sperm. Situated immediately between "Panic Pilots" and "Panic Plague" in Kroker, Kroker, and Cook's \textit{Panic Encyclopedia} is the entry for "Panic Penis":

No longer the old male cock as the privileged sign of patriarchal power and certainly not the semiotician's dream of the decentered penis which has, anyway, already vanished into the ideology of the phallus, but the postmodern penis which becomes an emblematic sign of sickness, disease and waste. Penis burnout, then, for the end of the world.

And just in time! Because in all of the technologies of sex which make possible a sex without secretions (the computerized phone sex of the Minitel system in Paris; video porn for the language of the gaze; designer bodies; and gene retreading), in all of these technologies of sex, the penis, both as protuberance [sic] and ideology, is already a spent force, a residual afterimage surplus to the requirements of thematic society.
...When we have already passed beyond the first two orders of sex, beyond sex as nature and beyond sex as discourse, to sex as fascinating only when it is about recklessness, discharge and upheaval—a parodic sex, then we have also broken beyond the analytics of sexuality and power to excess; beyond Foucault's language of the "care of the self" to frenzy; beyond the "use of pleasure" (Foucault again) with its moral problematization of the ethical subject in relation to its sexual conduct to a little sign-slide between kitsch and decay. Not then the nostalgia for an aesthetics of existence today or for a hermeneutics of desire (these are passé and who cares anyway?), but parodic sex as about the free expenditure of a "boundless refuse of activity" (Bataille) pushing human plans; not the coherency of the ethical subject...but the excitation of the subject into a toxic state, into a sumptuary site of loss and orgiastic excess. Not, finally, a productive sex, but an unproductive sex, a sex without secretions, as the site of the death of seduction as that which makes sex bearable in the postmodern condition.

Bataille was right. ...For expenditure is when "life is parodic and lacks an interpretation," that is, the excitation of the solar anus and the pineal eye. And why not? The pineal eye and the solar anus are also always about an excremental sexuality as the third order of simulation into which sex vanishes after the disappearance of the organic and discursive sexuality, and after the fading away of the body as yet another afterimage of the postmodern scene.

(180–81)

The entry reflects a now-familiar paradox in cyborg theory, both an anxiety over the loss
or obsolescence of the body, and at the same time an extravagantly articulated distaste for the body. Phone sex and video porn do not result in "sex without secretions," of course, but rather in fairly straightforward old-fashioned masturbation, and even postmodern masturbation results in secretions though these may well merely anoint the furniture rather than mingle with those of the woman in the potentially fertile womb. The implication is that our communications as computer-mediated text—our knowledge—has brought evil into a once-pure world. The implication here is that our union with technology has made the material of our bodies even more base than they already are. The implication is that we risk reducing our most spiritual bodily emanations—our potential children—to merely physical pleasure. The implication of the excremental sexuality of the posthuman cyborg replicated through technology is that semen is as base as shit.
Chapter 2
The Electronic Page and the Archived Body: Text, Machine, and Human Spirit

2.1 The Electronic Page and the Cybernetic Organism

Disputants, many of them writers, say to me, “Words are still words—on a page, on a screen—what’s the difference?” ... The changes are profound and the differences are consequential. Nearly weightless though it is, the word printed on a page is a thing. The configuration of impulses on a screen is not—it is a manifestation, an indeterminate entity both particle and wave, an ectoplasmic arrival and departure. The former occupies a position in space—on a page, in a book—and is verifiably there. The latter, once dematerialized, digitalized back into storage, into memory, cannot be said to exist in quite the same way. It has potential, not actual, locus (Purists would insist that the coded bit, too, exists and can be found, but its location is not evident to the unassisted and uninstructed senses.) And although one could argue that the word, the passage, is present in the software memory as surely as it sits on page x, the fact is that we register a profound difference. One is outside and visible, the other “inside” and invisible. A thing and, in a sense, the idea of a thing.
In 1690 John Locke (1632–1704) prefaced his *An Essay Concerning Human Understanding* with the following epigraph:

As thou knowest not what is the way of the Spirit, nor how the bones do grow in the womb of her that is with child: even so thou knowest not the works of God, who maketh all things. —Eccles. 11. 5

How is a human made? Locke’s inquiry into “the understanding that sets man above the rest of sensible beings” (Intr.1) thus linked, as many explorations into the human mind would continue to do, the puzzling question of the physical formation of the body with questions of how the human spirit finds itself housed there. Locke notably chooses not to “meddle,” he explains, “with the physical consideration of the mind; or trouble myself to examine wherein its essence consists; or...whether...ideas do in their formation, any or all of them, depend on matter or not” (Intr.2). Locke’s focus, then is not upon the material matters of mind, but on how reason and knowledge, which he argued are not innate—not evident in “children, idiots, savages, and the grossly illiterate” (1.1.27)—are stamped upon the mind through various forms of experience and education. For the time being, he wrote, leaving the material formation of the human body and placement of the soul therein in the realm of God, Locke would use the analogy of the mind as a blank upon which knowledge is inscribed. Locke’s epigraph suggests that if we do not know how God creates the material frame of man nor the way of the mysterious soul itself, then we can at least attempt to understand the process of educating the blank mind and forming of human identity. As we will see in the following pages, the relationship between book, page, or text and the unique richness of
the human mind (and soul) is tightly knit in our cultural understanding of what it means
to be human. Ethereal inscription, as Birkerts argues in the epigraph above, has
profound and consequential effects upon our cultural understanding of what makes us
human—of the locale and stability of human spirit or soul, and human identity.

The discourse upon the supposed disembodiment of the text is closely related to
that upon the supposed disembodiment of the human cyborg, particularly since the
book, as representation of thought, creativity, intellect, or human spirit, has had a long
history in the development of what we consider to be “humanness.” How is a human
made? Leaving aside for now the question of the body, how is a moral, sentient, feeling,
loving being created from this particular organisation of base materials? The answer has
been traditionally couched in what we now call “nature versus nurture.” The ideal
human spirit may have once been thought to have been imparted with the seed of a
sanctified union between man and woman but it was also, and increasingly over the last
two hundred years, seen as the product of the institutionalised liminal system of
education, the product of our literary and (until recently in our educational systems)
religious texts. If the cyborg is a creature of both text and body, then the cybernetic
machine threatens human spirit not only through its distortion of natural embodiment,
but through its distortion of the traditionally accepted relationship of the physical page
to the formation of identity.

Consider, for example, the following explanation by Harold Bloom, when asked
why children should read:

To be coldly pragmatic about it, reading good books will make them more
interesting both to themselves and to others. And it is by becoming more
interesting—and this sounds callous, but it's true, I think—that by becoming
more interesting both to oneself and to others, one develops a sense of one's
separate and distinct self.

So if children are to individuate themselves, they will not do it by
watching television, or by playing video games, or by listening to rock, or by
watching rock videos. They will individuate themselves by being alone with a
book, by being alone with the poetry of William Blake or A. E. Housman, or
being alone with Norse mythology or The Wind in the Willows. (Long, n.p.)

Literary and cultural theorists have long associated the creation of individual identity
with the lone reader and his book. Sven Birkerts, for example, writes:

If [my daughter] goes to a school where reading is not prized, if she follows the
non-reading horde of her peers, where will she find the incentive, the desire to
read on her own? And if she does not read on her own, where will she find the
nutrients she needs in order to evolve an independent identity? (Gutenberg
Elegies, 28)

Derrick de Kerckhove makes a similar argument in the chapter entitled "The Future of
the Book" in his Connected Intelligence: The Arrival of the Web Society:

Reading and writing give the literate person control over language. In turn, this
special control over language gives that person a separate identity. This kind of
separation between the individual and the social group is quite impossible in an
exclusively oral society. ... This power of control is greater if the text is fixed.
... Unlike either networked interactive or oral communications, books hold up
a fixed mirror to individual development. Thus, the printed book is indeed a
necessary condition of the existence of private identity.” (123)

These characterisations of identity are highly problematic (to suggest that the illiterate, or the uneducated, or those manual labourers who do not work with words and have neither the time nor inclination to read books, are not individuated and have no independent or private—or interesting!—identity is a rather elitist presumption); but moreover, such characterisations emphasise once again the assumptions that form the foundation for the supposed cyborg consciousness. We have seen with regard to discussions of the body that too much (scientific) knowledge is a potential evil; with regard to canonical texts of the Humanities, however, literary knowledge is seen as integral to formulating a culturally specific notion of individual identity based upon literacy and, in the past, a predominantly Christian spirituality.

The arrival of the networked computer not only transforms the revered book into undeniably commercialised machine, it also has the capacity to transform and represent the human body or identity as archived data. Thus the biotechnologically reformatted psyche or the supposedly disembodied cyborg (the human self uploaded to the machine, or reading, writing, and publishing at the screen interface) represents a challenge to the notion of human consciousness as an embodied being developing a refined identity through education by the material book. As with the characterisation of physical disembodiment discussed in the previous chapter, the disembodiment of ink on page into electronic aether has resulted in a conversation concerning the revolutionising of human consciousness or identity, which ultimately serves to reinscribe traditional beliefs about human identity that are based upon historical metaphors of text, body, and human spirit. Our bodies and our consciousness, as I will later discuss, have been
associated with the book and the page since such machines for reading first appeared, but when the language used to describe our bodies, our texts, and our machines is no longer metaphorical or analogical but rather symbolical, our notions of our own human identity must shift slightly to accommodate the machine. That is, our understanding of our bodies in relation to our machines is no longer a comparison between joints and hinges or a book’s header and footer with our own head and feet, but our body processes, our body itself, can now be accurately reproduced by machine calculations; our entire DNA sequence is now transcribed as computer text. Our bodies, our machines, and our texts are no longer definitionally distinct when we can use the on/off mechanisms of DNA combination to do computer calculations (see Bass and “DNA Computer”). It is this convergence of signs for body, machine, and text that suggests our posthumanity and contributes to the extreme narratives of an exaggerated and horrifying effacement of human embodiment in literary and cultural theory to embellish an underlying concern about the consequences to the human spirit/identity when we can be reproduced by technological means—when we are definitionally indistinguishable from our technology.

What changes when we no longer think of the book as real but rather as “virtual”? The book has long been considered a machine for reading, but presentation of text on the electronic page of the digital machine rather than on the surface of a parchment and leather or paper machine has inspired a flurry of commentary on the future of the book that seems inevitably to address not only how the page will change but, more profoundly, how we will change with the increasing prevalence of invisible
bits as the storage medium for our knowledge. Whether a lamentation for the loss of
the smell and texture and substance of ancient books, or an exultation in a supposed
new freedom from hierarchical structures, the conclusions are overwhelmingly
consistent that the “terminal” page signals an end, or at least a beginning of something
else, which will profoundly affect our historical perspective, our cultural and democratic
values, our ability to reach our young, even our morality. After Adorno, Benjamin, Innis,
Ong, or McLuhan, it would be imprudent to argue that the material form of
communication is not intricately connected to cultural paradigms, “grooves which
determine the channels of thought of readers and later writers,” as Innis stated it in his
exploration of monopolies or oligopolies and hierarchies of knowledge in The Bias of
Communication (11). Whether the material of the page is indeed causative, however—
whether the electronic page is a technology that effects freedom and democracy (see
Bolter, Lanham, Landow, Miller) or cultural decline (see Birkerts, Fulford, Heim, Stoll),
whether the page’s influence on our culture is more important than our culture’s
influence on the page (and whether “our culture” means western society or the
academics who are responsible for most of the speculation upon the materiality of our
texts)—seems not only impossible to conclusively determine but in itself is a
conversation laden with cultural assumptions about knowledge as a visible material form
both representing and molding the invisible, immaterial entity that is our soul or
intellect. Speculation upon the immaterial construction of our electronic texts is a

1 For reflections upon the future of the page or book and the cultural consequences of
electronic texts see, for example: Birkerts; Birkerts et al.; Bolter; Castel; Coover; Grusin;
Hardison; Heim; Joyce; Landow; Lanham; McLuhan; Moulthrop; Nikiforuk; Nunberg;
Stoll; Tolva; and Turkle.
conversation about human embodiment: it is a conversation haunted by the old philosophical questions of the physical body and its relationship to human spirit.

Katherine Hayles notes in *How We Became Posthuman* that “the liberal humanist subject lies in the mind, not the body,” suggesting that the so-called posthuman condition can be seen as deconstructing the liberal humanist subject but also, “to the extent that [it] constructs embodiment as the instantiation of thought/information, it continues the liberal tradition rather than disrupts it” (5). I would agree with this statement, adding however that the electronic environment that “necessarily makes the subject into a cyborg” (xiii) is seen as disruptive to the liberal tradition due to the resulting destabilisation of paradigms for both mind/body and mind/text relationships. The electronic page has been instrumental in reconfiguring these two separate but related aspects of western society: it has destabilised our understanding of our bodies (no longer predominantly conceived of as the cathedral for the soul but rather as mechanical entities equipped with computing devices called brains); and it has destabilised a centuries-old system of inscribing and disseminating principles of morality (religious or humanist or socialist) through stable and unchanging, hierarchically sanctioned texts written and published by institutionally approved authorities.

Page, body, and spirit together have a long tradition. Metaphorically the page has always been a body with header and footer; it might contain an appendix or index (from the Latin meaning “indicator” or more specifically “forefinger”) or footnotes or frontispiece (from the late Latin frontispicium, from frons, “forehead” and spic-, “a root denoting “see”); it might be part of a chapter (from the Latin caput, head); it is bound into a book with a spine (and the electronic page has access to memory). A material
surface with boundaries, edges, and margins, for centuries it has been made of skin, and bound in skin. Correspondingly, the body has been metaphorised as a book for centuries. Recall for example that the “founder” of modern anatomy, Andreas Vesalius (1514–64), is known for revolutionising the pedagogy and study of anatomy with his assertion that not ancient books but the human body itself should be the primary text and ultimate authority in the study of human structure. William Harvey (1578–1657) reiterated in his work on reproduction the dictum that study of the body should precede study of texts “since Natures Book is so open, and legible” (23).

On a symbolic level, material page and body both are receptacles for the immaterial human spirit. As a material representation of thought, the inscribed page—simplest of mechanical communications devices—represents what has traditionally distinguished humankind from beasts or machines. Page and body are the repository for knowledge, memory, creativity, and imagination as text, mind, or spirit. Shakespeare made use of the analogy of brain as writing surface in Hamlet’s promise: “I'll wipe away all trivial fond records” from memory, he proclaims, to better remember the words of the ghost “Within the book and volume of my brain.” Traditionally the page has also been the vehicle by which religious and moral knowledge are disseminated, and thus when the materialist philosopher Locke published An Essay Concerning Human Understanding, he described understanding (that “most elevated faculty of the soul”) beginning as a surface clear of writing. “All ideas come from sensation or reflection,” he postulated. “Let us then suppose the mind to be, as we say, white paper, void of all characters, without any ideas” (2.1.2).

Locke’s challenge to traditional Christian notions of a moral soul present from
birth and directed by God's will marks the increasing secularisation of our understanding about what constitutes humanity; it also inadvertently emphasises—in an age characterised by both the rapidly increasing commercialisation and distribution of the printed book and the corresponding increase in printed challenges to the traditional authority of the church—the importance of the page as a trope for the inscription of the human spirit. In describing "how men commonly come by their principles," Locke suggested that children "grow up to the dignity of principles in religion or morality" through the doctrines professed by their caregivers, instilled into the unprejudiced understanding, "for white paper receives any characters." All ideas, he suggested, come from sensation and reflection: for Locke, this means a physical body experiencing sensually the external physical materials in the "real" world ("yellow, white, heat, cold, soft, hard, bitter, sweet") and a mind contemplating these sensations. Reflection for Locke is "the operations of our own minds within"—the experience of the "real" world that writes knowledge onto the blank page of mind. As we shall see, both the sensory components of the electronic text that create "virtual" worlds, and the unique reflection of or upon reality that results from the operations within our machines (rather than our minds) contribute to the notion that electronic texts will change both human embodiment and human understanding of the world.

The metaphoric linking of the material housing of the text to the material housing of the soul or intellect is a common theme in contemporary critique of electronic texts, which emphasises repeatedly that the so-called fusion of machine and human in the electronic archive of the computer means both the redundancy of the human body and the potential loss of our humanity. Michael Heim, for example, writes
that “At the computer interface, the spirit migrates from the body to a world of total representation. Information and images float through the Platonic mind without a grounding in bodily experience. You can lose your humanity at the throw of the dice” (100–1). Sven Birkerts similarly conflates book, body, and humanity in his discussion of the immaterial page in a chapter on “The Fate of the Book”: “Maybe we are ready to embrace the pain of leaving the book behind;” he writes, “maybe we are shedding a skin; maybe the meaning and purpose of being human is itself undergoing metamorphosis” (Gutenberg Elegies, 190). For Kroeker and Weinstein, in the networked text that comprises the Internet, human intelligence becomes reduced to something less than human (“a circulating medium of cybernetic exchange”). “Key to the success of the virtual class,” they write, “is its promotion of a radically diminished vision of human experience and of a disintegrated conception of the human good: for virtualizers, the good is ultimately that which disappears human subjectivity.” The codex book, however, has also represented information and images without a grounding in physical experience; it has on numerous occasions presented a diminished vision of human experience and a disintegrated conception of “human good.” Both paper page and electronic file contain expressions of human consciousness (whether benign or maleficent) and, indeed, paper and file frequently contain exactly the same text. How is it that the meaning of being human is so profoundly linked to the materiality of the text?

In any given discussion of the cultural effects of the electronic text, whether optimistic or pessimistic, at some point we are asked to acknowledge the effects of the electronic page upon our relationships to our own bodies and spirits. Indeed, with the
rise of machines built to mimic human consciousness, with the increased prevalence of computer control of and communication with the biological processes in living organisms, our literature has exhibited an “ontological nausea” (Dery) at the perceived loss or redundancy of—or freedom from—the “natural” body with its physical limitations. Thus cultural analyses of the electronic text or hypertext will almost inevitably discuss embodiment versus disembodiment, or the “reality” of those tactile or visible objects our sensory perceptions tell us exist versus the “virtuality” of those things our bodies are fooled into sensing (variously called virtual realities or virtual worlds, though arguably Fielding’s Tom Jones is as virtual a world as is the computer narrative game Myst or a computer simulation of flight or surgery²). When the page becomes electronic, when the workings of the computer emulate the electronic processes and functions of the human brain (where Galen, Vesaluis, Descartes, and others in the history of western medicine and philosophy have situated the seat of the soul), when the brain is accepted as electro-chemical mechanism and the mind its secretion while the electronic page is characterised as an indeterminate entity both particle and wave, the acceptable metaphoric links between body and page become highly contested. If the page is traditionally the material embodiment of immaterial mind, then as the composition of the page tends toward mystery—immaterial bits—while our

² One could argue that the most significant difference between imaginary worlds of fiction and virtual worlds of computer fiction is that the latter require more expensive gear. All narrative is to some degree virtual reality (virtual meaning “in essence or effect but not in fact”). Both imaginary and virtual worlds are representations of the real world, but computer generated representation is mapped/reflected/simulated at a higher resolution, and computer-generated virtual reality may provide sensory (bodily) stimulus such as three-dimensional imagery, touch, or sound to describe the imaginary world in addition to textual information.
explanations for the workings of the less and less mysterious components of humanity—mind and body both—tend toward material and mechanical processes, there is a problematic and often disturbing reversal of metaphorical fields and relationships. This is compounded by the fact that our computer texts can reflect an environment so finely mapped that it seems real to our visual, auditory and proprioceptive senses. If we once saw "humanity" as the mind inscribed by the sensory experience of the world (which then represents it on the page), then what happens to our notions of human subjectivity when the computer text can in effect replace that function of the human brain and represent the world to us in a text without our having to have perceived it first?

What I explore here, then, is in part the materiality and immateriality of the page but moreso the metaphors of page and book and their relation to our physical bodies and immaterial souls, and thus our cultural understanding of what it means to be human. The legible body, the material page, and the expression of the human spirit on the page figure as largely metaphoric structures intricately entwined, which together symbolise our humanity. As the complexity of the architecture or our understanding of the architecture of our bodies and our machines rapidly evolves, the material of the page literally symbolises the future of our humanity.

Before proceeding further, some definitions are required. I refer frequently in the ensuing pages to consciousness, mind, soul, spirit, or ghost. Although these terms connote vastly different notions of that unnameable, un-locatable, and unmeasurable quotient of humanity, they all represent the animating life force that has been associated over the centuries with rational thought or free will, and therefore morality and/or
immortality and which, regardless of what it is called, seems to be located in the vicinity of our brains. Second, what is meant by “electronic page”? Page, of course, comes from the Latin página, a column of writing in a scroll. The display of text and image on a computer screen in a horizontal or vertical format similar to the dimensions of our traditional paper pages, which we read by “scrolling” up or down, corresponds quite closely to the traditional page. Indeed, the e-texts that are published via the Internet are called web pages, and are marked up with attention particularly to duplicating the appearance of the printed page (as are other forms of electronic text that replicate on screen aspects of traditional page layout and format). The electronic page is both database and bits, potentially far more malleable and responsive to user input than the paper page, and a completely new means of mimicking the train of human thought, but it is nevertheless a form of page upon which our texts appear. The term electronic describes the flow of electronic charge that results in generating, sending, receiving, storing, and display of the binary data that comprises a computer text: the text is in electronic form when bombarded onto certain computer screens to form images, or when it is “moving” through circuits, or stored temporarily in random access memory (the use of this term, however, is slightly problematic since a computer-mediated text may also take the form of sound waves, magnetised atoms, or physical bumps etched into the surface of a CD). The electronic page has two states: the visible display of text legible to humans (which may be text and image in a sophisticated layout approximating a full-colour printed page or the underlying program code displayed as unformatted alphanumeric text), and the invisible machine-readable bits that are the information for the transmission and storage, content, layout, markup, and programmed functional
capabilities of the page on the screen. The electronic page or book therefore does not correspond exactly to the paper page in that its composition relies upon both the seen and the unseen text, and while the alphanumeric code saved as bits may not be visibly displayed in the familiar format of a surface upon which text and image are placed, the data of an electronic page must be stored somewhere in order for it to exist. When I write of the archived human body or consciousness as “page” I refer to the visible display of text or image, though of course the fact that body and consciousness are also represented as invisible binary encoded data is central to the reconceived figure of the human body as Book of Nature.

Finally, the electronic page is closely associated with the figure of the cyborg, the human-machine amalgam. The cyborg is not merely a human with mechanical components but a human with written and mechanical components. The conception of the computer as virtual library of human memory coincides with conceptions of both the human mind and human reproduction as textual code: the organic body as a programmable entity and the sum of knowledge as a machine process mimicking human thought share a similar history in fact, as American post-war scientific endeavours. Vannevar Bush’s article “As We May Think,” which described in theory what would be realised in computer hypertext documents (“a device in which an individual stores all his books, records, and communications, and which is mechanised so that it may be consulted with exceeding speed and flexibility. …an enlarged intimate supplement to his

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3 The cyborg Clynes and Kline envisioned in their 1960 “Cyborgs and Space” was to have both mechanical components and controlling mechanisms in an automatic feedback loop—that is, incorporation of both machine and communications device (writing) form the cyborg.

“Earlier accounts of individuality were associated with some sort of identity of matter, whether of the material substance of the animal or the spiritual substance of the human soul,” he wrote. “We are forced nowadays to recognize individuality as something which has to do with continuity of pattern, and consequently with something that shares the nature of communication” (103). While there was significant debate in the United States about the applicability of Wiener’s information theory to genetics, the metaphors of human life as text were nevertheless present and became, as Kay argues, dominant and potent metaphors “in the general conceptualization of heredity as a genetic program, a scriptural technology” (90). While representation of the body’s reproduction as information system is a post-war phenomenon (the term *information* for Wiener had a highly specific mathematical meaning), the analogy of human bodies as textual, written

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documents was a very old one and was not unique to Wiener’s work. Indeed, some years earlier, in publishing their discovery in 1938 that the human genetic material was DNA in the form of long chains, Leeds researchers Astbury and Bell had also used the metaphor of human life itself as pattern and text:

Knowing what we know now from X-ray and related studies of the fibrous proteins, …how they can combine so readily with nucleic acid molecules and still maintain the fibrous configuration, it is but natural to assume, as a first working hypothesis at least, that they form the long scroll on which is written the pattern of life. No other molecules satisfy so many requirements. (Astbury and Bell 114)

These three formative technologies, the machine as memory system, the mind’s regulation of the body as information system, and the body’s reproduction itself as textual code, have fused in the figurative and actual construct known as cyborg.

The cyborg is the merging of the knowledge of our bodies and our machines at the loci of the brain and reproductive systems. Our increasingly complex understanding of natural and body systems has influenced how we build our machines to mimic those systems; and thus, as machine processes seem to replicate more and more closely the processes of human reflection and reproduction, the cyborg represents a destabilisation of our very humanity.

The cyborg exists as both a material being and a symbolic one. It is in literal terms a real human body modified by machine and program. In metaphoric terms, the cyborg is the human body unchanged while the human being “enters” the machine as transcribed body or transcribed consciousness. In the first case, the body joins with the
machine as communications system transferring information as data which determines a programmed process of a feedback loop; in the latter case, the consciousness enters the machine and interacts with virtual bodies (avatars) in a virtual world, also archived as textual data, as code, as information. William Gibson's name as the spokesman for this postmodern cyberpunk era we see ourselves inhabiting results from his succinct depiction of a future society in which text and body, human consciousness and human reproduction (both physical and representational) are condensed:

[L]n some weird and very approximate way, [being in the city] was like a run in the [computer] matrix. ...it was possible to see Ninsei as a field of data, the way the matrix had once reminded him of proteins linking to distinguish cell specialties. Then you could throw yourself into a highspeed drift and skid, totally engaged but set apart from it all, and all around you the dance of biz, information interacting, data made flesh in the mazes of the black market.

(*Neuromancer*, 16)

As Scott Bukatman remarks in his chapter on "Terminal Flesh," with the appearance of *Neuromancer*'s Case

the state of terminal identity, the thorough imbrication of human being and electronic technology, is nearly complete. The body of the subject, and thus the subject itself, has been encoded and decoded, penetrating the terminal to discover, as a character in *Schismatrix* finds, that "there's a whole world behind this screen." (243)

Bukatman concludes:

the body must become a cyborg to retain its presence in the world, resituated in
technological space and refigured in technological terms. Whether this represents a continuation, a sacrifice, a transcendence, or a surrender of “the subject” is not certain. ...in works as otherwise diverse as Neuromancer or Max Headroom, Blood Music or Videodrome, the condition of being is presently listed as terminal. (247)

On the one hand, linking the material housing of the text conceptually to the material housing of the soul/intellect suggests that the death of the book parallels the redundancy of the human. As the page becomes immaterial, so is humanity depicted as immaterial, the soul perilously flickering in a state of virtuality: in the process of dematerialising our selves into the ethereal text of the computer, we imagine that our embodied humanity gets left behind, snagged on the edge of the screen separating world from data. On the other hand, the continued existence of the conscious mind or the soul, or spirit, or ghost, coupled with freedom from the body’s limitations is a longstanding human desire, of which the electronic archive is the secularised version. The electronic page, then, also represents the human dream of or fears for some aspect of our selves, be it cellular or spiritual, that lives on after the death of the body.

2.2 Mind as Page: Ideologies of the Post-Modern Soul

Nor shall death brag thou wander'st in his shade,

When in eternal lines to time thou grow'st:

So long as men can breathe, or eyes can see

So long lives this, and this give life to thee.

—William Shakespeare, Sonnet 18
The literary conceit that inscribing one's thoughts and emotions upon a page will confer a semblance of immortality upon the author or subject (reconfigured now that the textual contents of the page are further abstracted as on/off bits of information) has resurfaced as the notion of "uploading" the mind to the computer so the consciousness as code lives on without the body. In popular cyberpunk fiction this has been a common theme. Pat Cadigan's story "Pretty Boy Crossover," for example, depicts the trade of immortal youth, beauty, and fame on the screen in exchange for the death of the physical body and an enduring though possibly limited sentience. Rudy Rucker's trilogy *Software*, *Wetware*, and *Freeware* features the transfer of both human and machine consciousness from one material housing to another in a process as straightforward as switching hard drives from one computer to the next: the old "pheezer" Cobb Anderson, whose "software," his "personality, his memories, his style of thought" (*Software*, 24) have been digitally preserved, discovers with some chagrin that his mind has been placed in a Mr. Frostee ice cream truck. Similarly *Mona Lisa Overdrive*, the third and last of William Gibson's Sprawl series that made cultural currency of "cyberspace" and the phrase "data made flesh," is an exploration of the ghost in the machine as a form of sentience akin to immortality. A central character of the concluding novel, Angela Mitchell, is a cyborg entity—a fusion of organism, machine, and code—a woman whose brain has been engineered to jack into cyberspace without external hardware. At the novel's end, Angela is killed as she crouches over the dead body of her lover Bobby Newmark. Her consciousness, however, will live on with his, uploaded as data to the computer matrix to exist in a disembodied afterlife in a high resolution, three-dimensional virtual space along with several other "ghosts" of dead acquaintances.
and artificial intelligences. This microcosm of the physical world is contained within a powerful biochip,\(^4\) called an aleph (or "soul-catcher"), with a virtually infinite storage capacity (it is, according to one character, "an approximation of everything" [154]).

Gibson’s series frames cultural questions that are frequently identified as uniquely postmodern concerns about the machine, but in many ways the evolution of the material “holders” of our textual inventions and representations of ourselves and our environment from page to microchip to bionchip reiterates an old metaphor of capturing the soul or spirit in the text: the sentient beings that live on after death of the body as programmed reproduction of consciousness are essentially encoded as bits (signs representing 1/0) and/or alphanumeric text. The aleph not only recalls “The Aleph” by Jorge Luis Borges, wherein the poet Danesi attempts to “set to verse the entire face of the planet” with the aid of the Aleph in his cellar (a point in space that contains all points, where everything in the world is both represented and present); Gibson’s aleph biosoft also specifically associates the ghost, soul, or immortal angel with this electronic archive of the universe. The computer chip where Angie (Angela, suggesting “angel”) and her partner Bobby (The Count, suggesting of course the computational component of their afterlife) will reside in an artificial world after their deaths until their power source runs out—the aleph—is a deliberate association of human consciousness with alphanumeric text. These worlds, created by human devices and filled with textually rendered objects that can be sensed by the uploaded human

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\(^4\) A biochip is an integrated circuit composed of biochemical material or organic molecules. In Gibson’s trilogy the biochips that are grafted into Angela Mitchell’s brain, and allow her to access the matrix without computer hardware, are produced from “immortal hybrid cells” engineered from human cancer cells and a DNA model.
consciousness, seem to offer a means of defying death through a sometimes gruesome process of detaching the mind from the dead and decaying flesh.

_Neuromancer_ (1984), first of Gibson’s Sprawl series, plays on images both of the body as data and of consciousness as information: in a future world where commerce revolves around the recreation of bodies through grafts and implants, genetic material and hormones (10–11); where corporations inject employees with microprocessors, the hero Case, who had once “lived for the bodiless exultation of cyberspace,” recalls also that the elite stance of the cyberspace cowboy involves “a certain relaxed contempt of the flesh” (Neuromancer, 4–6). The body is “meat,” and when Case enters the matrix (the electronic information network), which reminds him of “proteins linking to distinguish cell species,” he is “data made flesh” (16). Here the page becomes three-dimensional or, more accurately, describes a three-dimensional world, and the consciousness enters it as a virtual body with virtual flesh, existing in a virtual space with almost no need for physical body or physical reality.

What Gibson called the “consensual hallucination” of cyberspace currently exists in either the textual worlds of MUDs or the graphical/sensual worlds of virtual reality, where the characters one creates and inhabits, their physical appearance, travels, objects, and adventures are “real-time” experiences and instantaneously archived data preserved in the electronic text of the recorded “real.” Nor is the dream of a form of immortality as coded consciousness free from the constraints of the body merely a fictional construct. In a 1996 lecture Toshiba Professor of Media Arts and Sciences at MIT Marvin Minsky claimed that in the near future it will be possible to transfer human memories, intact, to disk (cited in Hayles, _How We Became Posthuman_, 13). Also in 1996,
head of British Telecom’s research lab Peter Cochrane described a technology to capture human thoughts on a single silicon chip which he dubbed “Soul Catcher” and in which British Telecommunications invested: “Despite specialisation and an exponential growth in knowledge,” he wrote,

we still see people of outstanding ability able [to] understand and contribute more than the average. Unfortunately, they die and their expertise is lost for all time. The question is, can we capture their expertise and presence for future generations? Do they have to die 100%?”

Somewhat tongue-in-cheek, Business Week’s article “The Mind is Immortal” later described the future technology as being able to make a rather straightforward decision by the year 2050 “to evacuate your biological body and take up residence in silicon circuits.” The Soul Catcher would comprise “wireless links to microsensors under your scalp and in the nerves that carry all five sensory signals” to record “organized, online archives of everything that happens,” (so described by D. Raj Reddy, a professor of computer science at CMU). The article concludes:

For people who chose not to inhabit silicon, virtual immortality could still ease the sense of futility that now haunts many people. Individuals would know their lives would not be forgotten, but would be preserved as a thread in a multimedia quilt that keeps a permanent record of the human race. And future generations would have a much fuller understanding of the past.

Much like the genetic “map” that makes our cellular information live on generation after generation, this technology will purportedly transcribe consciousness by mapping the sequence of experience that is written upon our minds.
The four-letter code of genetics, data storage miniaturisation, microprocessor-controlled prosthetics, artificial intelligence, the global grid of communication/control systems—the fusion of our understanding of our own bodies with the virtual representation of life onscreen, all problematise what were once clear boundaries between categories of the human and the text. And when the page becomes "virtual," somehow so does the human as characterised by cyborg discourse—that is, an almost human, a human in form, but something more, or less, than human.

While the pessimistic vision of humanity's future with the advent of the electronic page is often dark and apocalyptic, there is also a freedom implied by the mind’s escape from the body. This freedom of the mind, particularly in cyberpunk texts such as Gibson's work, corresponds to a marginal and disenfranchised underclass defying systems of corporate hierarchy and regulation of human bodies in the "real" world. The postmodern debate on the materiality of the text, in contrast, is frequently caught in a moralising negativism that suggests the human body is inevitably robbed of spirit by the machine: in these scenarios, the lawless frontiers of cyberspace will steal our souls and transform the masses into empty beings, at the least passive and unthinking if not passively evil. The invisible and aethereal components of the electronic page representing the immaterial thoughts of anyone who troubles to publish them become emblematic for some writers of a progression towards superficiality, inhumanity, and a giving over of spirit to the machine. The premise of Clifford Stoll's *Silicon SNAKE OIL: SECOND THOUGHTS ON THE INFORMATION HIGHWAY*, for example, is as follows: "Perhaps our networked world isn't a universal doorway to freedom. Might it be a distraction from reality? ...A misuse of technology that encourages passive rather than
active participation?” Andrew Nikiforuk cautions in *The Globe and Mail* that computers have been “oversold with terrorist-like nerve,” and “citizens should remember that computers are just a glittery delivery truck. …pitifully empty of rousing ideas, [and] moral parables.” Vivian Sobchack describes electronic space as a “two-dimensional, binary superficiality” and suggests that the electronic text, which “disorients and liberates the activity of consciousness” is “dangerous” because its “lack of specific interest and grounded investment in the human body and enworlded action,” she argues, “its saturation with the present instant, could well cost us all a future” (104).

Devaluing the physical body and the material world by immersing ourselves in the electronic text, she concludes, “suggests that we are all in imminent danger of becoming merely ghosts in the machine” (106). How the engagement of human consciousness with an electronic text on a horizontal/vertical grid differs from the engagement of human consciousness with an inked text on a horizontal/vertical grid is not fully explained here. Nevertheless, the implication that the immaterial page captures our souls (ghosts) is explicit.

For critics such as Jean Baudrillard and Arthur Kroker, who might represent the most extreme theorists of what is seen as a postmodern crisis of representation and humanity, electronic communications merge human-as-archive and textual-machine-as-etherial-impulse into a horrifying vision of humanity's future. Kroker and Weinstein, for example, write that

the virtual class promotes a grisly form of raw social materialism, whereby social experience is reduced to its prosthetic after-effects: the body becomes a passive archive to be processed, entertained, and stockpiled by the seduction
apertures of the virtual reality complex” (“Global Algorithm 1.4,” n.p.).

Baudrillard similarly suggests that the electronic text in effect captures the soul and leaves the empty shell of human body behind: “[A]s soon as behavior is crystallized on certain screens and operational terminals, what’s left appears only as a large useless body, deserted and condemned. The real itself appears as a large useless body,” he writes. “This is the time of miniaturization, telecommand and the microproccession of time, bodies, pleasures. There is no longer any ideal principle for these things at a higher level, on a human scale” (“The Ecstasy of Communication,” 128–9).

For Baudrillard, the world of freely available information is an obscene one:

“today there is a whole pornography of information and communication,”

that is to say of circuits and networks, a pornography of all functions and objects in their readability, their fluidity, their availability, their regulation, in their forced signification, in their branching, in their polyvalence, in their free expression. (130)

Obscenity begins, he explains, when “everything is exposed to the harsh and inexorable light of information and communication” (130). Baudrillard’s play on the word obscene as the movement away from the scene of the body and the landscape to a hyperreal simulation also of course relies on the denotation of obscene as indecent and morally offensive. And while claiming that “this is not necessarily a negative value judgment,” he writes of the disappearance of passion in the obscene world of information—of hazard, chance, and vertigo as opposed to the passion, investment, desire, and expression of a previous (and, I would argue, idealised) era. Similarly, in his 1983 Simulations, Baudrillard argues that the archived digital codes of both body and text are deceitful, claiming that
such codes hide the fact that they reflect no physical reality other than their own model. Inherent in the computer simulation of the real is the ability to reproduce what was once assumed to be the work of God or Nature: the real, he writes, “is produced from miniaturised units, from matrices, memory banks and command models—and with these it can be reproduced an indefinite number of times.” (3). Thus he posits that divinity is “volatilized” in the “visible machinery of icons being substituted for the pure and intelligible Idea of God” (8). In Baudrillard’s successive phases of the image, “the reflection of a basic reality” is good: “the representation is of the order of sacrament”; while the second order, which “masks and perverts a basic reality,” inaugurates the age of simulacra and simulation and is “an evil appearance—of the order of malefice” (11–12).

Baudrillard here summarizes a crucial issue of the convergence of page and body in an electronic text: when we can reproduce ourselves in and through the writing of our own models by a machine that reflects not the sensory experience of the world, but merely our own ideas of it, we tamper with both ancient notions of natural human understanding and with the natural reproduction of our bodies. The section in Simulations entitled “The Metaphysics of the Code” emphasises this tension between human reproduction and electronic textuality: Baudrillard begins with a summary of the “new operational configuration” of a universe of structures and binary oppositions, proclaiming that “Digitality is its metaphysical principle (the God of Leibniz) and DNA its prophet” (103). But what is a “pornography of information and communication” (“Ecstasy of Communication,” 130)? If pornography is writing about sex, and information and communication refer to forms of written and disseminated text, then a
pornography of communication is about the sex in writing (that is, reproduction). For Baudrillard, the level of the second, third, or fourth order of simulacra, the hyperreal (or simulation without an original) are a godless form of being: there is “no longer any God to recognise his own” (12), he writes of the reformatted cyborg body-mind. Simulation of both the physical body through genetic mapping and sensory experience through virtual reality in the computer is a high-resolution mapping of real objects and events, based upon the precision of mathematical rendering or prediction. In this way, the electronic page usurps the position of what we have come to define as human subjectivity—the human being created by God or Nature through “natural” sexual reproduction, inscribing upon the mind’s screen the sensory experience of the real world external to the mind. In the electronic page is both a reflection of the real and invention of an imaginary world, and a reproduction or re-creation of the human body and mind or spirit. The computer, by virtue of its high-resolution representation of human experience, seems to hold within it and distort the essence of humanity: it generates sensory experience, it mimics human consciousness and thought processes, it creates a virtual human body for a transcribed consciousness; it has transcribed a map of the human genome and has made possible the rewriting of the human body, mind, and emotions. The age of simulacra is a “decisive turning point,” Baudrillard claims, “in which there is no longer any God to recognise his own, nor any last judgement to separate true from false, the real from its artificial resurrection, since everything is already dead and risen in advance” (Simulations; 12).

If we can indeed reproduce our minds or souls in the electronic page, then our perceptions of mind-body relationships undergo tremendous cultural revision. In these
extreme versions of the effect of the electronic page, we can either recreate our selves as
digital angels; or we can risk the disappearance of God and ruin Judgement Day, when
according to Christian faith the dead shall be raised. As we shall see, the metaphors of
the body as page are also intrinsically associated with our cultural understanding of the
minds or souls of humankind.

2.3 Body as Page: The Archived Body and the Book of Life

Floating through the skull and heart and lungs of Alexander Tsiaras's world we
see every detail of our knowledge about the body and our ability to measure
and define its function. We see here a body utterly and vividly intact. Only the
soul has been removed. ...whatever else is to be found in this collaboration
between an executed criminal and an artist we are somehow deftly aided in the
ancient search for the soul. It is the oddest of ironies. The atomized, digitized
body of Joseph Paul Jernigan reconstituted and imbued with a mesmerizing
beauty and realism is as good an argument for the tangibility of the soul as one
can find in this cheerless age of cause and effect.

—John Hockenberry,

Introduction to Body Voyage by Alexander Tsiaras

[A] living virtual reality...originates with the merger of genetics and simulation
where blood turns into electricity. ...[It] functions in the time of recombinant
culture, whose sociology is based on splicing, cloning and sequencing. ...The
vanishing body has been resuscitated, just short of vacuity, as the circulating
body. The body has become a circulating medium of exchange, coursing
through the mediascape. ... The wired body is also the scanned body—input and output—a fully colonized alpha and omega of, by, and for the mediascape. The "biological" (scanned and wired) body is an image resource for the mediascape and, for the time being, its image actualizer. ... The perverted image (perverted as image exchange-value) and the ambivalent sign (fanatical and cynical) are the effects of the dependence of the mediascape on "biological" bodies as image resources and image actualizers. ... Welcome to the post-God era.

—Kroker and Weinstein, Data Trash, 56–7

Like the capture of the mind in the electronic text, the capture of the human body in the machine text also represents both a redundancy or death of the human body and an immortality of sorts in the code. Depending on the writer’s point of view, this may be a terrifying spectre of human insignificance signifying a posthuman existence or it may be a positive vision of continued life beyond the body’s death (also signifying a posthuman existence). Over the centuries ideas of spirituality and morality have been culturally structured by the assumption that the spark of life, genius, or spirit is an unaccountable and undiscovered and possibly immaterial entity located within our bodies but somehow separate from our physical being; every time another discovery is made to explain the mechanical-chemical workings of our bodies and brains, the soul seems dislodged from its precarious position as mysterious life force in the body. The refinement of the medical understanding of our bodies as material architecture controlled by hormonal communications systems in a feedback loop with electro-chemical systems in the brain seems to further disprove any likelihood of the existence
of an immortal part of our selves.

While it is common to proclaim that we have "evolved" into the cyborg or the posthuman, it is our awareness of our bodies, previously as the temple of the soul and now as pages of editable text archived in the virtual library of the machine and retrieved for display on the "postmodern" page of the computer screen, that has profoundly changed. In a striking parallel development, as our knowledge of the body's most invisible elements and processes has become more complex, visualised, and transcribed in visible form, the architecture of the machines that mimic the processes and actions of the human body has become more complex, hidden, and invisible. Consider the difference, for example, between a page in which you can actually feel the patterns of letters in the raised ink under your fingertips, to a page that exists only in random access memory until it is saved to a mysterious and invisible position on the hard drive as magnetised bits decipherable only by the machine. And consider the difference between William Harvey's discovery of the path of blood circulation which he announced in 1616, to the discovery in 1989 by J.R. Riordan et al. that the majority of people suffering from cystic fibrosis have a small mutation in one microscopic DNA fragment, which causes three out of one gene's 250,000 base pairs (A-T or G-C) to be missing (that is, three out of some three billion base pairs in the DNA of our 46 chromosomes), a deletion which in turn results in the loss of one amino acid—one molecule—out of the 1,480 in the protein for which that gene is a "blueprint." Our bodies and our texts have

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5 As a species, Homo sapiens has not changed into a significantly different or more complex form: while our social experience of the world has changed enormously in the last fifty years, genetically our species does not significantly differ morphologically or physiologically from our pre-postmodern ancestors.
become similarly coded bits (1,0 encodes machine texts, while A,C,G,T encodes body
texts) but conceptually our understanding of body and text has been reversed: the white
page with its black ink that has always been visible and accessible in the codex book is
now mysterious and hidden bits; the components of living bodies, the creation of both
life and thought that were once hidden and mysterious in the human body are now
magnified, diagrammed, documented, transcribed, archived.

At the same time, the body becomes highly metaphorised as a text not only to be
read and transcribed, but also re-written. This fundamental change in our understanding
of the body as page is illustrated most tellingly by current metaphors for study of the
body no longer as Book of Nature authored by God but now as genetic blueprints co-
authored by humans—the published, bound, and immutable work versus the page
describing the plans for a work yet to be finished. Thus Andreas Vesalius (1514–1564)
wrote in Epitome (1543), “Concerning the Organs Which Minister to the Propagation of
the Species,” of God the “Author of the human fabric” (83). In contrast, Victor Spitzer
and David Whitlock, directors of the Visible Human Project datasets and authors of The
Atlas of the Visible Human Male (1998), subtitle their text “Reverse Engineering of the
Human Body;” and the U.S. Department of Energy’s overview of the Human Genome
Project, “To Know Ourselves” (1996), introduces the human genome as “The Recipe
for Life.”

In the rhetoric of body as archive in literary and cultural theory, the notion that
the natural human body has become redundant exists in direct contrast to the medical
versions of its centrality. The transcriptions of the human body through the Visible
Human Project and the Human Genome Project, both stored in the National Library of
Medicine (NLM) at the National Institutes of Health (NIH) in Bethesda, Maryland, are the most comprehensive archival projects in medical history. The National Library of Medicine’s Visible Human Project and the Human Genome Project, coordinated in the United States by the NIH and the U.S. Department of Energy, represent for the medical community the culmination of Vesalius’ project to know the human body in order to heal it, to prolong both the quality of life and life itself. For cultural critics it represents something far more sinister.

The Visible Human Project is the outcome of the National Library of Medicine’s long range planning in 1986, which established the library’s goal of “building and disseminating medical image libraries much the same way it acquires, indexes, and provides access to the biomedical literature” (NLM, “The Visible Human Project® Fact Sheet”). The project effectively began in 1989, when the library’s ad hoc Planning Panel on Electronic Image Libraries made the recommendation that the NLM build “a digital image library of volumetric data representing a complete, normal adult male and female” (NLM Board of Regents). Begun in 1990, the U.S. Human Genome Project involves the identification of all 60–80,000 genes in human DNA and the sequences of the 3 billion bases that make up our DNA, the storage of this information in databases, and the development of tools for the data. The datasets resulting from both projects are the human body paginated, represented as alphanumeric code, digitised, pixelated, and available as online databases in the National Library of Medicine’s electronic collections (see the National Library of Medicine’s Databases and Electronic Resources at www.nlm.nih.gov/databases/databases.html).
The Visible Man was the first project to be completed, a process of mapping by MRI and CT scans the fresh cadaver of executed murderer Joseph Paul Jernigan, freezing the body so the tissue offered the same resistance to the saw as did the bone, quartering the body and positioning it in gelatin coloured blue with food dye from the university cafeteria, and finally milling away the surfaces of the frozen blocks from toes to head at 4 mm intervals and digitally photographing each newly exposed surface (figure 2.1). At a resolution of .33 mm, the raw data totals 15 gigabytes, or twenty-three CDs, as the literature frequently explains (the anonymous Visible Woman dataset, at higher resolution, is about 40 gigabytes in size).
One of the most significant changes in the study of anatomy represented by the dissection of Jernigan is that the body has been cut not to reveal gross physical units such as a given muscle, organ, or tissue, but rather in cross-section as fine leaves of body. These digitised leaves of Jernigan's body now exist in the form of a comprehensive and readable electronic text. Various "fly-through" animations of the sliced body available for public viewing on the Internet are created in the same way that flip-page animations are: a sequence of consecutive images shown in rapid succession are interpreted by the eye as movement (see, for example, "From head to toe: an animated trip through the Visible Human male cryosections" at the "Visible Human Project® Gallery," www.nlm.nih.gov/research/visible/visible_
gallery.html). The NPAC/OLDA Visible Human Viewer (www.dhpc.adelaide.edu.au/projects/vishuman2) is a Java applet that allows the viewer to place something akin to a bookmark at any point on the body and then download that particular page as an axial, coronal, or saggital plane of the sliced body (figure 2.2).

Not only the visual display but also the rhetoric of the body as a book appears frequently in the project literature and popular media: for example, project officer
Michael Ackerman described one of the problems with the archival material as the absence of labelling for the various systems and organs of the digitised body: “For a librarian, this is very unsettling. It’s like having books lying all over the place not indexed or catalogued” (Wheeler A14). The liner notes to Body Voyage, the CD-ROM featuring renderings of the data by photojournalist, artist, and writer Alexander Tsiaras, emphasise that the data of Jernigan’s body comprises “over a raw terabyte of data—the equivalent of five million typewritten pages.” Life magazine’s feature article on “The Visible Man” in February 1997 comments: “Jernigan had no idea that his body would itself become a textbook” (44). The fold-out article “A Technicolor Gatefold of the Digital Man” in this issue featuring Tsiaras’ work is labeled “The Whole Body Catalogue” and claims that Tsiaras used “15 gigabytes of computer data from a real body—equal to 20 million typewritten pages—to compose this picture” (38). Whether the electronically archived body is equivalent to five million or twenty million pages, what is most prized about the collection is its visibility, the display of the body “as it’s never been seen before.” And having made the body interior visible and legible, the project renders what was once Jernigan “knowable.” What becomes mysterious and awe-inspiring for readers of the Jernigan text, then, is not the complex human authored by God or Nature but rather the human-authored program that renders the flesh as three-dimensional voxels with complex algorithms and powerful hardware, and reassembles the slices into something approximating the three-dimensional human form. Here the systematised visibility of this disembodied body, the gruesomely “real” interiority of the human body provokes comment on Jernigan’s “immortality” through

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6 The editorial review for the Body Voyage CD based on the Visible Man data begins:
being transcribed as archive, as if in macabre imitation of the poets’ conceit of achieving immortality through the lines inscribed upon a page. Even though the project has already contributed to development of visualising techniques that enable surgery to be more precise and therefore less invasive and painful, even though the project allows students to learn anatomy or simulate surgery through repeated dissections of a three-dimensional image of a body that is not preserved (a distorted version of living flesh) or alive (and vulnerable), the reproduction of the human body as computer text has generated numerous commentaries, most notably by Catherine Waldby, on the cultural disturbances to, or violations of, human embodiment through such transcriptions.\(^7\)

Waldby, for example, suggests that “the violence of anatomy is the violence of a particular kind of writing practice, a set of techniques that destroy the fleshly body along particular analytic lines in order to inscribe its trace in various knowledge media” (“Virtual Anatomy,” 89). In the chapter “Posthuman Spectacle” of her recent book *The Visible Human Project: Posthuman Medicine and Informatic Bodies*, Waldby comments that “anatomical knowledge, the rendering of bodily interiors as operative images, can only

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\(^7\) See commentary by Cartwright, Curtis, Thacker, and Waldby.
take place when the anatomical body is sacrificed, killed and dismembered” and notes that in the case of the VHP, this “economy of sacrifice is particularly evident” (36). Further, the repository of Jernigan’s body as an archive of “a social identity and a known history,”

embodies within itself the latent status of all subjects all citizens, as objects within the optical field of biomedicine, potential ‘standing-reserves’ and sources of biovalue. It is this point which ushers in the question raised in this book’s title, the question of the posthuman. (37)

The suggestion of “sacrifice” with an attendant critique of the violation of Jernigan’s dead body is made here without mention of the “Visible Woman,” an anonymous woman who donated her body to science, though Waldby later mentions in her discussion of Jernigan’s anatomisation as “directly determined by his status as penal non-citizen and object of institutional violence” an “unconfirmed rumour [which] claims that [the Visible Woman’s] body was specifically donated to the Visible Human Project by her husband” (56). Neal Curtis also ignores the Visible Woman in his comparison of the VHP representation of the body to Kafka’s short story “In the Penal Colony,” referring only to the executed criminal body of Jernigan to illustrate the violent inscription of the law upon the body.

And yet real bodies, ordinary bodies as well as criminal bodies, have been dissected by anatomy students for hundreds of years in order to benefit the living (not only the wealthy, as Waldby suggests in “Virtual Anatomoy” (105), since anybody visiting a doctor will be the beneficiary of his or her knowledge of human anatomy). The visible human project has the potential to replace the use of dead and preserved bodies for the
study of anatomy: why is it that the study of a *virtual* body—images of a body—become contested rather than the study of hundreds of *real* bodies? What is being contested here? I do not dispute the revulsion that is expressed at the idea of dissection, but there is nothing unique about the dissection of dead bodies. What perhaps is most unique about the VHP besides its consistent availability is its *detail* of representation. The VHP re-creates the human body with such accuracy that it is frequently depicted as Jernigan himself, rather than as images of Jernigan’s body.

Curtis, for example, suggests that converting the body to text is a violent reproduction of the human body without *sanguis*, or “the life blood that flows around the body” (255). Jernigan’s body is thus reproduced by science as text and machine: “the metaphysics of the VHP is its citation and reproduction of a certain configuration of the body, not only as a complex machine, but as the enclosed volume we call the organic body” (263). Moreover, the procedures of “techno-scientific law” enacted upon Jernigan’s body can “reanimate the body and rebirth it” (263), as if to suggest that the images of the body have become a real body without spirit. Curtis emphasises that there is no life blood in the recreation of Jernigan, nor the blood which is the counterpart to Christ’s sacrificial blood draining from his wounds (*cruris*) (254–5). That is, science has created an animated body without the spirit of life. Such criticisms, however, are overstated and frequently without acknowledgement of the benefits of technology to real human lives and living human bodies.\(^{6}\) In part, what is disturbing about this

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\(^{6}\) Once again we can unearth a conflict between the lived experiences of real bodies and the speculations upon technology’s detrimental effects upon human spirit based on tenuous notions of “disembodiment” and the soul. One of the first uses of the VHP data was by SUNY researchers in developing their “3-D virtual colonoscopy,” a non-
transcription is that it destabilises traditional metaphors of the Book of Nature or Book of God: when human architects re-write the body, who is responsible for life and afterlife?

If humans are now the architects of life, who will take care of our ghosts?

Waldby, for example, writes in “Revenants: The Visible Human Project and the Digital Uncanny” that

after all, if a body can be rendered into data and thus cross the interface into the digital afterlife, what prevents the process from effecting some form of reversal, the digital revenant who rematerializes in real space. The spectacle of cyberspace summoned up by the VHP is not one we wish to enter and merge with the data, but rather one which seems to menace us as the space of a new form of death-in-life, a new and horrifying destination for our own failing bodies, and from which such bodies might return in altered and uncanny form.

(14)\(^9\)

Waldby argues that the images of these corpses creates an “indeterminacy between life and death, between living and dead bodies.” The dead bodies used for the Visible Human Project, she continues, have been “preserved from dissolution” and “hence, the powers of preservation and resurrection involved in the digital simulation of the body

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invasive imaging technology using a helical CT scanner and 3-D software to examine the colon. Show me a critic who would rather have a 72-inch colonoscope shoved up his or her ass than admit that the technological reproduction or simulation of the human body is a demonstration of valuing human dignity rather than debasing it and I’ll reconsider my argument.

\(^9\) This so-called menace is somewhat overstated: both Jemigan and the unnamed woman whose body was used for the Visible Woman dataset willingly donated their bodies for medical use, including dissection.
are of the order not merely of its recording but its reproduction” (6). The material flesh itself, however we might personify the representation of it on screen, is not preserved from dissolution; the bodies are dead and decomposing as bodies naturally do; the images are merely images. The rhetoric of a ghastly soulless humanity floating through cyberspace here again centers upon reproduction and on who we would prefer to metaphorise as “author” of humanity.

The Human Genome Project, like the Visible Human Project, is a process of making the interior workings of the body visualised, archived, and legible (that is, capable of being read or deciphered): here the molecular relationships are envisioned and transcribed if not actually mirrored. The metaphor of transcription, the analogy between human life and text, is one that has dominated the rhetoric of human DNA since its discovery. In 1962, for example, Isaac Asimov wrote a book for a popular audience describing the genetic code, in which he created an elaborate analogy of atoms as “the letters of chemical language” and molecules as the words (35); simple molecules he described as the “words of one syllable” (39), and the twenty-two amino acids as “the twenty-two ‘words’ out of which the ‘sentence’ of the protein molecule is constructed” (71); the list of triplet nucleotides that correspond to a specific amino acid is the “Triplet Dictionary” (170). In 1967 microbiologist Robert Sinsheimer, a key figure in the inception of the Human Genome Project, wrote *The Book of Life* in which he commented “In this book are instructions, in a curious and wonderful code, for making a human being. In one sense—on a sub-conscious level—every human being is born knowing how to read this book in every cell of his body” (5). The rhetoric of body as book to be transcribed and re-written appears frequently in descriptions of the Human
Genome Project. A National Human Genome Research Institute press release from 1988, for example, equates life itself with text in an electronic archive:

THE BOOK OF LIFE: READING THE SEQUENCE OF HUMAN DNA

The sequence of bases—the chemical building blocks that make up the DNA strand—contains the instructions for everything a cell does, from conception until death. If the letters representing the 3 billion bases that make up the human genome were printed out in books, and the books were stacked one on top of the other, they would reach as high as the Washington Monument. The ultimate goal of the Human Genome Project is to read the order, letter by letter, of those 3 billion bases. Changes in the spelling of the DNA letters can increase your chances of developing an illness, protect you from getting sick, or predict the way your body will handle medicines. Once scientists can read the DNA instruction book, they will be able to understand and treat diseases better.

(NHGRI 1998)

The statement published by the National Center for Biotechnology Information also emphasises the human body as book and as architectural blueprint:

The Human Genome Project is entering its climactic phase that will result, as early as 2003, in a complete and accurate DNA sequence representing the genetic blueprint and evolutionary history of the human species. Moreover, a “working draft” of this “book of life” may be available as early as 2001 and, in both cases, an index to the chapters and paragraphs will greatly enhance both the completion of the finished product as well as the practical utility of the intermediate results for biomedicine.
This new gene map represents such an index as it includes the locations, within this text, of more than 30,000 genes. (NCBI 1998)

The analogy appears not only in the literature produced for public, but also in textbooks: “The genome is now an open book—any passage can be read” reads Lubert Stryer’s preface to Molecular Design of Life, for example.

The library information for gene sequences as published documents at the National Library of Medicine indicates strikingly how our bodies are actually perceived as pages of text. Searching for “chromosome 7” through GenBank at The National Center for Biotechnology website (www.ncbi.nlm.nih.gov) will result in a number of links to various sequences catalogued just as any other text in our library systems. The descriptor for accession number AC073349 lists the document as a “working draft sequence” of a particular chromosome segment (at last date of access, June 2001). This tiny portion of our bodies written in its four-letter alphabet is accessible online as a long scrolling document; it is approximately fifty single-spaced pages when printed. The catalogued segment has a title, “The sequence of Homo sapiens clone,” and an author, R.H. Waterston.

Inevitably, when we write the human body as page, we position ourselves as its authors. Recall, for example, the National Institute of Health’s patent dated 14 March 1995, on a cell line from a Hagahai person from Papua New Guinea, finally “disclaim[ed] and dedicat[ed] to the public the entire term of said patent” in October 1996, five years after the initial application and only after much public criticism, (U.S. Patent and Trademark Office disclaimers). The claim of United States Patent No. 5,397,696 included the names of several “Inventors”; the “Title of Invention” was listed
as “Papua New Guinea human T-lymphotropic virus.” When the reproduction of our bodies, the most basic process of our creation, is described as a process of writing and our “code” as being “transcribed” in our cellular DNA, genetic reproduction is seen as a process of writing, as program (from Latin programma, public notice; from Greek prographein, to set forth as a public notice: pro-, before + graphein, to write). The program—the code written to produce both the computer text and the body text—is the means to not only prolonging but also rewriting the fate of a human life.

2.4 Of Books and Human Spirit: Cyborg Values

As the proclaimed “greatest contribution to anatomy since Vesalius’s 1543 publication of De Humani Corporis Fabrica” (Spitzer and Whitlock xi), the Visible Human Project has developed a logo incorporating an illustration from Vesalius’s text as if to reinforce not only the various imaging techniques used to “read” the human body and re-present it as text—from lettering discrete muscle groups to reducing all structures to pixels and voxels—but also to emphasise the project’s subject as defying mortality (figure 2.3). Flayed, frozen, sliced, and digitised, the body in the VHP logo is that of a handsome-faced and well-muscled man in a classical pose, gesturing as if in exposition, filled with vitality despite lacking skin and a large chunk of brain. In contrast, the final panel of the original panoramic view of this anatomised body gradually stripped of parts and life spirit shows the same criminal subject slumped in an attitude of dejection, with the reminder of his mortality and sin plainly visible in the gallows behind him (figure 2.4).

The VHP logo depicts life without the spiritual morality implied by Vesalius’
sequence of images showing the slow loss of life spirit in reminder that the punishment for the convicted criminal is eternal death (the viewer would have recognised the criminal would be buried in unconsecrated ground), and his spirit damned to eternal Hell. Instead, the VHP logo depicts life with a morality conferred by the gift of the body to medical science, as expressed by numerous writers and perhaps most enthusiastically by John Hockenberry in his introduction to Body Voyage, the Time Warner coffee-table book of Jernigan’s body. Hockenberry claims that the convicted murderer gave his body not only to science, “but to humanity as well,” concluding, “Whatever tragic legacy Joseph Paul Jernigan left in life, in death he has found grace.” The slogan on this page of the Body Voyage codex, “Not even Lazarus looked this good” (n.p.) attests to the tendency in the popular media valorising such projects—so much at odds with the theorists critical of the supposed redundancy of the body and spirit—to imbue the body archived in the cybertext with a soul, with immortality, with a high moral purpose. The
slogan also attests to the notion that sophisticated technology has increasingly challenged the established authority of “God’s Book”: the biblical story of Lazarus and religious faith (“he that believeth in me, though he were dead, yet shall he live” John 11: 25) is here overshadowed by the suggestion that Jernigan has been raised from the dead through his gift to science and the subsequent technological rendering by human authors. While Vesalius’ hanged criminal is judged by God and sentenced to eternal punishment, the twentieth-century convict’s salvation and immortality is thus conferred by science. Similarly the National Library of Medicine newsletter suggests that the
donation of the body to science is directly associated with immortality: “An anonymous 59-year-old Maryland woman who donated her body to science is now immortalised on the Internet as the Visible Woman, completing the second phase of NLM’s Visible Human Project” (National Library of Medicine, NLM News). The arrogance inherent in the popular literature extolling the virtues of the Visible Human Project is that the complex of the once-living human body can be converted to immortal spirit by technological means; while the arrogance inherent in critiques of the VHP is that the complex of the once living body can demonstrably lose its spirit through technological means.

This is not to suggest, of course, that there are not profound moral questions to be asked about medical technology. The extension or reproduction of human life through technology comes with a commercial caveat. To see our bodies as text—as written documentation of cellular structure—solidifies metaphors of human authorship or engineering of human bodies, which in turn results in the cultural reality of our bodies understood as copyrighted databases, as instruction sets for patented products. While the popular literature applauding medical accomplishments so often emphasises that the theme of the human-authored text of the transcribed human body is life if not immortality, if we see our cellular structures as written, we also see them as patentable. Copyrightable. Re-writable. Programmable. Disease and mortality are now to some degree considered a failure of our programming—of the way our bodies have been written. The soul of the cyborg is at stake in the environment of the electronic page because life and death, previously the realm of God or Nature, now are in the realm of the human-authored page.
And the human-authored page has resale value. In the electronic age, "value" is inscribed by the now dominant institutions of medicine and commerce (and commercial medicine). The perceived value of the established literary and religious canons continue to recede while that of commercial medicine and biotechnology is increasing in our secularised society. The book as cultural icon or fetish of value symbolising human spirit, or humanity, is rapidly becoming part of our history.

The electronic text, however, is not so much the relocation of the soul or mind in the machine, but rather represents a relocation of cultural allegiances that is well symbolised by the cultural assumptions surfacing in the VHP logo and the panorama of Vesalius’ *De Humani Corporis Fabrica*. The human body, once contextualised within the theoretical framework of the moral and spiritual, has shifted to a mechanical secular system whereby human authors confer life-spirit and the technological drive toward immortality. The cultural understanding of the book as ultimate authority has also slowly evolved ever since Vesalius, Galileo, and later thinkers suggested that Nature was the true book of authority rather than the texts of the Ancients. It is this very question of authority that is at the heart of the debate on the electronic text: if the codex book and paper page so closely associated with our own bodies and spirits have since the rise of printing inscribed and disseminated principles of knowledge, human understanding, 

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10 While the licence to use the data of the Visible Male—a project frequently praised for its economy as a comparatively low 1.4-million-dollar investment—was originally available for download free of charge, the knowledge now has a cost: a complete set of tapes for either the male or the female is $1,000 in the US, Canada and Mexico and $2,000 elsewhere <www.nlm.nih.gov/research/visible/getting_data.html>. More disturbingly, the patenting of human cell lines has vast economic and social implications, as many critics have noted.
and morality through stable, sanctioned texts written by institutionally approved authorities, then what the electronic text threatens most is the perception of authority.

In his chapter on “The Death of Literature,” Sven Birkerts notes that “Literature and the humane values we associate with it have been depreciated, reincarnated in debased form. They have not been extinguished, for our culture will always need to pay lip service to them, but they have been rendered safely, nostalgically, irrelevant” (The Gutenberg Elegies, 184). What such criticism conveniently ignores is that the literature inscribed in the codex book has played its own guilty role in various cultural genocides. We need only to look as far as the horrible legacy of the residential schools in post-colonial countries to see the cruelty and destruction inherent in the triumphal march of European literature inscribed on paper.

Why are there so many suggestions that it is the electronic text that distorts the human spirit to passivity, evil, and malefice when passivity, evil, and malefice have been here as long as humans have? Why has the addition of emissions of light to molecules of ink as a means of textual display inspired so many articles, essays, even entire books, on the virtuality, ethereality, invisibility, or instability of the electronic page when the electronic text itself—infinately reproducible, stored on relatively durable CDs or DVDS, copied in seconds to disk or tape—is possibly more permanent than what is printed on the acidic pages of our notoriously disintegrating paperbacks? Why have symposia and books been devoted to the future of the book or of the page, as if the demise of the material codex is imminent or its form has succumbed to cultural flux when never before in the history of humanity have there been so many pages daily written, printed, and read by literate peoples the world over? Certainly, the electronic page significantly
alters the rate of distribution of and access to texts, but can we even agree that the idea of a page is significantly altered? We still call a web page a page though the reader sees it on a screen and scrolls down through an unbroken (unpaginated) text made visible by electronic bombardment. It is still arguably a page when the reader cannot feel ink or the rough surface of paper or parchment under the fingers, or when instead of turning recto to verso in order to see another piece of text the reader clicks on a hypertext link (which is, both in intent and purpose, a faster footnote).

What changes when we no longer think of the page as real but rather as virtual? Nothing, it seems, and everything. In his afterword to The Future of the Book, Umberto Eco invokes the words of Claude Frollo in Victor Hugo's Hunchback of Notre Dame: “‘Ceci tuera cela’ (The book will kill the cathedral, the alphabet will kill images)” (295). Eco remarks that one significant issue raised by the participants in the symposium which instigated this collection of essays on the book’s future “that ceci (the computer) tuera cela (the book).” The phrase is a sign of the supercession or destruction of one medium of communication by another (cf. Nunberg 10, Duguid 66, Debray 143), but it is also worth noting that what was at stake for the clergy that Frollo represents was the material housing of spirituality—where knowledge of it would originate, where it would be taught and learned, how it would be disseminated to the people. Books challenged the authority the cathedral represented. In the same way, the dissemination of knowledge through the electronic page is threatening—or invigorating—because in our secular world the “cathedral”—for which society reserves the highest form of reverence—is the mind (and, arguably, the educated mind), which has for centuries been represented by the mundane and unthreatening codex or paper page. And now the
computer, threatening to reproduce humanity in both body and spirit, has usurped the humanist-educated mind further from its once lofty position. There is arrogance inherent in the rhetorical claims to the human spirit by proponents of both the Humanities and the Sciences. Cyborg discourse is to some extent a conversation based on the questions: Who gets to be the authority on the human spirit? Who gets to write the culturally valued texts? Who gets to decide what is a moral action by or upon the human body?

In his introduction to the 1994 *Queen's Quarterly* issue entitled *The End of the Book*? Boris Castel writes that "the printed page and circuit-driven technologies are not kindred, but powerful antagonists. Human intelligence and creativity will be the losers in our Faustian pact with an increasingly seductive electronic devil" (777). *The End of the Book*? is a celebration of fetish—a celebration of and lament for the traditional containers for western humanist knowledge, both the libraries and the bound pages of the book, hand-made at great expense for the promotion of Christian humanist values. This nostalgic issue is illustrated throughout with evocative photographs of splendidly ornate European monastic libraries, complete with monumental statuary, the Bibliothèque Nationale in Paris, and wooden bookshelves replete with ancient leather-bound texts. One caption reads: "The magnificent Waldsassen monastery library in Bavaria, built in a century when knowledge was celebrating its triumphs."

In this issue Robert Fulford reflects upon "The Ideology of the Book," commenting that, "Since the Enlightenment, Western civilization has made the book the shrine of modernity, the place where we store and locate our ideals. It now stands in some danger of becoming only a shrine, a place for occasional worship." Fulford

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concludes with a call to arms:

When I read about what Gates and his competitors are preparing for us, I sometimes think about those pioneers of information technology, the monks who preserved part of the wisdom of antiquity during the centuries when hardly anyone else seemed to care about it. ...“A monastery without a library is like a castle without an armoury,” [a monk in Normandy in the year 1170] wrote. “Our library is our armoury. Thence it is that we bring forth the sentences of the Divine Law like sharp arrows to attack the enemy. Thence we take the armour of righteousness, the helmet of salvation, the shield of faith, and the sword of the spirit....” In the environment created by ontrushing technology, scholars, librarians, teachers, writers—all those who take responsibility for generating and spreading knowledge—may well find themselves called to a similar battle. They will need to be shielded by faith in the value of their endeavours, and by the sword of the spirit.

What are we to conclude from this obituary for the book that invokes righteousness, salvation, faith, and spirit to attack the amorphous enemy technology that is somehow opposed to “knowledge”? It is tempting to suggest that what is depicted as a threat to the human spirit is at least in part a reaction to a threat to historical modes of the dissemination of knowledge and morality. For the duration of its history, the finite narrative of printed material bound into book, functioning as a coffer for religious and secular law as well as historical and cultural interpretation, inevitably biased by the author’s own cultural prejudices and privilege, has been used to validate, codify, and authorise a society that until very recently comprised the small literate group with
enough leisure and wealth to read, write, and publish. The page, material representation of mind and/or soul, is the cathedral of humanism. In the twentieth-century culture of the cyborg, however, a dominant understanding of human nature is that the creation of our selves, of our souls and our minds, and our free will, is a material and therefore re-configurable process. Medical and cybernetic technology both have contributed to placing the perfected body and re-produced mind at the forefront of cultural ideals while the once-valued liberal humanist education and perfection of mind and spirit recede in cultural importance and value.
Chapter 3
Loco-Motive Powers and Spasmodic Affections: The Enlightenment
Cyborg

3.1 Modernity and Postmodernity

Every animal is more or less a human being, every mineral more or less a plant, every plant more or less an animal.[...] There is nothing clearly defined in nature.... Any given thing is a specific thing only in greater or lesser degree, more or less earth, more or less water, more or less air, more or less fire, more or less in one classification or another...so nothing is of the essence of a particular being.... No, presumably because there is no quality which any given being does not share with some other, and it is the greater or less proportion of that quality which makes us attribute it to one being to the exclusion of another....And then you talk of individuals, you poor philosophers!

—Denis Diderot, D'Alembert's Dream (1769), 181

"There is a startling temporal and geographical correlation," write the editors of The Cyborg Handbook, "between cyborgism and postmodernism" (13, n. 2). The appearance of the cyborg in contemporary culture and literature has been described
overwhelmingly as a “post”-(insert your favourite portentous noun here) phenomenon,¹ and as a politicised insignia of a largely undefined postmodernism.² While the cyborg figure as an expression of transgressed boundaries and the fragmented, decentered, or multiple self in a corporate and capitalistic “wired” world is certainly a plausible and meaningful category, the presupposition that it is a specifically “postmodern” entity is worth exploring, if only because the assumption is so pervasive and yet largely unexplained. How accurate, or even helpful in the understanding of our own humanity, is the equation “postmodernity is to cyborg as modern is to human” (Gray et al. 521)?

¹ Some of the better known examples of the “post-” cyborg include Hans Moravec’s prediction of our “postbiological” future in his Mind Children: The Future of Robot and Human Intelligence (1); various articles in Virtual Futures: Cyberotics, Technology and Post-Human Pragmatism, ed. Joan Broadhurst Dixon and Eric J. Cassidy; Arthur Kroker and Michael Weinstein’s ominous pronouncement on virtual/archived bodies: “Welcome to the post-God era” in Data Trash (57); Donna Haraway’s “A Cyborg Manifesto,” in which she describes her postmodern cyborg as a “creature in a post-gender world.” (150); Jeffrey Deitch’s Post Human; Katherine Hayles’ How We Became Posthuman. There are also the “Postcolonial Cyborgs” of Joseba Gabilondo, and the “Visions of Cyborg Anthropology in Post-Cultural Worlds” (characterised by a “non-modern cultural identity”) of Sara Williams in The Cyborg Handbook, ed. Chris Hables Gray et al.; or Sherry Turkle’s suggestion in Life on the Screen: Identity in the Age of the Internet that computer culture contributes to a poststructuralist “decentering of the ego” by allowing people to think about “identity as multiplicity...to build a self by cycling through many selves” (178).

² Mark Poster’s “Postmodern Virtualities” (1995), Donna Haraway’s “Cyborg Manifesto” (1991), Allison Fraiberg’s “Of AIDS, Cyborgs & Other Indiscretions: Resurfacing the Body in the Postmodern” (1993), Veronica Hollinger’s “Cybernetic Deconstructions: Cyberpunk and Postmodernism” (1990), or Larry McCaffery’s Storming the Reality Studio: A Casebook of Cyberpunk and Postmodern Fiction (1992) including Brian McHale’s “POSTcyberMODERNpunkISM,” (1992) were all early influential associations of the postmodern identity specifically with the figure of the cyborg. See also numerous other publications, for example, Lance Olsen’s “Cyberpunk and the Crisis of Postmodernity”; David Porush’s “Cybernetic Fiction and Postmodern Science”; Claire Sponsler’s “Cyberpunk and the Dilemmas of Postmodern Narrative; or Joseph Tabbi’s Postmodern Sublime: Technology and American Writing from Mailer to Cyberpunk.
The suggestion that we are no longer human (or that we are “posthuman”) is certainly as problematic as, but perhaps more easily understood than the ubiquitous postmodern which is so variously defined (or rather altogether undefined) as to be almost devoid of meaning. The postmodern cyborg is frequently identified with fragmentation of identity and loss of subjectivity, along the lines of Fredric Jameson’s portrayal of the postmodern condition as characterised by superficiality, “the transformation of reality into images,” schizophrenia, and fragmentation (125). Cyborg theory as a category of postmodern theory has also been influenced by such critiques of digital technologies as Baudrillard’s ominous projection of contemporary society as a “hallucinatory” (Simulations, 142) world of simulacra in which capital “was the first to feed...on the destruction of every referential, of every human goal, which shattered every ideal distinction between true and false, good and evil” (43). Haraway’s “theory in a

The supposed fragmentation of the postmodern identity might be either celebratory or apocalyptic, but in either case the assumption is that individual identity is stable in modernity and unstable in postmodernity. As Hans Bertens explains in Approaching Postmodernism:

For Gerald Graff the celebratory mode of Postmodernism is characterized by a “dissolution of ego boundaries”; for Daniel Bell “the various kinds of postmodernism...are simply the decomposition of the self in an effort to erase the individual ego,” and Ihab Hassan notes the “the Self is...really an empty ‘place’ where many selves come to mingle and depart.” For Hoffmann this movement in the direction of a less defined, less stable identity is even a shift of epistemic proportions: “The perceivable signs of a tendency toward the disappearance of a subjectivity in modern literature become a fact in postmodern works. Thus a radical gap between modern and postmodern literature is reflected in the opposition of two epistemes: subjectivity versus loss of subjectivity.” The postmodern self is no longer a coherent entity that has the power to impose (admittedly subjective) order upon its environment. It has become decentered, to repeat Holland’s phrase. The radical indeterminacy of postmodernism has entered the individual ego and has drastically affected its former (supposed) stability. Identity has become as uncertain as everything else. (Fokkema and Bertens 46–7)
postmodernist...mode,” which describes the twentieth-century subject as “a kind of disassembled and reassembled, postmodern collective and personal self” (“Cyborg Manifesto,” 163) presents a more positive version of the fragmented identity as opposition to a culture defined by binary categories and controlled by industrial capitalism and “hierarchic dominations” (161). Presented as a sign of secular culture governed by technological forces and corporate structures, and assailed by the absence of fixed spiritual values, the postmodern cyborg is also mapped in large part as the pitting of “scientific” against what we might call “humanist” values, as in Lyotard's designation of modern as “any science that legitimates itself with reference to a metadiscourse...making an explicit appeal to some grand narrative, such as the dialectics of Spirit, the hermeneutics of meaning, the emancipation of the rational or working subject, or the creation of wealth” and postmodernism as “incredulity toward metanarratives” (The Postmodern Condition). This version of the postmodern is also evident in Haraway’s “ironic political myth,” which deploys the cyborg as a means of detachment from and challenge to historical “traditions of ‘Western’ science and politics—the tradition of racist, male-dominant capitalism” by representing a disengagement of dualisms such as self/other, mind/body, culture/nature, male/female, reality/appearance, or God/man (150). Such constructions, however, tend not only to postulate a limited demarcation of humanity today, but also to present an oversimplified version of the cultural constructions of human identity in the past. To consider the cyborg solely as a postmodern phenomenon provides only a limited understanding of the complex history of metaphors for the human as machine. We might instead consider the genesis of the cyborg as coinciding with that of the machine itself, and
paralleling its development; as the understanding of natural processes have deepened and changed, so have the literal and figurative constructions of both machine and human-machine (figures 3.1 and 3.2). Moreover, the human-machine has since its inception been coded by its association with both mind-body questions and the physically labouring body. As such, ever since human was first conceived as machine, the man-machine has provided a highly politicised metaphor particularly for members of an intellectual (writing) sector of society which acts as guide for and ward of the spirits of working (manual, physically labouring) citizens.

The cyborg, however, is studied almost exclusively as a contemporary sign—either of a twentieth-century malaise resulting from the unnatural merging of human with inhuman in a technologically driven society, or less frequently, a new age of profound albeit potentially dangerous possibilities for the future of humanity now that we’ve graduated from modernity. It seems unnecessarily limiting, however, to exaggerate the novelty of the issues of identity and social values raised by the cyborg figure. While, as Larry McCaffery points out, the postmodern is “understood best by examining what is unique about our contemporary condition...[which] derives its

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unique status above all from technological change" (McCaffery 3), the “postmodern” cyborg is also (under other names) a creature of history. If we are to interpret cyborgs politically, we need to resituate our studies to examine the conditions of their origin. It is of course tempting to suggest that the cyborg represents something new and radically different, “a new map, a new way to conceive of power and identity” (Gray and Mentor 459), but it is equally important to attempt to understand the extent to which our present constructs of identity are dependent upon, and indeed reconfigurations of, those of the past. The human machine has in fact been an enduring figure in our literary and medical imaginations for hundreds of years and, while the technology of the past three hundred years has changed dramatically, our literature has continued to express common themes centring on the meaning and value of human spirit in a world of mechanical reproduction. In the ongoing materialist debate about human will, spirit, and autonomy in relation to how we understand and manipulate the “mechanical” qualities of our bodies, the recurring dispute is over both spirit and conception: if the human rational spirit can be mechanically produced/reproduced, then what becomes of our understanding of spirituality, morality, the immortal soul—what becomes of that indefinable part of our minds that gives us our very humanity, our judgement and our

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will to act in "moral" ways (and what, therefore, becomes of our systems for well-ordered and lawful society)? Ultimately, the figures of pre- or early modern man-machine and postmodern cyborg have both stood as highly politicised signs of the status of individual autonomy within the structures of dominant social bodies.

Nevertheless, the figure of the cyborg would seem to have no history prior to Norbert Wiener's coining of the term cybernetics in 1948 to describe the new scientific field examining control and communication in machines and living organisms. Some preliminary exploration of a cyborg history has been done by Jonathan Sawday in "Forms Such as Never Were in Nature": The Renaissance Cyborg," but as Sawday points out, the cyborg is frequently described with reference to Haraway's much-quoted "Cyborg Manifesto" as having essentially "no forerunners" (Sawday 173). Emerging as a specific construct from American military science in the late 1940s and 1950s, the human-computer cybernetic interface has been invoked both as a sign that the regime of the totalitarian "Enlightenment project" has reached its pinnacle of domination and control of the individual, and as a sign that it is about to topple into a non-hierarchical (rhizomatic) world of true freedom for the individual.

For Haraway and others, the postmodern cyborg represents a rupture from the past. Indeed, in contrast to the pre-cybernetic machine of what appears to be an intellectually naïve past, Haraway argues, "Late twentieth-century machines have made thoroughly ambiguous the difference between natural and artificial, mind and body, self-developing and externally designed, and many other distinctions that used to apply to organisms and machines" ("Cyborg Manifesto," 152). The cyborg in Haraway's influential essay, then, is something beyond and radically changed from what was once
“modern,” or “human.” Sadie Plant writes in less utopian terms of becoming posthuman cyborg by jacking into virtual sex, but nevertheless characterises it as a breaking away from modernity. Plant remarks rather cryptically in “Coming Across the Future” that “The cyborg has no history, but that of the human is rewritten as its past” (31). She explains—quoting Foucault—that “Modernity is marked by ‘an explosion of numerous and diverse techniques for achieving the subjugation of bodies and the control of populations, marking the beginning of an era of ‘bio-power’’” (31). While Foucault’s words are undoubtedly meaningful and evocative in the context of understanding the cyborg figure, Plant’s suggestion is that we look solely to the posthuman future. Uncoupling the body from “its own and external authority: possession and self-possession, control and self-control,” is not “a matter of education, which is always a question of restoring past information, the recollection of some originary transcendence, and the remembering of authority,” she concludes. Rather, “It is a process of forgetting the past, which is also the abandonment of truth and the dismemberment of authority. While it is ‘necessary to dig deeply in order to show how things are historically contingent’. …Attention must be turned to the future instead” (34–5). This contrast between so-called Enlightenment or Modern ideals and our current or future cultural condition as if we have achieved a radical break from the naïveté of the past and a more sophisticated acceptance of the complexities of human identity is not uncommon. “It is no accident that the modern has become postmodern as human changes to cyborg,” explain the editors of The Cyborg Handbook (Gray et al. 7).

Similarly, Claudia Springer writes in Electronic Eros: Bodies and Desire in the Postindustrial Age that “At the same time that the cyborg represents the triumph of the intellect, it also
signifies obsolescence and the dawn of a posthuman, post-Enlightenment age” (19). Or, as Jeffrey Deitch explains in *Post Human*, our current “post-modern era…characterized as a transitional period of the disintegration of the self” suddenly arose in 1968 “when the culture of Modernism reached both its culmination and its collapse” (n.p.). Sherry Turkle similarly suggests in *Life on Screen: Identity in the Age of the Internet* that in the textual computer-mediated environments known as MUDs, the self is “multiple and constructed by language” and thus provides a means of thinking about the postmodern identity in contrast to the modern: postmodern terms such as “‘decentered,’ ‘fluid,’ ‘nonlinear,’ and ‘opaque,’” she writes, contrast with “modernism, the classical world-view of reality…characterized by such terms as ‘linear,’ ‘logical,’ ‘hierarchical,’ and by having ‘depths’ that can be plumbed and understood” (17).

I do not intend to engage in an unproductive debate defining the modern versus postmodern cultural milieu. My question is simply whether the figure of the cyborg as postmodern entity is too heavily slanted towards imagining current or future trends in light of some radical change from past “stable identities” or scientific or authoritarian “grand narratives” without examining a historical context: Is the cyborg wholly postmodern? Another way to phrase the question would be: How do contemporary reactions to the idea of human-machines come not from a “technological” condition but from a history of ideas associated with mind and matter, human spirit and sentiment versus corporeal and material desires, or individual human value in what is perceived to be an increasingly secular world?

If we consider that Haraway’s definition of the cyborg—both a chimera and a reality “from the 1950s and after”—as “the figure born of the interface of automaton
and autonomy,” we can begin to unearth some of the problems of categorising the
cyborg figure as a unique symbol of a contemporary “ontological nausea” (Dery). The
ey early modern preoccupation with the differences between man and animal, and medical
or political definitions of the human as automaton raise questions about Haraway’s
suggestion that the cyborg exists

when two kinds of boundaries are simultaneously problematic: 1) that between
animals (or other organisms) and humans, and 2) that between self-controlled,
self-governing machines (automatons) and organisms, especially humans
(models of autonomy). (Primate Visions, 139)

If this is an accurate definition, then the cyborg is a very old beast indeed.

Arguably, in early modern materialist and mechanistic hypotheses which
described the workings of the human body and mind as organic machines and instigated
debate over the autonomy of the individual, the definition of self and human
subjectivity was as uncertain and fragmentary as it is today—perhaps more so if we
recall debates over what actually constituted humanity. Enlightenment classification was
on the one hand an attempt to rigidly define humanity—to distinguish the human from
animals, to categorise monstrous births (did two-headed babies, for example, have one
or two souls?*); to decide such questions of category as Edward Tyson’s anatomical
classification of a “pygmy” (actually a chimpanzee) as the missing link between monkeys
and men. On the other hand, more recent decisions quite late in modernity to include
women and so-called people of colour as humans with political rights, for example, or
even the as-yet unresolved matter of whether human identity is enmeshed with an
immortal soul, might indicate that the search for stable categories of the self have been ongoing, and always questioned, and always subject to destabilisation or hybridisation.

The concepts of identity formulated in the Enlightenment would encourage the individualism which informed the declaration of the rights of man, and also simultaneously informed even then "the dissolution of traditional stable senses of self, soul, and of social obligation in that welter of indulgent narcissism and moral solipsism encouraged by the fashionable new sensibility and...utilitarian hedonic calculus" (Rousseau and Porter 30). It was, even then, a dark "highroad to nihilism" which, as Rousseau and Porter point out, was "trodden...by none other than that hero of the late Enlightenment, the Marquis de Sade" (31). The new, secular concepts of mechanical or materialist identity wrought by the Enlightenment both built and undermined a "stable" sense of selfhood, which was constantly being re-assessed and re-written, constantly being fit into a new moral framework that would accommodate a humanity seen increasingly as being driven by laws of nature rather than those of God. And wherever there was a mechanical identity formulated there was also resistance to it. Recall, for example, in The Memoirs of Martinus Scriblerus (1742) the satiric barbs aimed at such reductionist attempts to define individual identity. One example among many is the letter to Martinus by the Society of Free Thinkers, who use an analogy of worsted stockings as bodies with a conscious identity. Suppose the stockings had been darned so often with silk thread that they became silk, they write.

Now supposing those stockings...endued with some degree of Consciousness at every particular darning, they would have been sensible, that they were the

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4 See Barbara Maria Stafford’s chapter on “Conceiving” in Body Criticism, 210–79.
same individual pair of stockings both before and after the darnings... and yet
after the last of all, there was not perhaps one thread left of the first pair of
stockings. (Kerby-Miller 140)

A thinking being, they go on to explain, might be conscious of “some individual self-
moving, self-determining principle,” but the body is—like a House of Commons—
composed of a system of particles and ruled by majority” (140). Concluding that since, as
everyone knows, modes of thinking are produced by merely mechanical processes the
Society has employ’d “a great Virtuoso at Nuremberg” to make an artificial man who
“(being wound up once a week) will perhaps reason as well as most of your Country
Parsons” (141).

The hubris of humans trying to rationally determine and legislate the essence of
individuality is reinforced in the following chapters on the “double mistress.” In an
absurd legal wrangling over the identity/ies of the siamese twins Lindamira and
Indamora, Dr. Penny-feather in defence of Martinus’ marriage to Lindamira as “one
lawful wife,” argues:

It will be necessary to determine the constituent Principle and Essence of
Individuality, which, in respect to mankind, we take to be one simple identical
soul, in one simple identical body. The individuality, sameness, or identity of
the body, is not determin’d (as some vainly imagine) by one head, and a certain
number of arms, legs, and other members; but in one simple, single... member
of Generation. (157)

If there are “two Wills, and therefore two different Persons... if multiplicity of Wills implied
multiplicity of Persons, there are few Husbands but what are guilty of Polygamy, there
being in the same Woman a great and notorious diversity of Wills” (159), he argues at one point. Dr. Leatherhead replies:

That neither the individual Essence of mankind, nor the Seat of the Soul, doth reside in the Organ of Generation; and this first from Reason, For unreasonable indeed must it be to make that the Seat of the Rational Soul, which alone sets us on a level with beasts; or to conceive, that the Essence of Unity and Individuality should consist in that which is the Source of Discord and Division. In a word, what can be a greater absurdity, than to affirm Bestiality to be the Essence of Humanity...? (160)

In other words, is the soul or individual identity housed in the mind or in the body—is it in the corporeal and material self, the most “base” physical structures of lust and reproduction that we share in common with beasts, or is it in the immaterial mind alone, housed within the brain? Such asinine explanations of selfhood as those offered by these battling lawyers are jokes, as we shall see, at the expense of legitimate human science, and are grounded in real claims about individual subjectivity. Locke, for example, had argued in Essay Concerning Human Understanding (1690) that human consciousness—man’s sense, memory, and reason—is a product of matter in motion. Such a view, he suggested, “also shews wherein the Identity of the same Man consists.”

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5 “Multiple” personalities of a sort were noted but not heavily theorised as a serious psychological disorder as they are today. The Oxford physician Thomas Willis, for example, in noting a mechanical cause for the sensitive soul refusing to “hearken to the dictates of Reason,” explained that “the Blood, like the Sea working with the winds, is compelled into various Fluctuations. ...[and] entering inequally and impetuously the Confines of the Brain, succeed inconstancy of judgment, and frequent Changes of a thing proposed; as sometimes they will do this, anon that, as if ten Minds were together by the Ears in one Man” (Soul of Brutes, 53).
Identity is nothing more than "participation" in a single life, and entirely dependent on the material organisation of a single organised body, even if the particles of matter themselves will change:

viz. in nothing but a participation of the same continued Life, by constantly fleeting Particles of Matter, in succession vitally united to the same organized Body. He that shall place the Identity of Man in any thing else, but like that of other Animals in one fitly organized Body taken in any one instant, and from thence continued under one Organization of Life in several successively fleeting Particles of Matter, united to it, will find it hard, to make an Embryo, one of Years, mad, and sober, the same Man. ... For if the identity of soul alone makes the same man; and there be nothing in the nature of matter why the same individual spirit may not be united to different bodies. ... But yet I think nobody, could he be sure that the soul of Heliogabalus were in one of his hogs, would yet say that hog were a man or Heliogabalus. (2.27.6)

Locke in fact pre-empts both the much-lamented posthuman cyborg catastrophe of identity when the body is materially changed, and Baudrillard's predicted Judgement Day debacle (The Ecstasy of Communication, 50; Simulations, 12) as a result of our cybernetic inscriptions of the human form:

If identity (to instance that alone) be a native impression, and consequently so clear and obvious to us that we must needs know it even from our cradles, I would gladly be resolved by any one of seven, or seventy years old, whether a man, being a creature consisting of soul and body, be the same man when his body is changed? Whether Euphorbus and Pythagoras, having had the same
soul, were the same men, though they lived several ages asunder? ...What makes the same man? Nor let any one think that the questions I have here proposed about the identity of man are bare empty speculations; which, if they were, would be enough to show, that there was in the understandings of men no innate idea of identity. He that shall with a little attention reflect on the resurrection, and consider that divine justice will bring to judgment, at the last day, the very same persons, to be happy or miserable in the other, who did well or ill in this life, will find it perhaps not easy to resolve with himself, what makes the same man, or wherein identity consists. (1.3.4–5)

Such questions as these were much discussed in the early modern period but never truly settled. Locke's materialist explanation was influential and much opposed, and today we still find resistance to the medical versions of human character as merely a system of organic material and electro-chemical components. Neither side "won," though empirical medical and scientific discourses tended to develop the materialist explanations of humanity while a predominant literary discourse would begin to develop a more sentimental view of the soul and intellect. Questioning individual autonomy and uniqueness—attempting to come to terms with what is human or animal; striving to determine whether human identity is enmeshed with sexual (natural) reproduction or rational thought; having a sense of the individual identity as multiple, or as fragmentary and discontinuous—none of these conditions is unique to the postmodern cyborg world.⁴

⁴ See also, for example, At the Borders of the Human, edited by Erica Fudge, Ruth Gilbert and Susan Wiseman.
Furthermore, how assured were the differences between "natural and artificial, mind and body, self-developing and externally designed" which Haraway posits as pre-cyborg identity? How do we situate Locke's formula for stamping morals upon the young mind—or La Mettrie's somewhat ironic claims in his 1747 *L'homme machine* that the human body and mind are the same material differently modified, that the human being is a "well enlightened machine," that an ape might learn language since "the transition from animals to man is not violent," or that to build a talking man is "no longer to be regarded as impossible"—in the current conversation which characterises the late twentieth-century human-machine identity as not only postmodern but also post-industrial, post-Enlightenment, post-nature, post-gender, post-national, post-identity, post-cultural, post-biological, or posthuman?

There are, of course, profound differences between the Enlightenment man-machine and the twentieth-century cyborg, not least of which is the influence of global industrialisation and communications technologies on our perceptions of human consciousness. Furthermore, as we will explore in greater detail, the mechanistic view of human processes throughout the Enlightenment was highly theoretical and metaphorical, while contemporary versions of the human machine are practical and effect the mechanical and chemical engineering of both body and mind. In contemporary fiction and theory, however, where the cyborg is very much a metaphoric creature, the cyborg and the man-machine share certain similarities. The cyborg, never neutral, signals either a better future where traditional prejudices of race, gender, or geography can be overcome, or the profound loss of our humanity. In current fiction and theory, the artificially enhanced human—implicit or explicit symbol of the human

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becoming machine—is inevitably presented as a question of human autonomy and moral authority: the cyborg now, as was the man-machine, is presented as a spiritual and moral issue. Why, then, is cyborg history so completely absent from cyborg theory? In part it is because the figure of the cyborg is as much a product of particular academic or intellectual agendas as it is a product of technological change. Thus, while Haraway has celebrated the possibilities for cyborg identity from the standpoint of a feminist agenda for the future, other authors such as Baudrillard, Kroker, Stoll, Birkerts, and Heim to name only a few, have warned against the moral dangers of “merging” with the machine. Baudrillard’s “The Ecstasy of Communication” for example, warns that the supposed redundancy of the body has resulted in a loss of “real” connections of community—what was once “a public scene or true public space” is now “gigantic spaces of circulation, ventilation and ephemeral connections” (130). “There is a problem here,” he writes,

to the extent that this electronic ‘encephalization’ and miniaturization of circuits and energy, this transistorization of the environment, relegates to total uselessness, desuetude and almost obscenity all that used to fill the scene of our lives. …This is the time of miniaturization, telecommand and the microproces sion of time, bodies, pleasures. There is no longer any ideal principle for these things at a higher level, on a human scale. What remains are only concentrated effects, miniaturized and immediately available. This change from human scale to a system of nuclear matrices is visible everywhere: this body, our body, often appears simply superfluous, basically useless in its
extension, in the multiplicity and complexity of its organs, its tissues and functions, since today everything is concentrated in the brain and in genetic codes, which alone sum up the operational definition of being. (128–9)

Michael Heim similarly argues that

The darker side [of computers] hides a sinister melding of human and machine. The cyborg, or cybernetic organism, implies that the conscious mind steers...our organic life. Organic life energy ceases to initiate our mental gestures. Can we ever be fully present when we live through a surrogate body standing in for us? The stand-in self lacks the vulnerability and fragility of our primary identity. ...The more we mistake the cyberbodies for ourselves, the more the machine twists ourselves into the prostheses we are wearing. (101)

At the computer interface, writes Heim, “the spirit migrates from the body to a world of total representation. Information and images float through the Platonic mind without a grounding in bodily experience. You can lose your humanity at the throw of the dice” (101). In cyberspace human ethics “languish,” he claims. Cyborg existence “may amplify an amoral indifference to human relationships” (103). Kroker and Weinstein more hysterically argue that the “hardwiring” of our bodies with the machine signals a cultural disintegration of apocalyptic proportions: “If we cannot escape the hard-wiring of (our) bodies into wireless culture,” the authors fret (as if “virtual” communications can only annihilate both the morality and imaginations of computer users) “then how can we inscribe primary ethical concerns onto the will to virtuality? How can we turn the virtual horizon in the direction of substantive human values: aesthetic creativity, social solidarity, democratic discourse, and economic justice?” Vivian Sobchack suggests an
extreme version of the moral hazards of "merging" with the machine:

The two-dimensional, binary superficiality of electronic space at once distorts and liberates the activity of consciousness from the gravitational pull and orientation of its hitherto embodied and grounded existence. ...It denies or prosthetically transforms the spectator's physical body so that subjectivity and affect free-float or free-fall or free-flow across a horizontal/vertical grid.

...there are subjects of electronic culture out there who prefer the simulated body and a virtual world. Indeed, they actually believe the body (contemptuously called "meat" or "wetware") is best lived only as an image or as information, and that the only hope for negotiating one's presence in our electronic life-world is to exist on a screen or to digitize electronic existence. Such an insubstantial electronic presence can ignore AIDS, homelessness, hunger, torture, and all the other ills the flesh is heir to outside the image and the datascape. ...Devaluing the physically lived body and the concrete materiality of the world, electronic presence suggests that we are all in imminent danger of becoming merely ghosts in the machine. (104–6)

In other words, if the human mind merges with the machine our "redundant" body components will be left behind like a material shell as the soul is encompassed by and lost within the machine.

Why are such drastic and unproven claims being voiced with such authority? Whether the interpretation of cyborg is positive or negative, the notion that we are embarking on a new era of individual identity is so prevalent as to seem incontestable—but how is it that ethics, aesthetics—"humanity"—is so closely tied to the spectre of the
capabilities of human motion and senses being aided or extended by electronic
machine? Ask any programmer or gamer—who, as cyborg, reads, writes, and imagines
in electronic texts—if he or she still enjoys the tastes and textures of good food, if he or
she enjoys physical contact with another human being; ask if his or her subjectivity is
insubstantial and careless of the world's ills (ask Steven Hawking). How is it that the
human-machine interface is so frequently associated with its effect on human spirit and
morality when the most cursory glance at the cyborgs already around us suggests that
despite the fusion of their bodies with the machine that regulates their heartbeat, or
through which they enact role-playing games or publish their thoughts (of human rights
issues as much as hate literature and bomb recipes), they are people not so very
different from the "non-cyborg" in terms of human goals or emotions or morality—
that cyborgs are only as good or as evil as their human components allow them to be?

Claims that technology will make a better future for humanity, and the resisting
suspicion that human spirit is incompatible with the machine—that the human figured
as machine either uplifts or threatens the moral and spiritual aspects of humanity—are
also characteristic of early modern discourse. As will be discussed later in this chapter,
Swift's satiric critiques of reducing human intelligence and spirit to mere mechanism are
a less grisly version of the contemporary cyborg, but they address no less a resistance to
medical and scientific versions of the mechanical or material production of human
character—and they no less exhibit the discomfiture of a sanctioned moral and
intellectual authority threatened by mass communications of the uneducated throng.

Three hundred years ago, as today, notions of the mechanical human were closely
associated with questions of morality, individual autonomy, and free will encoded within

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paradigms of class and social order: mechanical production of the human, both physical and intellectual (mind and matter) excited on the one hand hope for social progress and human liberation through scientific endeavours and on the other anxiety about the potential corrupting effects of the mechanical on the human spirit. The man-machine is a signifier that slides easily along the scales of political agendas.

3.2 The Enlightenment Cyborg: Of Conception, Clockwork, and Control

In the upper region serving the animal faculties, the chief organ is the brain...engendered of the purest part of seed and spirits...and it is the most noble organ under heaven, the dwelling-house and seat of the soul, the habitation of wisdom, memory, judgment, reason, and in which man is most like unto God.

—Robert Burton, The Anatomy of Melancholy (1621)

Why do people lose their tempers? What makes children bratty? Why do fools fall in love? What makes us laugh? And why do people believe in ghosts and spirits?...I want to convince you that our minds are not animated by some godly vapor or single wonder principle. The mind, like the Apollo spacecraft, is designed to solve many engineering problems, and thus is packed with high-tech systems each contrived to overcome its own obstacles.


How are we made, why are we made, why do we do what we do? Wisdom, memory, judgement, reason, all these intangible aspects of soul and mind are as vital to
the earliest investigations of human spirit or psyche as they are today. In the
seventeenth century, a not uncommon assumption was that the immortal soul in the
brain was also the locale from which both human seed and human spirit emanated:
physical and mental conception both originated with the organ that housed our rational
soul—our closest connection to God. Pinker’s use of the passive voice, “is designed
to,” in the quotation above, of course, sidesteps an important aspect of a very old
question: who is the engineer of the human machine? In the seventeenth century, it was
assumed to be God; in the twentieth century, the engineer of the human machine is
generally assumed to be natural evolution and, more and more frequently, man himself
(a process frequently characterised as an “unnatural” evolution to the posthuman). The
attendant concern, however, once we’ve agreed upon the creator of the machine, is the
steering of the craft.

In the century roughly between Descartes’ Meditations and Le Discours de la
Méthode (1637) which describe humans as material machines with immaterial souls, and
La Mettrie’s L’homme machine (1747) which argues boldly that there is but one form of
matter in the universe and if man is a machine he is mechanical in both mind and body,
the status of human consciousness began to change in medical and philosophical
discourse from the holy (the human comprised a mechanical organic being, moved by
and under the dominion of God’s laws) to the secular (the human was a mechanical
organic being moved by forces within the body itself, under the dominion of natural
laws). This chapter on the “Enlightenment cyborg” explores both conception and
motion: for as long as we have understood that human bodies and machines both move
according to natural laws, the way we perceive the body to be materially engineered has
determined our understanding of how the human-machine knows, thinks, makes
decisions, and acts.

In other words, what power not only creates but also drives the actions of
humankind? Is it God, a Supreme Intelligence, or are human thought, will, and actions
the product of the material arrangement of the body? Towards the end of the century
Denis Diderot posited a question through his character Bordeu in the unpublished
materialist play D’Alembert’s Dream (1769):

Do you think one can make up one’s mind about Supreme Intelligence without
knowing exactly where one stands on the indestructibility of matter and its
properties, the distinction between mind and matter, the nature of man and the
reproduction of human life?

That is, how is the human made, both bodily and intellectually? Diderot begins with this
very question, suggesting that sensitive flesh (“or soul as my daughter calls it”) can be
made from insensitive stone. Make it eatable, he declares, by converting it to humus,
allowing plants to feed from it, and in turn feeding on the plants to make matter into
flesh. The conundrum that forms the basic premise of the play is how the construction
of the material organism results in a sensitive body that thinks and reasons (or has a
soul). D’Alembert, Diderot argues—“one of the greatest mathematicians in Europe”—
was formed not from a pre-existent germ created by God but “he develops in body and
mind and becomes a writer, a physicist and a mathematician....Through eating and
other purely mechanical operations” (152–3). Thinking matter, Diderot claims,
following the precepts set out by materialists throughout the period, is created through
purely mechanical processes.
The question of a Supreme Intelligence, rephrased today in terms of human emotion, morality, or free will, and entangled in questions of the reproduction of both body and mind, is central to “cyber” discourse in which the humanity (or soul or spirit or imagination) of human-kind is potentially undermined if the human being is wholly material and therefore capable of being produced and reproduced as are machines. (The question now of course regarding a Supreme Intelligence is not whether there exists a God or Satan watching over and controlling our actions, but whether there exists a computer-aided government or corporate cyborg intelligence watching over us and controlling our actions). The significance of the early Enlightenment to a history of the cyborg is that the human mind or spirit during this period was set on the same conceptual level as the body (in fact, dispersed throughout the body). The body had long been compared metaphorically to human-made devices; it was only in the early modern period that the whole human being began to be speculated upon as the result of material production, and thought, soul, intelligence, or sentiment as purely material mechanisms: it was in the Enlightenment that human will and intelligence—the soul—was first threatened by a metaphoric merging with the machine-body.

The “Enlightenment cyborg,” of course, never existed: the “self-regulating man-machine system” first envisioned by Clynnes and Kline in 1960 when they coined the term “cyborg” from “cybemetic organism” is both engineered and programmed (it has a feedback mechanism created or augmented by technological means): no such programmed organic creature was possible in the eighteenth century although, as Otto Mayr has demonstrated in Authority, Liberty, and Automatic Machinery, feedback loops existed in practical technology and informed schemes for automata as well as economics.
in early modern Europe. As a social reality, the metaphor of the human-machine no less than it does today provoked speculation about the production, material reproduction, and autonomy of human beings. The image of the human-machine provokes similar themes used towards culturally specific political ends, and thus the early modern man-machine prefigures the late twentieth-century cyborg: then, as now, it symbolises the potential for emancipation as much as tyranny; human health as well as mental or spiritual imbalances; and individual autonomy as well as state or corporate control.

Over the course of the Enlightenment one significant change in cultural assumptions was an increasing acceptance by influential thinkers that a mechanistic view of the natural world and of humanity, rejected by the contemporaries of Descartes and Hobbes, could be acceptable. While it never adequately explained the workings of human body and mind, the mechanical philosophy that interpreted the organic body as a calculable system of hydraulics, pipes, vessels, levers, pulleys, and pumps, was extremely influential in seventeenth and early eighteenth-century philosophy, physiology, and medicine. And while it made sense in terms of medical physiology to study the human being, and human tools, as mathematically quantifiable entities governed by laws of mechanics, for others the potential outcome of this—the representation of human spirit itself as mechanical—was an unsettling and indeed a spiritually hazardous claim. The materialist concept of the human spirit proved to be a constant source of controversy and the resistance to it reflected by eighteenth-century animists and vitalists, and literary figures such as Swift and Sterne, or the later Romantics, has been well documented. I will not attempt to reiterate what has already been said: the approach I take here in terms of a cyborg history has to do specifically
with the subtle shifts in cultural understanding of the mechanisms of body and mind that suggested the human as a machine might be not only physically engineered or created by human beings but also steered and controlled by human intervention. We now see ourselves under the command of the natural processes of our own bodies, which we can in turn harness and steer. This is not new of course, but the significance of "steering" becomes vital in that cyborg allegiance to the human machine-body indicates our own intervention in the crafting, sculpting, or engineering of human identity on a previously unimagined scale. Our current literature, theory, and popular media repeatedly asks: if we accept that we can mechanically re-produce not only the human body but also the mind and emotions, what then of the autonomy of the soul, what of the spirit, what of that unknown essence that we like to believe differentiates us from animals and automata? If we are cyborgs, what will ultimately guide our actions?

Descartes wrote in *Meditations* (1641) of the human subject as a pilot within and united to the body: "Nature...teaches me by these sensations of pain, hunger, thirst, etc., that I am not only lodged in my body as a pilot in a vessel, but that I am besides so intimately conjoined, and as it were intermixed with it, that my mind and body compose a certain unity" (Meditation 6, "Of the Existence of Material Things, and of the Real Distinction Between the Mind And Body of Man," number 13). Almost exactly three hundred years later, the American mathematician Norbert Wiener coined the neologism *cybernetics* from the Greek *kybernetes* or "steersman" to describe the new science of "control and communication in machines and living organisms" (Wiener 14). Today for various medical and scientific purposes the human-machine, as a system of natural mechanics and electro-chemical reactions like any other natural or human-made system
may also be, like other natural and human-made systems, re-engineered by human
devices. The human organism today is, significantly, piloted by the human subject under
the power of the body-machine itself—self-powered and self-controlled through a
number of internal feedback mechanisms; in the early seventeenth century, it was a
force of God that was believed to ultimately power the vessel, and under God’s
authority was it steered by the soul-inhabitant.

Thus, while Descartes in the seventeenth century and Wiener in the twentieth
both suggest that the inexplicable actions resulting from illness might be compared to
imperfect mechanisms of the most advanced technologies of their respective eras, their
interpretations of how human will functions and the extent to which it is correctable, are
notably different. Descartes uses the analogy of clockwork to describe problematic
human will and choices:

And as a clock, composed of wheels and counter weights, observes not the less
accurately all the laws of nature when it is ill made, and points out the hours
incorrectly, than when it satisfies the desire of the maker in every respect; so
likewise if the body of man be considered as a kind of machine, so made up
and composed of bones, nerves, muscles, veins, blood, and skin, that although
there were in it no mind, it would still exhibit the same motions which it at
present manifests involuntarily, and therefore without the aid of the mind, [and
simply by the dispositions of its organs], I easily discern that it would also be as
natural for such a body, supposing it dropsical, for example, to experience the
parchedness of the throat that is usually accompanied in the mind by the
sensation of thirst, and to be disposed by this parchedness to move its nerves
and its other parts in the way required for drinking, and thus increase its malady and do itself harm... (Meditation 6, number 17).

Wiener, in turn, adopts an analogy from the most sophisticated technology of his own milieu to describe the basis of human actions: There is a "significant parallel," he writes, between the workings of the nervous system and of certain machines....The central nervous system no longer appears to be a self-contained organ receiving signals from the senses and discharging into the muscles. On the contrary, some of its most characteristic activities are explainable only as circular processes.

The cybernetic theory of how humans function like machines, he notes, is consistent with the practice of treating mental disorders by "clearing" long-term memory, "as in clearing a machine of all information, in the hope that when it starts again with different data the difficulty will not recur" (Wiener 17). Significantly, Descartes had quite deliberately extricated the mind from his analogy altogether, thus separating the imperfect machine (functioning solely by its physical organisation) from the steersman created by God: like the clock, he suggested, the human body may be "deflected from its proper nature," "considering the machine of the human body as having been formed by God for the sake of the motions which it usually manifests" (Meditation 6, number 17). For both Descartes and Wiener, the pilot of the human machine is an individual human identity, but for Descartes the pilot made choices based upon a relationship with God; for Wiener the human as machine meant that the controlling force of human will and choice was the machine-like system of a feedback loop entirely enclosed within the body or externally modified by human technology: Descartes' subject-soul created by
God had free will, occasionally obstructed by the mechanical systems of the body; Wiener's subject-mind, as prone to imperfection as the body, had perhaps more limited freedom in terms of voluntary will, which was increasingly through the twentieth century seen as having to do with how the individual was "programmed," and also therefore potentially under the dominion of human engineering and human design. The position and rank of this metaphoric steersman of the human body (and to whom it owes its allegiance) is one of the most significant distinctions between the man-machine of the seventeenth century and the contemporary cybernetic human-machine. If we have long considered ourselves as mechanistic vehicles of an indefinable spirit, however, we have not yet quite come to terms with who has authority over that little person at the helm.

3.3 Mechanics, Motion, and Morality

The cyborg is the figure born of the interface of automaton and autonomy.

—Donna Haraway

If matter is inert and passive, and if that kind of matter is seen to be dominant, there seems to be no room for mind or spirit. The result is mechanism, automatism, and necessity. On the other hand, if matter is thought to have active principles inherent in it, or if it is receptive to such principles imposed upon it, once again there is no need for spiritual or mental causality in the workings of nature.

—John W. Yolton,

*Thinking Matter: Materialism in Eighteenth Century Britain*, 3–4

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“Our original ideas... all might be reduced to these very few primary and original ones, viz. extension, solidarity, mobility, or the power of being moved,” wrote Locke in 1690 (Essay Concerning Human Understanding 2.21.73), thus reducing the highest order of human ideas to matter in motion. The early modern notion of the organism as a mechanical entity is closely associated with the concept of movement: how does inert mass form the will to perform an action, and how then does the will result in action? Is the human being a mere automaton, acting and reacting based upon mechanical laws, or are we creatures with rational souls and free wills? The mechanical philosophy which played perhaps the most significant role in English physiological theories from the 1660s to the 1720s (Brown 183) was an attempt to account for all of Nature—including human nature—in terms of matter and motion (for example, figure 3.3). Even if motion could be accounted for by mechanistic means, however, the problem remained as to how the machine was steered or, to use a common metaphor in eighteenth-century medical descriptions of the nervous system, if the body was a musical instrument, and the rational self was making the music, who was the conductor? Or, in the moral terms of motion, what moves us and how are we moved?
To be "mechanical" was not primarily what we understand it to mean today, as repetitive and unthinking (though of course that was a significant connotation). In scientific terms at the beginning of the century, mechanical referred to the moving parts of the natural world. John Harris’ 1704 edition of *Lexicon Technicum*, for example, says: "Mechanicks, Dr. Wallis defines to be the Geometry of Motion: and is a Mathematical Science which shews the Effects of Powers, or moving Forces, so far as they are applied to Engines: and demonstrates the laws of Motion, &c." The mechanical philosophy that contributed so much to our medical and metaphorical definitions of the human body was primarily to do with the motion of bodies, equally applicable to the motions of the engines built by men and those built by nature: Samuel Johnson’s *Dictionary of the English Language* (1755) defines mechanical philosophy as one that "endeavours to explicate the Phanomena of Nature from Mechanical Principles, i.e. from the Motion, Rest, Figure, Position, Magnitude, &c. of the Minute Particles of Matter."

It is worth noting, in light of the supposed newly indistinct boundaries epitomised by the cyborg, that there is no distinction made here between "natural" and "mechanical" insofar as nature’s laws are what dictate the mathematics of motion. The mechanical here is wholly natural.

Descartes, for example, wrote in *Principles of Philosophy* that

The only difference I can see between machines and natural objects is that the workings of machines are mostly carried out by apparatus large enough to be readily perceptible by the senses (as is required to make their manufacture humanly possible), whereas natural processes almost always depend on parts so small that they utterly elude our senses. But mechanics, which is a part of
species of physics, uses no concepts but belong also to physics; and it is just as 
“natural” for a clock composed of such-and-such wheels to tell the time, as it is 
for a tree grown from such-and-such seed to produce a certain fruit. So, just as 
men with experience of machinery, when they know what a machine is for, and 
can see part of it, can readily form a conjecture about the way its unseen parts 
are fashioned; in the same way, starting from sensible effects and sensible parts 
of bodies, I have tried to investigate the insensible causes and particles 
underlying them. (part IV, chapter cciv)

It was an astute and, as it turns out, a rather prescient observation that manufacture is 
*humanly* possible only when the working parts are perceivable. Now that we can through 
technology perceive and manufacture the previously invisible working parts for the 
human machine—such as vaccines or through various forms of biotechnology—we 
designate them “artificial” as opposed to “natural.” It is a distinction loaded with 
meaning in the present-day discourse that associates the visualisation, mapping, and 
construction of invisible things with artifice, simulation, dishonesty, even maleficence. At 
the origins of human sciences, however, the machine was simply the application of 
natural laws, and for some influential theorists the human was no different. As the 
Italian mechanist physician Giorgio Baglivi wrote in 1696:

> Whoever examines the bodily organism with attention will certainly not fail to 
discern pincers in the jaws and teeth; a container in the stomach; watermains in 
the veins, the arteries and the other ducts; a piston in the heart; sieves or filters 
in the bowels; in the lungs, bellows; in the muscles, the force of the lever; in the
corner of the eye, a pulley, and so on. So let the chemists continue to explain
natural phenomena in complex terms such as fusion, sublimation, precipitation,
etc., thus founding a separate philosophy. It remains unquestionable that all
these phenomena must be seen in the forces of the wedge, of equilibrium, of
the lever, of the spring, and of all the other principles of mechanics. In short,
the natural functions of the living body can be explained in no other way so
clearly and easily as by means of the experimental and mathematical principles
with which nature herself speaks. (De Præci medic, in Opera Omni medico-practice et
anatomic Venice, 1727, 78; quoted in Moravia)

Since doctors, Baglivi wrote,

have begun to examine the structure and action (effectus) of the animate body on
the basis of geometrical and mechanical principles, as well as of physical,
mechanical, and chemical experiments, they have not only discovered
innumerable phenomena unknown to preceding centuries, but have also
realized that as far as its natural actions are concerned the human body is
nothing more than a complex system of mechanical and chemical movements
that obey mathematical laws. (78)

The attempt to explain how mathematical principles of geometry and mechanics that
govern nature (and motions of machines) also govern the will and motions of the
human body was vigorously contested, and the philosophy of l'homme machine eventually
would require an increasing understanding of the qualities of chemical and electric
forces to explain the vital characteristics of the alive organism. It would not be the

7 See Jean Baudrillard's Simulations or The Transparency of Evil.
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“separate philosophy” at which Baglivi had scoffed: the living machine would become to some extent sensitised and vitalised, through an integration of mechanical theories with those of chemical reactions and the “ethereal fluids” of magnetism and electricity. However much our literature has emphasised the sensitivity of humankind as an emotional, moral, or imaginative response of the mind rather than as a physical response of fleshly action and reaction, this early definition of the body as moving by mechanical laws of nature, as a mathematically quantifiable entity governed by natural laws, has never left our medical and scientific views of humanity. Our bowels still are seen to have filter mechanisms, but we now characterise them as activated or powered by invisible electro-chemical reactions.

But the man-machine also had to do (and still does have to do) with a social order inscribed by an intellectual and highly literate elite (whether representing religious, state, or academic authority) with the intent to limit, make use of, or at least moralise upon, the actions of the populace. To this extent the laws of nature were then, as they are now, frequently re-inscribed through the lens of a particular moral or social order. Hobbes’ *Leviathan*, based upon a materialist premise of the mechanical nature of man—where will and actions are governed primarily by material in motion—had envisioned a system of ethics and politics to circumscribe the roles of citizens in the state. His “artificial man” as state or commonwealth encompassed a theory of the motion and motivation of the subject citizen: “sovereignty is an artificial soul,” he explains at the outset,

as giving life and motion to the whole body; the magistrates and other officers of judicature and execution, artificial joints; reward and punishment (by which
fastened to the seat of the sovereignty, every joint and member is moved to
perform his duty) are the nerves, that do the same in the body natural.
Hobbes' artificial man is thus steered by monarchical government which distributes
through the nerves a means of control by systems of reward and punishment; the
muscles, the moving parts governed by the joints (officials of the law), are "any
numbers of men joined in one interest or business" (Chapter XXII). The moving parts,
therefore, are of a lower order that serve the commonwealth of the whole body through
commercial interests. From early on, we should note here, the term mechanical was
complicated by its associations with lower status. Samuel Johnson, for example, defines
mechanical, mechanick only second as "Constructed by the laws of mechanicks" such as
Newton's; the first definition is "Mean; servile; of mean occupation." In this context it
implies a lower order human function, also true of the obliquely related man-machine
idea which concentrates on the body-as-machine as opposed to soul/spirit/mind.

Hobbes' artificial man, of course, was not so much an organic being as a
metaphor for the government of all those working bodies. The seventeenth-century
man-machine described by the influential Oxford physician and neuro-anatomist
Thomas Willis\(^8\) was an actual creature of motion and sense bound by strict laws of

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\(^8\) Willis' importance in the history of human sciences is noted by George Rousseau in
"Nerves, Spirits, and Fibres: Towards an Anthropology of Sensibility." Rousseau
suggests that without taking into consideration his paradigmatic works and theories, it
would be impossible to account for the culture of sensibility. "Before the Restoration,"
he explains, "Descartes' Discourses and his Passions of the Soul were paradigmatic works,
and deflected all types of natural scientists, directing them almost compulsively to the
study of physiology....The next such paradigmatic works in the biological and medical
sciences were Thomas Willis's texts on the brain published in the 1660s and 1670s"
(127–8).
nature and it was, like Descartes' *homme machine*, a cybernetic, or "steered" organism. As a member of the school of iatrochemistry, Willis postulated chemistry as a basis of human motion and sense rather than merely mechanics. The natural laws he described for the human machine were also, like those of Descartes, Hobbes, and others, ultimately loaded with heavy metaphorical freight as social laws. The "doctrine of the nerves" set forth in *The Anatomy of the Brain and Nerves* (1664) describes the means by which the body moves, defining the nervous system as all the parts upon which "gifted with the animal Spirit [the animating or vitalizing fluid within the body], Motion and Sense necessarily and immediately depend" (125). Willis posits that the faculties of the soul are dependent upon the brain and nervous system, but does not attempt here to explain the Rational soul—the immaterial soul governed by God. He was, nevertheless, also describing the importance of the brain and nerves together (as a plant with branches, or branching streams) in providing the pathways for the animating fluid of both sense and motion. This insight is in significant contrast to Descartes' theories which declared that the soul was united to the machine (body) in the centre of the brain but that sensation and action were attributable to the body alone, while the soul was responsible solely for thought. In his posthumously published *Treatise of Man* (1664) Descartes had described the mechanism of muscular action as a series of hydraulic effects in which the nerves served merely as conduits, pipes through which the animal spirits flowed and either filled or depleted the muscles to effect movement (figure 3.4). The soul had been placed in the brain by God, and it resided there like the fountain-keeper who oversees the tanks of water used to "produce, prevent, or change [the] movements" (101) of fountain automata like those he had seen in grottoes (figure 3.5).
For Willis, however, while the rational soul housed in the brain dictated the actions of the body, the corporeal soul exercised both motion and sense, was material and, most significantly, "Co-extended with the whole body" (Soul of Brutes, 5). G.S. Rousseau has claimed that Willis revolutionised the understanding of man by secularising the nerves (see "Nerves, Spirits, and Fibres"); but the nerves had long been dissociated from the holy realm of the mind. What Willis accomplished, though undoubtedly he would not have characterised it so, was to essentially democratise the "subtil little bodies" flowing through the nerves by suggesting that the subtle fluids which provoke human action continuously circulate throughout both body and brain. That is, the processes of body and brain were not separate as they were for Descartes: the pilot or musician perched in the brain, thanks to Willis' anatomical inquiries, would increasingly be imagined as owing its allegiance to the body itself rather than to God.

Some careful explication was required in order to extend the soul throughout the body, as Willis' view of the world and of man still required a hierarchical order. Defining the nervous system as soul was potentially problematic since, as he said in Anatomy of the Brain and Nerve, the nerves communicate "from the Head the instinct for the
performing of...motion” (128). That is, the combination of subtle fluids, brain, and nerves directly cause the muscles to perform the action dictated by the will. Without an immaterial pilot or fountain-keeper placed in the head by God, a purely mechanical system of human will and actions would collide at some point with Willis’ religious one. As if to reinforce that his work is not straying into the realm of moral authority, Willis is specific in the conclusion to his chapter “Of the “Nervous System in General where...a prospect of the whole Animal [i.e., animating] Government is exhibited” that he is dealing only with the movement of the spirits within the head and nervous system, upon which the soul depends (Anatomy, 130). “God willing,” he declares, he will deal specifically with the soul in a later tract.

In Anatomy, Willis divides the nervous system into the brain, the nerves, and the nervous fibres, the latter extending from the nerves and implanted in the muscles, and the entire system responsible for communicating sense and motion. The fibres,
roadways into the muscles, depend on the nerves, roadways from the brain, for the "forces and supplements of the animal Spirits" (128). While he uses numerous analogies to describe the physical structure of the nerves and the animal spirits, Willis' description of the mechanism of motion itself rests on the single metaphor of the Animal Government. The nerves are like plants, or like rivers, or like the pipes of a musical organ through which the music-making wind passes, as well as broad roads and paths extending "into the several Regions of the animated Body" (126–7). The "very subtil little Bodies" of the animal or vital spirits move through the nerves from the brain (much as light is "etherial little bodies" in the air [126]); these bodies are very much as others had described them, a breath moving upon those waters of the nerves (128); flowing or fluctuating waters; or rays of light. However, when Willis describes the animal spirits flowing from the nerves into the fibres—from the locale of will to the locale of action, he abruptly changes his metaphoric system for the government of bodily animation. Once the fibres deposit them in the muscles which also receive "auxiliary forces" from the blood (129), the animal spirits lose their vague aethereality and become troops and soldiers: "which being set as it were in a Watch-tower, are ordained....either from the objects outwardly, or more inwardly from the Head, forthwith into various forms and peculiar orders for the performing of motion or sense of this or that kind" (129). Note that the nervous bodies are "ordained" by either the rational spirit in the head or the sensory mechanisms of the body, and therefore the body shares with the brain an active governance of the animal spirits in a way that it did not in Descartes' system of hydraulics and pulleys separated from a unitary and indivisible soul.
The actions of a completely mechanistic body and brain would owe allegiance only to the conformation of the body itself, and it is not surprising that the orthodox Willis, Oxford educated, stanch Royalist, devout Anglican, elected professor of natural philosophy at Oxford, would encode his mechanism for movement in terms affirming a state body governed by the Head, a king-like sun image, and kept healthy by the orderly movement of the animal spirits as throngs attending to commerce—“congregated” in the brain or cerebellum, “as it were, into distinct Empories or Marts”—and as troops marching over its roadways. Flowing through the slender bodies of the nerves, the animal spirits:

break forth not in heaps, or in a thick troops but only contracted orderly, and as it were by bands or divisions: but they being carried beyond the extremities of the Nerves, and there possessing the Membranes, Muscles, and other sensible parts, dilate themselves as it were into a most ample field, and with a very diffuse Army they dwell in the Pores and passages of the Fibres planted every where about; where also being endowed from the blood with new food, they become more lively and more expeditious or ready for the designed offices. (130)

When the orderly circulation of the very subtil little Bodies is impeded, “perhaps by too great a supplement of the animal Spirits, and the too thick gathering of the fresh ones still into the nervous parts,” the “army of the Veterans” becomes confounded “and so

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9 I am indebted to Robert G. Frank for his excellent portrait of Willis’ biographical background and intellectual innovations in the science of neuroanatomy in “Thomas Willis and His Circle: Brain and Mind in Seventeenth-Century Medicine.”

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the orders of all being disturbed,” they “rush upon the nervous System with tumult and
impetuosity; from thence a great unquietness and continual throwing about of the
Members are wont to be excited, to which sometimes madness and fury succeed” (130).
It is an image that recalls Hobbes’ description in *Leviathan*, “Of Systems Subject Political
and Private” wherein he stipulates how a “concourse of people” may be lawful or
unlawful.

Whether the “muscles” of the larger body are the labouring bodies of the state,
or are the actual muscles that effect an individual’s motions and actions, the spirits that
actually cause the action are metaphorically potent. Willis’ description of animal
government (the government of animation, movement) is particularly resonant with that
of Hobbes when we consider that both concentrate their metaphors of the unlawful or
the unhealthy in terms of too-large gatherings of little human workers’ bodies in those
parts of the larger state body that are responsible for action and motion. The political
and private systems of the Commonwealth that he explicates in this chapter, Hobbes
declares, “resemble the similar parts or muscles of a body natural.” Describing various
assemblies of men, he says of private systems that

concourse of people; which if not forbidden by the Commonwealth, nor made
on evil design (such as are conflux of people to markets, or shows, or any other
harmless end), are lawful. But when the intention is evil, or (if the number be
considerable) unknown, they are unlawful.

This was an idea repeated in Willis’ description of orderly congregations in the “marts”
contrasted to the occasional “too thick gatherings” in the muscles. Hobbes had
concluded that factions “are unjust, as being contrary to the peace and safety of the
people, and a taking of the sword out of the hand of the sovereign." While it may be lawful," he suggests,

for a thousand men to join in a petition to be delivered to a judge or magistrate; yet if a thousand men come to present it, it is a tumultuous assembly...in such cases as these, it is not a set number that makes the assembly unlawful, but such a number as the present officers are not able to suppress and bring to justice. ...And this is all I shall say concerning systems, and assemblies of people, which may be compared, as I said, to the similar parts of man’s body: such as be lawful, to the muscles; such as are unlawful, to wens, biles, and apostems, engendered by the unnatural conflux of evil humours.

Note that Hobbes’ categories of lawful actions for large groups of the populace at once are commercial (muscular) in nature, but not in presenting written petitions which are intellectual in nature. For Hobbes and Willis both, free will may be possible but a healthy body, like a healthy society, requires an orderly flow through its “designed offices” decidedly situated in a system of hierarchical rule by an intellectual elite, commercial interests, and armed enforcement.

Jonathan Swift, who himself was writing from a very conservative perspective, would later counter with merciless ridicule such mechanistic explanations of human actions and movements as those of Hobbes and perhaps of the most famous of Willis’ students, the materialist Locke. The “certain great prince” in A Tale of a Tub (1704) intent on raising a mighty army and invincible fleet, for example, is motivated by the effect of pent-up sexual spirits upon the brain, as if the contained energies simply course
through the nerve conduits and fill up any available space:

What secret wheel, what hidden spring, could put into motion so wonderful an engine? It was afterwards discovered that the movement of this whole machine had been directed by an absent female whose eyes had raised a protuberancy, and before emission, she was removed into an enemy’s country. ...the collected part of the semen, raised and inflamed, became adust, converted to choler, turned head upon the spinal duct, and ascended to the brain. (79)

Similarly, the actions of a mercilessly warring king are arrested, Swift’s narrator explains, when

the vapour or spirit which animated the hero’s brain, being in perpetual circulation, seized upon that region of the human body so renowned for furnishing the zibeta occidentalis [civet, or musk from the anal scent glands], and gathering there into a tumour, left the rest of the world for that time in peace.

(80)

The same spirits, he concludes, “which, in their superior progress, would conquer a kingdom, descending upon the anus conclude in a fistula” (80). Swift’s anti-materialist jibes function to re-complicate such reductionist systems that betray an arrogant faith encouraged by the new science in human capacity to define and so reduce the complexities of spirit and character to rigidly defined mechanism. “For what man in the natural state or course of thinking, did ever conceive it in his power to reduce the notions of all mankind exactly to same length, and breadth, and height of his own?” (80), he scoffs. To interpret inexplicable human motivations, irrational and inconsistent, as mechanical properties, as movements of a vapour or vibrating musical strings, is
absurd. "Now, the form postulatum being held," Swift's Hack explicates in the manner of a learned philosopher,

it is of no import from what originals this vapour proceeds, but either in what angles it strikes and spreads over the understanding or upon what species of brain it ascends, it will be a very delicate point to cut the feather, and divide the several reasons to a nice and curious reader, how this numerical difference in the brain can produce effects of so vast a difference from the same vapour as to be the sole point of individuation between Alexander the great, Jack of Leyden, and Monsieur Des Cartes. The present argument is the most abstracted that ever I engaged in; it strains my faculties to their highest stretch; and I desire the reader to attend with the utmost perpensity, for I now proceed to unravel this knotty point.

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* * * * * * * * And this I take to be a clear solution of the matter. (82)

This is a witty comment on the impossibility of solving the question of such "knotty points" as humanity through employing mathematical formulae, but Swift of course had his own agenda in sneering at the mechanical spirit in *A Tale of A Tub Written for the Universal Improvement of Mankind*, in which he indulged his ire at the "modern" cultural changes espoused and enacted by a nation of fools threatening his own brand of

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authority as classically educated Author and Anglican clergyman.

Swift's recipe for mechanical learning is a similar scoffing at materialist definitions for the mind: take a collection of learned books "well bound in calf-skin, and lettered at the back, of all modern bodies of arts and sciences whatsoever," distil them seventeen times and let all that is volatile evaporate; then snuff the elixir up through the nose whereupon "it will dilate itself in the brain (where there is any) in fourteen minutes, and you will instantly perceive in your head" the entire sum of distilled knowledge. The notion of the mechanic, for Swift, is bound up with the lower order functions of mere labouring bodies. Swift's Grubstreet Hack for example in "Digression Concerning Critics," comments that while the (now extinct) critic had once been a restorer of "Antient Learning" and a noble hero capable of pronouncing "upon the productions of the learned, from his taste to a true relish of the sublime and admirable," the critic now is a mere labourer. Descending from the patron saint of the Moderns and from Pride is the "true modern critic," the Hack explains, who detractors will report "is a sort of mechanic, set up with a stock and tools for his trade, at as little expense as a tailor; and that there is much analogy between the utensils and abilities of both" (48). The modern "mechanic," labouring critic is therefore set in opposition to the life of the mind: "before one can commence a true critic," Swift suggest, "it will cost a man all the good qualities of his mind; which, perhaps, for a less purchase, would be thought but an indifferent bargain" (49).

10 Linda Zionkowski's "Territorial Disputes in the Republic of Letters: Canon Formation and the Literary Profession" is a useful discussion of disputes over writing as labour and the growing commodification of literature versus the learned writing of the "guardians of the commonwealth" [who] could participate in shaping social, political,
Perhaps his most scathing remark upon the materialist construction of human
spirit, Swift's *A Discourse Concerning the Mechanical Operation of the Spirit* (1704), is at once a
brilliant invective against mechanical views of the body and a parody of what he saw as
a false religion purported by the "mechanick," unlicensed "Enthusiastick" preachers
who claimed direct and unmediated illumination by the Holy Spirit. There are
"abundance of us who will not be satisfied with any other machine beside" Swift writes
in a conflation of masturbation and religious laziness, "being borne to Heaven upon
nothing but his ass" (127). The material/spiritual play is also, then, an elaborate defence
of the status of the true minds and spirits of the Commonwealth over the laughable
baseness of its uneducated "manual" citizens. In his satiric coupling of true spiritual
illumination with orgiastic physicality Swift makes explicit the debasement of spirituality
when it is reduced to a crude human-made artifice by "ejaculating the soul, or
transporting it beyond the sphere of matter" (129):

The fourth method of *religious enthusiasm* or launching out the soul [Swift writes]
as it is purely an effect of artifice and *mechanic operation*, has been sparingly
handled by any writer; because, though it is an art of great antiquity, yet having
been confined to few persons, it long wanted those advancements and
refinements which it afterwards met with since it has grown so epidemic and

and aesthetic beliefs" (4). Zionkowski describes the indignance of Goldsmith, Fielding,
and Johnson at the challenge to "legitimate" minds of the state by merely mechanic
labour of lower classes: "Goldsmith blames such anarchy," she notes, "on 'that fatal
revolution whereby writing is converted to a mechanic trade; and booksellers, instead of
the great, become the patrons and paymasters of men of genius.'" (5) Similarly, as Sir
Alexander Drawcansir in the *Covent-Garden Journal* Fielding "erects a binary opposition in
these passages. On the one side stand authority, hierarchy, and writing as an exercise of
the intellect; on the other, anarchy, equality, and writing as mechanical work" (8).
fallen into so many cultivating hands.

It is, therefore, upon this Mechanical Operation of the Spirit that I mean to treat, as it is at present performed by our British Workmen. I shall deliver to the reader the result of many judicious observations upon the matter, tracing as near as I can the whole course and method of this trade...(129)

Swift's satire is directed against the deluded and self-obsessed blindness of the fanatics, whose notions of spiritual inspiration can be explained in the crassest material and physiological terms; but it is also a high minded ridicule of the lower orders, the tradesmen, the workmen, the mechanics who to Swift's mind have no authority to communicate their own form of spirituality.

The notion of the mechanical spirit as easily purchased learning or religion would be a long-standing object of Swift's derisive humour. Book III of Gulliver's Travels once again manifests his resistance to what is perceived as a dehumanising process in equating and exchanging the human mind or spirit with merely mechanical, material, or quantifiable processes. His target here, however, is the philosophers who would attempt to reduce learning to mechanism. Swift marks, for example, the denial of human creative spirit in the absurd suggestion that purely mechanical processes can duplicate human thought through the Laputan word machine "for improving speculative Knowledge by practical and mechanical Operations." One of the Laputan professors proudly proclaims the machine's value to Gulliver, who relates to his readers: "Every one knew how laborious the usual method is of attaining to arts and sciences; whereas, by his contrivance, the most ignorant person, at a reasonable charge, and with a little bodily labour, might write books in philosophy, poetry, politics, laws, mathematics, and
theology, without the least assistance from
genius or study” (figure 3.6).

The contraption caricatures not
only actual devices that reproduce
artificially the human process of thought
(figure 3.7), but also the mechanistic
theories that seemed to imply that
knowledge is mere spinning of a machine,
that language, words, thoughts, all those
rational exercises that make us human, are reducible to artifice, to material in motion—at
the conclusion of such logic there could be only a limited complexity, no ultimate
purpose for human life, no God. Not only does he ridicule such theories but once again,
Swift asserts his position in the social order by contrasting the notion of achieving
valuable knowledge with that of bodily labour: the absurdity of learning by mere
mechanism as opposed to inherent genius, diligent study (of the right texts), and high
order thought. Writing and labour, for Swift, belonged in as different spheres as mind
and matter: to suggest otherwise would reduce great thinkers to the realm of mere
mechanics.

Indeed, the French physician La Mettrie would posit in L’homme machine (1747)
twenty years later that learning, and indeed morality itself is a mechanical process: “We
think, and we are even honest citizens, only in the same way as we are lively or brave; it
all depends on the way our machine is constructed” (La Mettrie 8). Furthermore,
“Words, language, laws, science and arts” are merely a mechanism of education
stamping ideas into our brains: “Man was trained like an animal;” he claimed, “he became an author in the same way as he became a porter” (La Mettrie 13)—that is, mind and body both are mechanical (and the education of the author is reduced to the same level as that of the porter, and the trained animal). In La Mettrie’s extreme version of the human machine, soul is equivalent to imagination, which is not an immaterial indicator of a higher order of being, but merely a physical imprint on the brain: judgement, reason, memory, all those aspects that make us human, are merely the result of this physical conformation: “All the windy learning which inflates the balloon-like brains of our haughty pedants,” he wrote, is therefore nothing but a mass of words and figures, which form all the traces in the head by means of which we discern and recall objects. …These words and the figures they represent are so closely linked in the brain that it is quite rare for us to imagine an object without the name or sign attached to it.

I always use the word ‘imagine’ because I believe that everything is imagined and that all the parts of the soul can be properly reduced to imagination alone, which forms them all, and thus that judgement, reason and memory are only parts of the soul which are in no way absolute but are veritable modifications
of that sort of medullary screen on which the objects painted in the eye are
projected as in a magic lantern. (La Mettrie 14–15)

For La Mettrie, the soul was a product of the organisation of the brain and thus an
understanding of matter in motion was all that was needed to explain the soul’s
faculties: “Given the slightest principle of movement, animate bodies will have
everything they need to move, feel, think, repent and, in a word, behave in the physical
sphere and in the moral sphere which depends on it” (La Mettrie 26).

Suggesting only that “it is folly to waste one’s time trying to discover [the soul’s]
mechanism” (33), however, La Mettrie would not adequately answer the frequent and
most compelling criticism of the mechanistic tradition, that the human soul, reason, and
morals could not be satisfactorily reduced to motion of gross material structures. The
Scriblerians, for example, had hilariously satirised such reductionist views of human
nature in The Memoirs of Martinus Scriblerus (1723).11 In a letter to Martinus the Society of
Free-Thinkers offers the possibility that if he cannot actually find the seat of the soul, it
might not exist, and offer instead their “easy mechanical Explication of Perception or
Thinking”:

We proceed now to explain, by the structure of the Brain, the several Modes of
thinking. It is well known to Anatomists that the Brain is a Congeries of Glands,
that separate the finer parts of the blood, call’d Animal Spirits; that a Gland is
nothing but a Canal of a great length, variously intorted and wound up

11 The Scriblerians, according to Kerby-Miller, were probably directing their ridicule
“primarily at Collins, who, in the course of his argument with Clarke, attempted to
develop Locke’s theories of the operations of the mind into an entirely mechanistic
system” (292).
together. From the Arietation and Motion of the Spirits in those Canals, proceed all the different sorts of Thought: Simple Ideas are produced by the motion of the Spirits in one simple Canal: When two of these Canals disembogue themselves into one, they make what we call a Proposition; and when two of these propositional channels empty themselves into a third, they form a Syllogism, or a Ratiocination. Memory is perform'd in a distinct apartment of the brain, made up of vessels similar, and like situated to the ideal, propositional, and syllogistical vessels, in the primary parts of the brain. After the same manner it is easy to explain the other modes of thinking; as also why some people think so wrong and perversely, which proceeds from the bad configuration of those Glands. ...

We are so much persuaded of the truth of this our Hypothesis, that we have employ'd one of our Members, a great Virtuoso at Nuremberg, to make a sort of an Hydraulic Engine. ... And we are persuaded that this our artificial Man will not only walk, and speak, and perform most of the outward actions of the animal life, but (being wound up once a week) will perhaps reason as well as most of your Country Parsons. (Kerby-Miller 140–1)

The organism represented as a hydraulic machine had obvious shortcomings: if animate bodies were equivalent with all other matter, and life was nothing but the movement of material parts of the body, there was still no adequate explanation for the inherent active force, the sensitivity, the ability to reason, and the forces of vitality that characterised living bodies. Even if one could explain motion by mechanic means, such complexities as human reason, morality, and feeling were still mysteries. The Scriblerians' witticisms
are also, like Swift’s take on the mechanical operation of the spirit, doubly encoded: the bombastic letter of the Free-thinkers is not only a reproach against reductionist philosophies of human intelligence but also a jest at the expense of the relatively uneducated country parson. The well-educated and privileged Scriblerians positioned themselves comfortably above those other writers “who are often Men of no Learning, or what is as bad, of no Knowledge” (Pope, quoted by Kerby-Miller 15). If learning and knowledge came to be defined by respected and influential men as mere motion potentially expressible by a mathematical quantity, then the means of establishing social hierarchies increasingly lay in asserting the indefinable qualities of genius and refinement, and the right kind of knowledge. The ridiculous Laputans in Gulliver’s Travels, for example, idolised by their gullible visitor, know only the sciences of mathematics and heavily theorised but poorly expressed music: “Imagination, fancy, and invention,” Gulliver explains, “they are wholly strangers to, nor have any words in their language, by which those ideas can be expressed; the whole compass of their thoughts and mind being shut up within the two forementioned sciences.”

Characterising the human as machine is inevitably associated with an attempt to explain the processes of intelligence, knowledge, rational judgement and therefore risks categorising intelligence, creativity, even morality itself, as mechanical processes rather than the exercising of “free will” based on the proper tenets of Christian faith and education. Not surprisingly, the man-machine has been met with resistance by writers who value the complexity and mystery of humanity. On the other hand, characterising the human as mechanical is also inevitably associated with a democratizing natural law that potentially equalises the capacity of all humanity to think, reason, and make
decisions as individuals rather than merely following the laws set in place by the upper classes. At the centre of the human-machine image is the problem not only of how we come by, and to whom we owe, the intelligence and knowledge that guides our actions, but also the relative value of such knowledge. Mechanic knowledge in certain social spheres would be relegated to second order thought, to the mere actions of the human automaton,¹² while the indefinable qualities of upper class genius, the autonomy of the creative and sensitive individual, would be elevated and revered.

"I feel, and therefore I am not mechanical" might be an oversimplified statement of the resistance to mechanistic theories; but as we shall see in the next section, the natural mechanism of the nervous sensibility that would become "sensory perception" in the sciences and "sensitivity" in the arts needed only to be better understood as something like conductive electricity before the rational, thinking human was associated once again with the machine.

3.4 Intelligence and Aether: The Sensitive Man-Machine

When a man is at peace with man, how much lighter than a feather is the heaviest of metals in his hand! he pulls out his purse, and holding it airily and uncompress'd, looks round him, as if he sought for an object to share it with—

In doing this, I felt every vessel in my frame dilate—the arteries beat all cheerily together, and every power which sustained life, performed it with so

¹² See Lorraine Daston’s “Enlightenment Calculations” for a useful discussion of how conceptions of the celebrated Reason of philosophers changed once mathematical calculation became associated with working class bodies, and thus equated with unthinking, repetitive labour rather than the essence of creative intelligence.
little friction, that 'twould have confounded the most physical précieuse in France: with all her materialism, she could scarce have called me a machine—

—Laurence Sterne, Sentimental Journey (1768), 4

If Swift, on the side of the Ancients, railed impotently against the man-machine, Sterne, already seemingly postmodern, complicated it, unrelentingly undermining the categories set in place by all his characters alike. In the above passage the sentimental Yorick, wondering why so many kind hearted men “fall out so cruelly as we do by the way” determines to share his wealth with someone less fortunate than he—until, that is, moments later when a monk enters the room to beg for his convent. Yorick refuses him, then feels instant regret when the monk leaves the room. Who knows what causes our virtues to change so like the ebb and flow of tides? he muses. For all I know, it might be due to the same cause, the moon itself. Finally, having met, become infatuated with, and gently rebuffed by a beautiful young woman, Yorick considers how to undo all the bad impressions the poor monk’s story (in case he had told it to her) might have planted in her against him. When he next sees the monk, he offers him a peace offering, exchanging with him snuff boxes and a stream of sentiment. The monk blushes at Yorick’s kind words; Yorick, holding tight to the hand of the woman he is trying to impress, blushes too “but from what movements,” he relates coyly, “I leave to the few who feel to analyse” (20). Whatever the source of Yorick’s virtuous intentions, Sterne portrays for his readers a quivering machine, his actions steered by—what? the pull of the moon’s gravity? or less mechanically by the moon as age-old symbol of love? Is Yorick’s morality mechanical or sentimental? If we might imagine Sterne is recalling Hobbes’ mechanical man, who is benevolent only for reasons that are self-serving (“For
no man giveth but with intention of good to himself, because gift is voluntary; and of all voluntary acts, the object is to every man his own good”), we find the chapter ending with Yorick plucking nettles from the monk’s grave and bursting into tears: “I am as weak as a woman,” he explains imploringly, “and I beg the world not to smile, but pity me” (21). Sensitivity had become by this time the most compelling argument against the man as machine, and it remains to this day a central thematic feature in the explorations of cyborg identity. Can a machine feel? we ask, watching the expressionless, deathly grey face of Jean Luc Picard as Locutus after having been assimilated by the humanoid machine species known as Borg (figure 3.8). The early mechanistic explanations of the human body were indeed in some ways superseded by characterisations of it as a “sensible” or sensitive one, and many historians have since explored the complexities of the culture of sensibility that arose during this period in part as a response to an overly mechanised view of humanity. For Sergio Moravia in “From Homme Machine to Homme Sensible: Changing Eighteenth-Century Models of Man’s Image,” Théophile de Bordeu emblematises an important turning point from homme machine to homme sensible. “Chaque partie organique du corps vivant a des nerfs qui ont une sensibilité, une espèce ou un degré particulier de sentiment,” Bordeu wrote. (Each organic part of the living body has nerves which have a sensitivity, a particular species or degree of feeling). For the iatromechanists, Moravia explains, “life was movement; for Bordeu, life is
sensitivity. For the iatromechanists, man was a mechanical apparatus; for Bordeu, man is an organism” (54–5). *L’homme machine*, however, was not replaced by *l’homme sensible*, so much as the man-machine remained mechanical and incorporated into its structure the natural mechanisms for vitality and sensitivity that had been missing from earlier explanations—that is, the transition in the eighteenth century was from man as *la machine* to man as *la machine sensible*. As we will see, the question of mechanical motion never disappeared regardless of how important the sensitivity of the organism might be: the power that moves us is also the power that allows us to be moved.

To understand the significance of the sensitive machine to the cyborg figure, we must return to Willis. For the cyborg is a creature that can be controlled and modified as a communications network; in Willis’ “Self-moving Divine Machine” the “Sensitive and Locomotive Powers” result not from a Cartesian mechanism of flowing liquids, pulleys, and cords in the body, but from the information (as we call it today) “communicated” by animal spirits or sensitive soul in a continuous network extended through both brain and body: the brain and nervous system considered together become a networked communications device. Willis’ portrayal of the animal spirits changes significantly in *Two Discourses Concerning the Soul of Brutes*, published as *De Anima Brutorum* (1672) nearly a decade after *Anatomy of the Brain and Nerves*. Rather than army

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13 “Cybernetics is a word invented to define a new field in science,” Wiener wrote in his article for *Scientific American* (November 1948). “It combines under one heading the study of what in a human context is sometimes loosely described as thinking and in engineering is known as control and communication. In other words, cybernetics attempts to find the common elements in the functioning of automatic machines and of the human nervous system, and to develop a theory which will cover the entire field of control and communication in machines and in living organisms” (14).
troops marching through the body, the animal spirits are army troops stationed
throughout it and passing along "communication" or "news," between the brain and
sensory organs. The spirits do not, he writes, travel back and forth as if on a course or
circuit, as is commonly assumed; it is, rather, the information that travels:

the Spirits contiguous one with another are set like an Army in Array;...they
move not from their station...and whether they be set in Battel Array, or on
the Watch, they perform the Commands carried outward from the Brain,
themselves being almost immovable, and effect Motion, and deliver presently
to the Brain the news of any sensible thing impressed, whereby Sensation is
made. (56)\(^4\)

A widely read and influential treatise—going through eight editions from 1667–
84, printed at Oxford, London, Amsterdam, and Geneva, and translated into English as
Two Discourses Concerning the Soul of Brutes, which is that of the Vital and Sensitive Soul of Man in
1683—De Anima Brutorum was an exceedingly cautious explication of the motive and
sensitive soul. By ostensibly discussing the soul of brutes in this work, Willis
scrupulously separated the source of morals and ethics located somewhere in the brain

\(^4\) This passage displays a remarkable though limited foresight of current explanations
for the relay of information through nerve cells by the depolarisation of the nerve cell
membrane, which causes a nerve to fire and start the nerve impulse. The ions in
solution bathing the inside and outside of the nerve cell, as "animal spirits," do not flow
back and forth to the brain or spinal cord, but transfer information at the cellular level:
when a given stimulus causes the membrane pores to open, positively charged sodium ions go into the cell (which is negatively charged relative to the surrounding fluids due
to a high concentration of potassium and organic ions). When enough positively
charged ions flow in to make the inside of the nerve cell positively charged, the nerve
"fires," and the electric charge is conducted as "information" along the length of the
nerve cell axon, to be communicated in turn to other nerve cells.
from that of the mechanical actions and motions of the body. However, his frequent discussions devoted to contrasting the rational soul of men to the corporeal soul shared by both men and brutes betray an interest in being perfectly clear about the distinction between the mechanistic motion, sense, and limited knowledge of all living bodies versus the rational and immortal aspect of humankind. Willis concentrates his study on the corporeal soul, explaining that the reason he can declare some people to be more “sick in the Soul” than in the body is because there are two souls co-existing in the human body (Preface, n.p.). The corporeal soul, unlike the immortal and immaterial rational soul, has material substance, and thus is prone to imperfections. Indeed, the corporeal soul might “extend its Sicknesses, not only to the Body, but to the Mind or rational Soul” and infect the latter with its “failings and faults.” Thus while he acknowledges the influence of the souls on one another, Willis notes specifically that he is examining only the workings of the subordinate, corporeal soul which man shares in common with brutes, and that morals, ethics, piety, belong in the realm of the rational soul. His work, he hopes, will offend no orthodox views of man’s immortal soul, and just in case, he reiterates throughout his first Discourse that the two souls in the animal government—the Rational soul of the intellect and the Corporeal soul of the body are constantly at war. It should be a worthy object to attempt to understand the physical mechanisms of the warring souls, he writes. He should not need to fear his work should be “censured for Pernicious or Heretical,” but 

on the contrary, we hope it is altogether Orthodox, and appears agreeable to a good Life, and Pious Institution: from hence the Wars and Strivings between our two Appetites, or between the Flesh and Spirit, both Morally and
Theologically inculcated to us, are also Physically understood; for that I see and approve the better things, and follow the worse; and this, The Flesh lusts against the Spirit, and the Spirit against the Flesh. (Preface, n.p.)

Willis is not being overcautious in his frequent reassurances of the existence of an immaterial soul: in France over half a century later the publisher of L'homme machine, Elie Luzak, was condemned by religious authorities, and La Mettrie was forced to flee France and then Holland to seek refuge at the court of Frederick the Great in Prussia after publishing the thesis that matter and mind were a single entity (Luzak, who had helped La Mettrie escape Holland, wrote to the Secretary of the Prussian Academy of Sciences, “Without me, he would have gone up on the gallows like a miserable thief.”)

L'homme machine inspired tremendous hostility and numerous written attacks and rebuttals (one of them by Luzak himself); its sale was forbidden in France, it was banned in Leyden, and burned in the public square of The Hague. La Mettrie's definition of the natural world as a single substance, arguing that the active principle is an inherent quality of matter itself and not distinct as soul, was a highly political claim: if the animal spirit was purely mechanical, located in and affected by the material body, then theological claims to the soul would be in effect obliterated. In effect, Willis' earlier characterisation of the body as microcosm of social order was the first step in “democratising” the nation of brain and animal spirits: plucking some of the rational soul out from its kingly seat in the brain and running it through the mechanical muscles corresponded to an undermining of the authority of church and monarchy over the actions of the body in society.
No wonder, then, that Willis' discourses on an entirely material soul emphasise repeatedly that the man-machine he describes is the work of God, and moved by God: "I profess the great God, as the only Work-man, so also as the first Mover, and auspiciously present, everywhere, was he not able to impress strength, Powers, and Faculties to Matter, fitted to the offices of a Sensitive Life?" (Preface, n.p.)

The human is indeed mechanical but, Willis carefully notes, it is a more perfect machine than any that man could construct: the Animal Spirits shut up within Passages, as it were Pipes and other Machines, abound with both an objective Virtue, by which many rays of Light...effect the sension of every Kind, and also an Active, by which the loco-motive powers, and also the acts of the Spasmodic Affections, are performed, beyond the forces or Instincts of wind, or any blast shut up in machines. (Soul of Brutes, 24)

The human-machine and the human-made machine both are significantly driven by active or energising forces of fire or light, but the superiority of the human machine is due to the spiritual qualities of the force that drives it:

In Mechanical things, Fire, Air, and Light, are chiefly Energetical, which humane Industry is always wont to use, for the greatly stupendious, and no less necessary works. This the Furnaces of Smiths, Chymists, and Glass-men, and of other boylers of several Kinds, Dioptrick Glasses, Musical, Warlike, Mathematical Instruments, with many other Machines...do testify. In like manner we may believe, that the Great Workman, to wit the Chief Creator, from the Beginning, did make the greatly active, and also the most subtil Souls

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15 *Sans moi il eut monté sur L'Echafaut comme un miserable bandit,* quoted in Thomson, 10.
of Living Creatures, out of their Particles, as the most active; to which he gave also a greater, and as it were a supernatural Virtue and Efficacy; from the Excellent Structure of the Organs, the most Exquisitely laboured, beyond the Workmanship and artificialness of any other Machine. (24)

Willis' human machine is not only high above the "artificialness" of other machines, but it is, even better, given "super"-natural particles of energy for both its "locomotive powers" and its "spasmodic affections." There is a delicate balance here between the machine driven by wholly material causes and one which ultimately moves by the immaterial forces of God's power, and Willis poises himself with a caveat in place:

If any one shall affirm, that most subtle Substance, and wholly Etherial, which serves for the Vital Oeconomy or Government to be immaterial, for that it enters upon the sluggish Disposition of inanimate Bodies, let him remember to be indulgent to me, if by chance I call it material. (Preface, n.p.)

A very "nervous" introduction indeed, to a tract that goes on to demonstrate that despite these significant differences between their souls, anatomically "we have noted little or no difference, in the Head of either" man or brute.

The difference between the corporeal and rational souls becomes particularly problematic when we consider knowledge, decision-making, and the will to act—the very stuff of morals. We know that "the Soul of the Brute is strong in sense and motion as a machine" (32), and the rational soul of man obviously "exercises the Acts of Reason, Judgment, and Will" (32), Willis explains, but if we know too that the soul of brutes is "much inferior and Material" (32), then by what mechanism do beasts come by their innate knowledge? For we know that beasts might also "choose Acts, which seem
to flow from Council, or a certain Deliberation” (32). Knowing as we do that they do not have an immaterial rational soul, then acts resulting from reasoned thought are not always guided by the immortal rational soul but by the soul extended through the body.

Though it is granted, Willis writes in his chapter on the “Science or Knowledge of Brutes,” that the brain “communicates” with the body, he has not yet inquired as to what kind of power it is that interprets the sensory information and thus results in the appetites and the acts of the other faculties of the body. “I cannot readily detect, in [the soul or body], or in any material subject…any thing, to which may be attributed such a Power, with a self-moving energy,” he says, but in “the animated Body, made by an Excellent and truly Divine Workmanship” (33), the soul and body together result in the faculties deemed necessary for those ends and uses of the animal determined by God. The question, then, is how to differentiate the two machines of man and brute. “The more perfect Brutes are indue with knowledges,” he allows, conceding again that some form of knowledge is due to the corporeal soul and extends through the material body (34).

At the outset of his analysis of knowledge, the subtle, ethereal substance that powers our actions and makes us move is described (as it was in Anatomy of the Brain and Nerves) as the wind in a musical organ, a metaphor not unique to Willis and one that seems carefully chosen to situate something of the divine music of the spheres (composed of the “shiny substance” of the heavens, or aether) within the vital human body. The body as instrument is a significant metaphor, articulating the function of the little pilot or musician or king controlling the mechanical body powered by this heavenly substance. “In most Mechanical things,” Willis explains, “or those made by humane Art,
the Workmanship Excels the matter” (33). We do not admire that “rude and simple sound” when wind is blown into a pipe, but we are amazed by the complexity and the harmony of musical organs, the effect of which excels both “the matter of the Instrument, and... the hand of the Musician striking it” (34). It is the way the machine is built that determines not only the harmony of the music but also the ability to play any number of tunes—the ability to freely choose and act:

Further, altho the Musical Organ very much requires the labour of him playing on it, by whose direction, the spirit or wind being admitted, now into these, anon into those, and into other Pipes, causes the manifold harmony, and almost infinite Varieties of Tunes; yet sometimes I have seen such an Instrument so prepared, that without any Musician directing, the little doors being shut up, by a certain law and order, by the mere Course of a Water, almost the same harmony is made, and the same tunes, equal with those Composed by Art. And indeed Man, seems like to the former, in which the rational Soul, sustains the part of the Musician playing on it, which governing and directing the animal spirits, disposes and orders at its pleasure, the Faculties of the Inferior Soul: But the Soul of the Brute, being scarce moderatrix of its self, or of its Faculties, Institutes, for Ends necessary for it self, many series of Actions, but those (as it were tunes of harmony produced by a water Organ, of another Kind) regularly prescribed by a certain Rule or Law... (34)

While the actions of brutes may correspond to the harmonic tunes produced automatically by a water organ, Willis concludes, they are “almost always determined

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[we might today say 'programmed'] to do the same thing" (34), that is, prescribed by a physical law or human application of physical laws. Further, the corporeal soul in man and brutes has a "Knowing Faculty," which is "Phantasie or Imagination," but it is inferior and "often deceived." The powers of man's superior soul—of "the Intellect, Judgment, Discourse, and other Acts of Reason, shews them far excelling any Faculty or Science of the Brute, and the whole power of the Corporeal Soul," he explains (38). The difference between men and brutes, then, is that in man the rational and immortal soul governs the corporeal as a king does his subjects:

I think we may say, with the most learned Gassendus, That the Corporeal Soul is the immediate Subject of the Rational Soul, of which, as she is the Act, Perfection, Complement, and Form by her self, the Rational Soul also affects the Form, and Acts of the humane Body. ...therefore we may affirm this purely Spiritual, to sit as in its Throne, in the principal Part or Faculty of it, to wit, in the Imagination, made out of an handful of Animal Spirits, most highly subtil. ...when as the Species, or every sensible Impression, of which we are any ways Knowing, being inflicted any where on the Humane Body, is carried to the Imagination or Phantasie, and there all the Appetites or Spontaneous Conceptions, or Intentions of things to be done, are excited, the Intellect or Humane Mind, presiding in this Imperial seat, easily performs the Government of the whole Man. (41)

"Knowing Power," however, is twofold—of body and mind—of the Intellect (the "Handmaid of the Rational Soul"), from which proceeds the Will; and the Imagination (the "Procress of the Corporeal Soul") to which the Sensitive Appetite cleaves (42).
There is always a war in the Empire of the Mind, Willis concludes, between Reason using its "proper force" and the Mind succumbing to the corporeal spirit, and rolling in the "Mud of Sensual Pleasures: So that Man becomes like the Beast, or rather worst" (43). Willis' frequent reiteration of the rational soul presiding over the corporeal suggests his discomfort with attributing so much of the human machine's actions and feelings to material processes within the body itself.

Prior to Willis, the ventricles, hollow cavities in the brain and dispersed throughout the body, rather than the brain itself, were considered the sites of nervous activity. This marks an important variance from previous theories. Descartes for example in *Traité des Passions* (1649) had stated, firmly associating the immaterial soul with God and keeping it separate from the body, that "there is only one soul in us, and that soul does not have in itself any diversity of parts (Art. 47). The mind is responsible solely for thought while the body is solely responsible for motion and heat (Arts. 4 and 5). For Descartes, the corporeal mechanism that makes the muscles move comes from the heart, which pumps blood up to the ventricles to be purified into animal spirits: "while we live there is a continual heat in our heart, which is a kind of fire that the blood of the veins feeds, and this fire is the corporeal principle of all the motions of our members" (Art. 8). Robert Burton too had separated the material animal spirits from the soul situated in the brain: The brain, "the most noble organ under heaven," is the seat of the soul and the "habitation of wisdom, memory, judgment, reason" (153), he wrote in *The Anatomy of Melancholy* (1621). The animal spirits, however, do not flow through the brain, but are limited to the ventricles. "The vital spirits are made in the heart of the natural [spirits, which are begotten in the liver]," and are transported to all the other
parts by the arteries. The ventricles in the brain “are the receptacles of the spirits, brought hither by the arteries from the heart, and are there refined to a more heavenly nature, to perform the actions of the soul” (154). The animal spirits, formed of the vital, are “diffused by the nerves to the subordinate members, [and] give sense and motion to them all” (148). Motion, imagination, cogitation, and memory are all, according to Burton, faculties of the ventricles.

As we know today, however, the cerebrospinal fluid produced in the ventricles of the brain functions rather more mundanely to cushion the brain and spinal cord from trauma, and also to remove the waste products of metabolism and other substances that diffuse into the brain from the blood; it is the cerebellum of the brain that regulates and coordinates complex voluntary movement. By proclaiming that the animal spirits are not separate from the brain, as the fluids in the ventricles are, but actually contained within the brain, Willis in effect demoted the brain itself to body system: the animal spirits of the corporeal soul, “procreated only in the Brain and Cerebel” (Anatomy 126), are continuous through both brain and body. In this explanation of the “soul of brutes,” Willis further develops his consequential theory wherein the material fluids of bodily motion and sense are made continuous with and dependent on the brain.¹⁶

¹⁶ This is a different interpretation than that of Rousseau in “Towards a Semiotics of the Nerve,” wherein he states that the “Willisian anatomy”—which emphasised “the brain as the commander of an army of nerves whose ranks consisted of the solids, animal spirits, and fibres” (219)—played a role in the “secularisation” of the ventricles and nerves during the early Enlightenment. The nerves and ventricles had long been bodily and secular. Insofar as Willis’ explanation actually portrayed the nerves and nervous fibres not as armies but as conduits for an army of “subtil little bodies” or animal spirits commanded by the brain, Willis’ anatomy seems far more important in the history of cyborgs as actually contributing to the eventual secularisation of the brain itself and the democratisation of the animal spirits which became increasingly defined (rather than as...
Willis' two-soul explanation of the moving, sensing, and thinking human-machine extended the material and corporeal soul from the brain throughout the entire body and, significantly, associated it with subordinate forms of both knowledge and the imagination, as well as motion and sense. By the end of the next century Diderot would be contemplating the possibility that sensitivity, as a property common to all matter or the result of the organisation of matter, could be the one "simple process that explains everything" (*D'Alembert's Dream*, 154), suggesting further that the matter of individual unity or identity might be explained as a spider with an infinite "network" or "web" of threads—not separate from but attached to itself (182)—or a spider as centre of a sensitive network composed of its long legs extending through the individual's body and sending "messages" to the centre. 17 For Diderot, there is no need to separate soul from body: they are made of the same material, and thus "the difference between the instrument called philosopher and the instrument called clavichord," he explains, is that the "philosopher-instrument is sensitive, being at one and the same time player and instrument" (157). That is, the individual is not a body-instrument separate from the pilot/musician of the mind or soul. The body steers itself: our keys may strike

a mystical immaterial substance separate from the material body) as natural processes of electro-chemical reactions in specific chemical solutions throughout the body and brain.

17 Bordeu later explains to Mademoiselle de L'Espinasse that what is perceived by the vibrating "web" of consciousness is limited "Because messages weaken in proportion to the distance they come from" (184). It is tempting to speculate that our own metaphor of the world wide web stems directly from such explanations of consciousness and extension. Bruce Sterling's Spider Rose (see chapter one), ostensibly is a posthuman being motionlessly perceiving the world from the centre of the polycarbon web made continuous with her body through a mind-link plug in her neck. The principle difference between this image of the posthuman and Diderot's materialist explanation of human consciousness is the continuity of human bodies with natural processes made possible by a knowledge of electricity.
themselves, he suggests, or things in nature around us might strike them and set them vibrating in harmony. Toward the close of the century, the little musician needed no longer look to God to power his machine; both machine and musician would be a singular unit moved by natural phenomena both within and outside of the body.

When the soul extended itself out into the nervous system, so did the markers of cultural authority. Willis’ nervous system thus not only provided a foundation for the medical and scientific study of the human senses; it also formed the basis for a new system of social hierarchy expressed as “sensibility,” which equated a heightened sensitivity and morality with cultural refinement and intellectual aptitude. The sensible being in medical terms was still a machine, or a vibrating musical instrument, but it was one increasingly characterised as quivering with human emotions and sensitivity. There would still be a war between intellect and body but if for Willis the difficulty was primarily to discern man from beast, for the culture of sensibility in an increasingly secular world, another difficulty was to differentiate between lower order mechanic bodies and higher order nervous bodies, between which points there was a gradation of difference intimately associated with intelligence. The Scottish physician George Cheyne (1671–1743), sixty-nine years after Willis (and thirty-six years before Diderot’s atheistic claims), would also characterise the human body as mechanical musical instrument in his best-selling The English Malady (1733). Non-philosophers need only suppose, he writes in the introduction, “that the Human Body is a Machin of an infinite Number and variety of different Channels and Pipes, filled with various and different Liquors and Fluids” (3), and as a musical organ (“a finely fram’d and well-tun’d Organ-Case”) with nerves like keys which convey sound to a “sentient Principle, or Musician” (4) in the
brain.

If Willis’ favoured analogy in a time of political turmoil was of the rational mind at war with the nervous (sensual) fibres, Cheyne’s—in a time when “our Wealth has increas’d, and our Navigation has been extended, [and] we have ransack’d all Parts of the Globe to bring together its whole Stock of Materials for Riot, Luxury, and to provoke Excess” (34)—was of the body’s quivering fibres frequently brought out of their “Harmony” by the body’s excesses and sensual pleasures. While he decried the rich, lazy, luxurious and inactive—those who “fare daintily and live voluptuously” (20)—whose nervous diseases were due to their own unlimited appetites, Cheyne’s musician as intelligent principle (rather than rational soul) was characterised by a distinct hierarchy of intelligence and sentiment. Nervous diseases do not occur in those living in “barren and uncultivated” countries or to those who are “rude and destitute of the Arts of Ingenuity and Invention” (20). “It is true indeed,” he wrote:

there are as many and as different Degrees of Sensibility or of Feeling as there are Degrees of Intelligence and Perception in human Creatures; and the Principle of both may perhaps be one and the same. One shall suffer more from the Prick of a Pin, or Needle, from their extreme Sensibility, than others from being run thro’ the Body; and the first sort, seem to be of the Class of these Quick-Thinkers

I have formerly mentioned. (253)

However much Cheyne claimed the intelligent principle was a musician residing somewhere in the brain, he also portrayed intelligence as having in effect seeped out into the nerves that “communicate” (he uses this term throughout) action, motion, and sense. The height of refinement was symbolised by the height of “sensitivity”—

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characterised by intelligence, literacy, and the expression of imaginative creativity. "It is a common Observation, (and, I think, as great Probability on its Side)" he opined, "that Fools, weak or stupid Persons, heavy and dull Souls, are seldom much troubled with Vapours or Lowness of Spirits" (36). And, while nervous disease might be "original" or "acquir'd" (13), those who are born with "weak nerves" (14) are of a higher moral and intellectual order. They are less likely, in fact, to succumb to the excesses of the merely rich and luxurious:

I shall only here observe two things in regard to [those who are born with weak nerves]. The first is, that they are never to expect the same Force, Strength, Vigour and Activity, nor to be made capable of running into the same Indiscretions or Excess of sensual Pleasures (without suffering presently, or on the Spot) with those of strong Fibres and robust Constitutions. No Art hitherto known, can make an Eagle of a Wren, (for tho' a Wren, by Art and Management, may be made, as it were, a Nightingale, yet never a Carrion Crow or Kite); but for all the innocent Enjoyments of Life, (at least, for Freedom from Pain and torturing Distempers, for Cheerfulness and freedom of Spirits, for intellectual Pleasures, mental Enjoyments, and Length of Days they (considering the Temptations and Miseries of this mortal State) generally have, and may always have, the Advantage of these others. (I always except extreme Degrees of Nervous Diseases.) As for intellectual Pleasures, the Case is without all manner of doubt, (without some notable Error, or in extreme Cases) possibly, because the Organs of these Operations being in their own Nature delicate and fine, when wasted and scrap'd... and thus communicated to their

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Posterity, these naturally subtil parts thus become more fine and sensible, are hinder'd by the natural Weakness of Children, in their tender Years...and so are longer preserv'd in their Sensibility and Refinement; at least the Case is generally in fact so, (as I have observ'd in most originally tender Persons well educated and disciplin'd) Infinite Goodness and Power bringing Good out of innocent Evil. (For the common Proverb is just and true, that a Venice Glass will last as long, if well look'd after, and even shine more bright, than a more gross and course one.) (14–15)

The highest order of sensibility, the sign of upper-class status, was inevitably associated with the highest order of thinking and writing, and as long as the higher classes remained in the world of the mind and did not fall into the corruption of bodily pleasure, they might expect to remain free of the "English Malady."

The Swiss physician S.A. Tissot (1728–1797) would similarly write in An Essay on Diseases Incident to Literary and Sedentary Persons. With Proper Rules for Preventing Their Fatal Consequences (1769) that those of superior minds were more likely to suffer from nervous diseases than were fools. "It is an old complaint, that study, though essentially necessary to the mind, is hurtful to the body," he wrote. Those who are of weak constitutions "as most studious men are, should take greater care than others, that what is impaired by application to their studies may be repair'd by attention to their constitutions" (16–17). For example:

It is observable that fools always eat and drink a great deal, and yet digest perfectly well, even though they lead a sedentary life, and do not surpass others either in the bulk or strength of their bodies: whilst men of genius and abilities,
though they have strong muscles, and take exercise sufficient, are obnoxious to crudities in the stomach and slowness of concoction. (27)

Not surprisingly, the view was widely accepted and promoted by writers in the area of “fine” as opposed to “mechanical” arts. William Duff (1732–1815) would write his An Essay on Original Genius and its Various Modes of Exertion in Philosophy and the Fine Arts, Particularly in Poetry (1767) that

most of our modern pretenders to Eloquence seem to have considered mankind in the same light in which Voltaire regarded the celebrated Dr. Clarke, as mere reasoning machines: they seem to have considered them as purely intellectual, void of passion and sensibility. This strange mistake may perhaps be supposed to be partly the effect of the philosophical spirit of the times, which, like all other prevailing modes, is subject to its deliriums; certain however it is, that while man remains a compound being, consisting of reason and passion, his actions will always be prompted by the latter, in whatever degree his opinions may be influenced by the former (245–6).

On the other side of the learned explorations that would eventually be divided into the Fine Arts and the Sciences, Diderot, whose Encyclopédie was designed to elevate the mechanical arts,18 would write in his unpublished D’Alembert’s Dream (placing poets and artists on a scale rather unflatteringly beneath philosophers) that

If the nerve-centre or trunk is too vigorous in relation to the branches we find

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18 Diderot remarks in his article on “Art” that “Bacon regarded the history of the mechanical Arts as the most important branch of true Philosophy” (Encyclopedia or Systematic Dictionary of the Sciences, Arts and Crafts, Vol. 1, 714).
poets, artists, people of imagination, cowards, fanatics, madmen. If it is too weak we get what we call louts or wild beasts. If the whole system is flaccid, soft, devoid of energy, then idiots. On the other hand, if it is energetic, well balanced and in good order the outcome is the great thinkers, philosophers, sages. (211)

In terms of the mythology of the fine arts, however, as G.S. Rousseau puts it, greater sensibility "makes for greater writing, greater art, greater genius" ("Semiotics of the Nerve," 241).

Throughout this period, as George Rousseau explains, the nerves became the "vital je ne sais quoi of the upper class; the spring of vitality and creativity that set class apart from the boi polloi or rank and file" (241); at the same time, the medical-scientific community was defining the animal spirits as material substances circumscribed by Newton's laws. Cheyne had been careful to emphasise that the human machine was acted upon by a spirit of higher order: to explain the self-active and self-motive powers of living creatures "Mechanically," he noted, "from matter and motion alone, and all the Powers of our Numbers and Geometry join'd to them... is mere Jargon and Ignorance" (62–3). It is "as utterly impossible to account for Animation from mere Mechanism, as to account for Thinking or Willing from that Principle," (63) he claims, but only after his attempt to account for motion by animal spirits, wherein he seems to be hedging as to whether the "musician" is governed by Nature or God. "The most difficult Problem in all the Animal Oeconomy," he writes, "is, to give any tolerable Account of Muscular Action or Animal Motion" (51), and goes on to postulate that human motion might be the action of Newtonian aether.
all the...secret and internal Actions of the Parts of Matter upon one another, are with some Shew of Possibility suspected, and by some Observations...made not improbably by the sagacious and learned Sir Isaac Newton [in Opticks, Book III], to be owing to an infinitely subtil, elastick Fluid, or Spirit, (as he strongly expresses that subtil Matter) distended through this whole System, penetrating all Bodies with the greatest Facility, infinitely active and volatile.... And by this *Ether, Spirit,* or most subtil Fluid, the Parts of Bodies are driven forcibly together, and their mutual attractive Virtue arises, ...and finding nothing in the Writings of other Philosophers, Mathematicians, or Physicians, of equal Probability with this, tho' imperfect Account...I will offer the Reader no other. (52–3)

It is true, he writes,

this *Newtonian Ether* advances us one Step further into the Nature of Things; but here we must necessarily stop, the Works of God appearing literally inscrutable to Perfection. ...in all the Works of God, there is a *ne plus ultra*; perhaps it may be in the inanimate material System of Things, as it is most certainly in the Animal Kingdom, that Nature and its Author, to distinguish itself from finite Mechanism, always operates by Systems and Organs in Number even infinite...and thus he leaves *Images* and *Signatures* of himself on all his Works. (59)

There may be, he continues,

Intermediates between *pure, immaterial Spirit,* and *gross Matter,* and...this intermediate, material Substance, may make the Cement between the human
Soul and Body, and may be the Instrument or Medium of all its Actions and Functions, where material Organs are not manifest: And may possibly be the Cause of the other secret and inscrutable Mysteries of Nature, and the same (for ought I know) with Sir Isaac Newton’s infinitely fine and elastic Fluid, or Spirit.

(60)

In *Opticks* (1718) Newton (1642–1727) had postulated that light is corpuscular and that the corpuscles are able to excite waves in the aether. Query 31 of Book III describes the powers and forces of small particles in phenomena such as light, magnetism and electricity:

Have not small Particles of Bodies certain Powers, Virtues, or Forces, by which they act at a distance, not only upon the Rays of Light for reflecting, refracting, and inflecting them, but also upon one another for producing a great part of the phenomena of nature? For it’s well known that bodies act one upon another by the attractions of gravity, magnetism, and electricity; and these instances show the tenor and course of nature, and make it not improbable that there may be more attractive powers than these.

Thus Willis’ “fiery” corporeal soul with its properties something like light is gradually becoming a specifically defined property that we today characterise as a “current” of electric and electro-chemical charge. The Cambridge physician David Hartley (1705–1757) would later postulate a theory of man based upon the laws of Newtonian science in *Observations on Man: His Frame, His Duty, and his Expectations* (1749), suggesting that the contact of an external object with the sensory nerves excites “vibrations in the aether residing in the pores of these nerves.” La Mettrie would also claim in *L’homme machine*
that "thought...[is] so little incompatible with organised matter that it seems to be one of its properties, like electricity, motive power, impenetrability, extension, etc." (La Mettrie 35). The shift from wholly mechanical beings to sensible ones entailed a process of defining the soul in terms of the invisible properties of natural mechanism (forces that were inherent in heat, light, electricity) rather than visible properties of natural mechanism (forces inherent in objects in motion and at rest), but they no less described the human spirit as being controlled by the same laws of nature as all material and mechanical objects.

If growing emphasis on the nervous sensibility that made humans feel paved the way for the cult of sensibility and later Romanticism in literature and the arts,¹⁹ it also corresponded to growing medical understanding of the "animal spirits" and their role in making the human machine move, think, and act as governed by natural rather than spiritual laws. Thus David Hartley's claim:

> It is of the utmost importance to morality and religion that the affections and passions should be analysed into their simple compounding parts, by reversing the steps of the associations which concur to form them. For thus we learn how to cherish and improve good ones, check and root out such as are mischievous and immoral.

(Thus demonstrating once again that wherever there is a new theory of human will and action some learned soul will write out a system for curbing them).

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¹⁹ See G.S. Rousseau, "Towards a Semiotics of the Nerve," and his preliminary investigation into the topic, "Nerves, Spirits, and Fibres: Towards an Anthropology of Sensibility."
By the end of the eighteenth century, the immaterial soul was increasingly omitted from the explanations for human motion, even when the authors were careful to note that God could very well be present: the spirit of motion was a material, natural force within body and brain. Erasmus Darwin (1731–1802), for example, would write in his first section of *Zoonomia; Or, the Laws of Organic Life* (1796)—"Of Motion"—that

By the words spirit of animation or sensorial power, I mean only that animal life, which mankind possesses in common with brutes, and in some degree even with vegetables, and leave the consideration of the immortal part of us, which is the object of religion, to those who treat of revelation. (5)

The soul is eradicated from the medical discourse of how the body moves: "The whole of nature may be supposed to consist of two essences or substances" he writes, "one of which may be termed spirit, and the other matter. The former of these possess the power to commence or produce motion, and the latter to receive and communicate it" (5). The spirit of animation for Darwin is entirely physical, and the elaborate metaphors of earlier writers are contracted here into lists of highly specific definitions (7–13). The animal spirits become "spirit of animation," or "the sensorium," numbered off into four "modes of action" (32). The soul here is replaced by the "power to commence or produce motion." The "primary motions of matter," Darwin writes, are those belonging to gravitation, to chemistry, and to life; and each class has its peculiar laws. Though these three classes include the motions of solid, liquid, and aerial bodies; there is nevertheless a fourth division of motions; I mean those of the supposed ethereal fluids of magnetism, electricity, heat, and light; whose properties are not so well investigated as to be classed with sufficient
accuracy. (Darwin 5)

The brain and nervous system thus might secrete “electric fluids” as other glands secrete fluids:

The similarity of the texture of the brain to that of the pancreas, and some other glands of the body, has induced the inquirers into this subject to believe, that a fluid, perhaps much more subtle than the electric aura, is separated from the blood by that organ for the purposes of motion and sensation. When we recollect, that the electric fluid itself is actually accumulated and given out voluntarily by the torpedo and the gymnotus electricus, that an electric shock will frequently stimulate into motion a paralytic limb, and lastly that it needs no perceptible tubes to convey it, this opinion seems not without probability; and the singular figure of the brain and nervous system seems well adapted to distribute it over every part of the body. (10)

Darwin later writes of the “cause of all motion” or “spirit of animation” as analogous to “heat, electricity, and magnetism, [which] can be given to or taken from a piece of iron; and must therefore exist, whether separated from the metal, or combined with it. From a parity of reasoning,” he concludes significantly, “the spirit of animation would appear to be capable of existing as well separately from the body as with it” (109).

That subtle spirit, Aether, has become ethereal fluid shared with the world at large, and eventually, with machines, in the form of electricity. Although Darwin’s preface asserts the difference between natural organic bodies and machines, it merely staves off an eventual merging of both in the cyborg figure: it was unfortunate, Darwin comments, that previous inquirers had
instead of comparing the properties belonging to animated nature with each
other, they, idly ingenious, busied themselves in attempting to explain the laws
of life by those of mechanism and chemistry; they considered the body as an
hydraulic machine, and the fluids as passing through a series of chemical
changes, forgetting that animation was its essential characteristic.

Demonstrating electrical fluid by organic creatures such as the torpedo and the
gymnotus electricus, Darwin could not know that once the physical properties of this
"zoonomic" electricity were better understood, it would be used to drive the motions of
machines, and that the motions of the human being—levers, pulleys, pumps, pipes,
hydraulics, chemistry, and now electrical charge—would once again be on an equal
footing with mechanical or machine processes.

3.5 Posthuman Insensitivity

Representations of the human-machine are contingent upon the cultural
understanding of and language used to describe both natural systems and systems of the
human body. When our predominant technology was clockwork, clockwork became a
means of describing the human body and mind. Increasingly, we have come to see the
systems of both mind-body and nature as characterised by the same processes and
defined by the same language. Accordingly, ethereal "sensibility" will become zoonomic
electric charge, which will become in turn a process described in terms of +/−, in terms
of Na+ and K+ ions. The early modern period which was beginning to define human
systems in the same mechanistic terms as natural systems (and therefore in the same
terms as machine systems) witnessed significant resistance from critics who wanted to
preserve conceptions of the spiritual human acting and developing within the societal body according to established religious, social, and educational systems. To see the human as mechanical threatened to displace a social order established upon the natural superiority of the learned (minds) over the labourer (bodies), and the resulting tendency was to attempt to establish a spiritual hierarchy of nervous sensibility that has fed into and nourished our own literary sensibilities.

In his lament for the Gutenberg era, Sven Birkerts writes of the postmodern “transformations that have been wreaked upon society by electronic media,” that “we are fractured and fragmented, dissolved and distracted.” Moreover, the “term ‘sensibility,’ standing for a coherent inwardness, [has] slipped from usage.” Birkerts laments the loss of “humanism, that once-grand growth that had its roots in the Renaissance, that took man as the measure of all things, and looked forward to the marriage of reason and spirit” (Gutenberg Elegies, 180–1). Certainly we no longer take “man as the measure of all things,” and rightly so; but if we recall the fractured, fragmented, distracted identities in Martinus Scriblerus or the “ten Minds...together by the Ears in one Man” described by Willis (Soul of Brutes 53), we can begin to dispel the over generalised characterisation of humanity as once having a whole and unitary vision of selfhood.

While notions of “sensibility” were certainly unique to the early modern period as opposed to our own, the thematic concerns underlying and bolstering the figure of the cyborg in literature and theory are not particular to the postmodern identity. Rather, inherent in the cyborg (both the figurative and “real” merging of human body and technological device) are elements of the early modern which suggest that, rather than
characterising a break with the past, the cyborg as a metaphorical sign of humanity's future in fact represents many of the same hopes and fears for our fate that were expressed centuries ago regarding the view of human as machine.
Conclusion

Cyborg Communications

Transgressed boundaries, in fact, define the cyborg, making it the consummate postmodern concept. ...It involves transforming the self into something entirely new, combining technological with human identity. Although human subjectivity is not lost in the process, it is significantly altered.


[When the human becomes cyborg in cyberspace] subjectivity is dispersed throughout the cybernetic circuit...the boundaries of self are defined less by the skin than by the feedback loops connecting body and simulation in a techno-bio-integrated circuit.

—Katherine Hayles, “Virtual Bodies and Flickering Signifiers”

If there is one pervasive theme in cyborg discourse it is the location of self-identity: the conversation circulates around what happens to mind, individuality, morality, or subjectivity, when the human pilot of subjectivity (under politicised categories of gender, race, biopolitics, etcetera) merges with the machine as
communications device. Whether adopted as a sign of potential good or of potential evil, the images of fragmented cyborg selves crossing and permeating all boundaries reflect the accounts of the “postmodern condition” which have problematised, challenged, and exposed as fiction the supposed assumption that individual identity comprises a central and coherent self. If our bodies are becoming obsolete, then our minds, our rationality, our very souls are, depending upon your viewpoint, either liberated or doomed. Baudrillard, Heim, Sobchack, Kroker and Weinstein all describe a spirit migrating from the body into the computer network, and the machine stealing our ethics, morals, or our ability to interact within a physical community. Cyborg feminists following Haraway’s lead celebrate it as an argument for “pleasure in the confusion of boundaries and for responsibility in their construction” (Haraway 150). The cyborg, an organic creature of control and communication, is formed by writing as much as any other technology. If the highest order of sensibility, virtue, or morality has long been associated with the highest order of thinking and writing, what happens when the body and indeed the consciousness itself is “rewritten” by human engineering? And, not unrelated, when human work changes from material brute labouring muscles to the immaterial information economy of communications and writing in this age of computers? If one of our most influential forms of technology has been writing, then our means of and control over written communications becomes one of our most contested battlegrounds.1

1 Compare, for example the following statements from the viewpoints of spokespersons for science and technology versus those for “humanism”: The final report (1997) of Industry Canada’s Information Highway Advisory Council (IHAC), promoting the “utmost urgency” for technological “progress,” a unified “Canadian culture,” and
When Jean Baudrillard spoke of the dangers of “ephemeral connections” (130) in an “absolute space” of simulation in his early article on “The Ecstasy of Communication,” he described the contemporary consciousness as a lone pilot at the controls of a hypothetical machine, isolated in a position of perfect and remote sovereignty, at an infinite distance from his universe of origin. Which is to say, in the exact position of an astronaut in his capsule, in a state of weightlessness that necessitates a perpetual orbital flight and a speed sufficient to keep him from crashing back to his planet of origin. (128)

The little steersman of the human body in this scenario has been wrested from the body and floats alone, detached from humankind and the “real” world. He is no longer an active pilot of the moving, acting body, but a passive receiver of messages:

We are here at the controls of a micro-satellite, in orbit, living no longer as an actor or dramaturge but as a terminal of multiple networks. …the very space of habitation…is conceived as both receiver and distributor, as the space of both reception and operations, the control screen and terminal which as such may be endowed with telematic power—that is, with the capability of regulating

productive industry for all, claimed that “powerful new technologies are becoming the infrastructure for a new 21st-century society, which is based on the exchange of intangibles—ideas, information, knowledge and intelligence. …The creation, manipulation and sharing of information and knowledge will become an overriding human imperative.” John Ralston Saul’s Inaugural Harold Innis Lecture, “Language and Lying—the Return of Ideology” (1995) argued that “A society dominated by structure and method, in which everyone talks about the value of information and knowledge—when they actually mean control over information and knowledge, and when most of the information and knowledge is packaged as fact—is a society blocked in its development” (823). One of the characteristics of our society, he argues, is that “Individualism has no role” (827), and “humanism is the most interesting anti-ideological route to take (835).
everything from a distance, including work in the home and, of course, consumption, play, social relations and leisure. Simulators of leisure or of vacations in the home—like the flight simulators for airplane pilots—become conceivable. (128)

If we consider postmodern identity is defined in part as the human-machine and in part as the absorption into a global arachnoid membrane of ethernet cables and telephone wires, we would do well to consider that subjectivity was associated with mechanism long before industrialisation, and that the first communications network was the body itself. What Baudrillard fears is, if you will, a metaphorical transfer of the human soul from ethereal spirits to ethernet. We might interpret the “extensions” of man as a loss of identity to technological devices, but it is important to remember that such constructions of identity are as metaphoric and imprecise as were Diderot’s descriptions of consciousness in D’Alembert’s Dream as a spider at the centre of a “network” or web (183–4; 193–4) receiving “messages” (184) from the outside world.

In the period during which L’homme machine became L’homme sensible, the soul as imagination, creative genius, or sensitive individual spirit became the property of literature and poetry; simultaneously the soul as aether, spirits, or motive energy, expanded out from the body and into the natural world claimed by science and technology. Cyborg discourse in literature and theory separates itself from the scientific discourse that has created the cyborg—the organism with mechanical components that is “steered” by feedback devices, written programs. Cyborg literature and theory encapsulates the question of what will ultimately guide our actions: if we have long accepted free will (and the attendant concerns of ethics, morality) as part of the human
nervous system, then the metaphoric abandonment of the body as we "merge" with the
networked machine implies that the individual conscious mind no longer steers the
human machine. Bound up with the notion of body as mechanical communication
device, then, is the question of authority. Who gets to say what the individual does,
thinks, what governs his or her actions? Is Science our authority on the human subject,
governed by natural laws and modified by human engineers; or is it Literature and Art
undeniably grounded historically in and continuing to draw upon the Christian mythos,
where the subject steering the vessel is ruled by an indefinable human genius, intellect,
or soul? Obviously this is a very broad generalisation, and certainly scientists may
believe in the soul while writers trained in the humanities may believe in the value of
scientific explanations of the human body. But in many ways the discourse of cyborg in
literature and theory is a resistance to the notion that humans might be steered by forces
outside of themselves—whether it is celebrating the individual consciousness by
metaphorically setting it free from the body to steer itself through the imaginative space
of cyberspace, or mourning the individual consciousness by announcing its metaphoric
absorption by the machine network outside the body.

The debate surrounding eighteenth-century materialism, primarily metaphorical
and analogical in its representation of the body's mechanisms, contributed directly to
notions in contemporary literature of figurative disembodiment and the status of the
human soul. The twentieth-century cyborg figure is in a complicated way a reminder of
Jonathan Swift's depiction of the Battle of the Books between the Ancients and the
Moderns in *A Tale of A Tub Written for the Universal Improvement of Mankind*, and while the
cyborg depicts contemporary technology as much as did the man-machine in the
eighteenth century, both circle the unanswerable questions of where human spirit is located, how it is defined, and who is finally the authority over the little pilot of the mind.
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