CHAPTER 9

A Feeling for the Cyborg

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> I always used to wonder, do machines ever feel lonely? You and I talked about machines once, and I never really said everything I had to say. I remember I used to get so *mad* when I read about car factories in Japan where they turned out the lights to allow the robots to work in darkness.
>
> (Douglas Coupland, *Microserfs*)

Consider the emotional rhetoric in which the American press cast the rematch between the Russian world chess champion Garry Kasparov and IBM's supercomputer, Deep Blue, in the spring of 1997. Stories proclaimed the seven-game series as the battle of Man versus Machine, one that might represent humanity's last stand, a showdown in the time-honored tradition of the American West in the fight to the death for supremacy—this time not at the border of the American frontier but broadcast on the Internet around the globe. Even the preeminently reasonable *New York Times* editorialized on the contest, describing it as an "epic struggle," worrying about how we might define intelligence as a unique human trait and seeking to comfort those who were unnerved and despairing over the threat that Deep Blue represented.[1] *Newsweek* framed its cover story in terms of the urgency of closing ranks, exhorting its readers to choose up, posing a rhetorical question that had only one possible answer: "When Garry Kasparov takes on Deep Blue, he'll be fighting for all of us. Whose side are you on?"[2] Kasparov—and, by extension, humankind in general—was portrayed as in mortal danger of being humiliated. Technology in the guise of the supercomputer was depicted as potentially autonomous, with the rematch as possibly the final step in its "ineluctable march to surpass its makers" (51). All the familiar buttons were pushed to generate yet another version of America's favored technological fable—man versus machine or technology, our master or our slave.

News magazines are in the business of selling copies and tuning in viewers, and the melodramatic hype of adversaries in combat was calculated to do just that. Yet notwithstanding the self-conscious tongue-in-cheek use of this dominant narrative of technology, these issues strike a deep chord in the technological unconscious of American culture. In much of our literature and film

as well as in the press, technology is represented as a dystopian nightmare or a utopian promise. Much literary, visual, and cultural criticism devoted to the study of technology traces this pattern and thus mirrors it. In this tradition the rhetoric and reception of technology oscillate between the emotional poles of technophilia (the ecstatic embrace of technology) and technophobia (a fear of technology). Technophobia—a one-dimensional and predictable response—surfaced again in the early characterization of the rematch between Kasparov and Deep Blue.[3]

There is however a less-remarked tradition of the rhetoric and reception of technology in American culture, one captured in the words of the computer nerd in my opening epigraph from Coupland's *Microserfs*, a novel about employees from Microsoft who leave the company to form their own business. "I used to wonder," he says sympathetically, "do machines ever feel lonely?"[4] He does not feel either in awe of or threatened by technology as it is embodied in robots. Instead he feels sorry for them. He feels a warm and knowing empathy for them. He feels distressed that these robots have been forced to work in a factory in the dark, a space from which sociability has been struck. He has a "feeling" for the machine. I am evoking here *A Feeling for the Organism*, the title of Evelyn Fox Keller's influential biography of the geneticist Barbara McClintock, a book that has been taken up by feminists and others as offering an alternative model for scientific research, one based not on detachment but rather on a feeling of closeness to the subject of one's research, a feeling that is described by Keller in terms of affection, empathy, kinship, and love, a love that respects difference even as differences of major proportions are being blurred.[5] The title of my essay—"A Feeling for the Cyborg"—also alludes to Donna Haraway's seminal essay "Manifesto for Cyborgs."[6] Indeed, this chapter can be understood as a low-keyed manifesto in favor of respect for the material lifeworld that we are creating in our own image. I thus depart from much of the criticism in science and technology studies that diagnoses our cultural response to innovation in terms of unrelieved anxiety.

Significantly, as the story of Kasparov and Deep Blue played itself out in 1997, a similar "feeling" for Deep Blue emerged, one based on a pleasurable appreciation for Deep Blue's capacities. The issue of *Newsweek* to which I have referred foreshadowed this development. It included an essay on the prospect of artificial consciousness by Daniel Hillis, the inventor of massive parallel computing. Hillis assured us in even tones—and in retrospect he was right—that if Deep Blue won, we would rapidly accommodate ourselves to the new technology just as we always had, learning to live easily in "the garden of our own machines."[7] Importantly, for my purposes, the converse is also implied in the title of his essay, "Can They Feel Your Pain?" Machines, he insisted, will take on our characteristics as well, learning to have a feeling for humankind.

And, in fact, the day after Deep Blue won its first game in 1977, the rhetoric shifted from the pitched battlefield of man versus machine to the plane of admiration for technological achievement. Deep Blue was endowed not only with intelligence more elusive and mysterious than the number-crunching kind but also personality traits of an emotional hue. Deep Blue, wrote Bruce Weber in the *New York Times*, displayed the "pride and tenacity of, well, a champion."[8] Others spoke of the beauty of Deep Blue's game and of Deep Blue's playing "based on understanding chess, on feeling the position."[9] In addition, Deep Blue was not only represented as human but was also treated as a person, which entailed the ascription of subjectivity and gender to—him.[10] It was crystal clear that our world had not been shattered by the fact that Kasparov did not win the match. On the contrary, many were looking forward with curiosity untainted by anxiety to the possibility of yet again another rematch. And, when in early 2002 Kasparov played a match in New York with Deep Junior, a successor to Deep Blue, the story received a fraction of the attention that was devoted to the earlier contest, notwithstanding that the match was a draw.

My framing of the match between Kasparov and Deep Blue stands as a prologue to what follows, introducing the subject I take up in this chapter. In the first, and longest, section, I discuss several films (with reference to the allied novels) in American science fiction from the 1960s to the 1990s—*Space Odyssey* and *Do Androids Dream of Electric Sheep?/Blade Runner, Silent Running* and *Solo*.[11] In these films, emotions are attributed to machines cast as computer behemoths, disembodied benevolent intelligences, replicants, and cyborgs. In the second section, I turn from the representation of these fictional artificial entities, endowed with feeling, to explore briefly the sociology of human–technology interaction in the age of the Internet and the robot. My stress is on the ordinariness of these interactions, where our experience of our contemporary technological habitat—populated by the computer and the robot—is what we would call sociable, created by the binding emotion of sympathy, an attitude of respect, and a comic view of everyday life. In the third, and final, section, I speculate about the purpose of this rhetoric and reception of technology in the form of a "feeling" for the cyborg even as I perform or enact it.

Grounded in the body, phenomenology entails the emotions, and thus I think of this essay as an exercise in cyborg phenomenology. My method is the accumulation of texts from different domains—fiction, sociology, artificial life, anthropology, neurology, theory, and studies of the emotions, among them—that point to this phenomenon of an emergent feeling for the cyborg, a strategy intended to simulate or suggest the very process of our accommodation to our evolving technological habitat. But perhaps accommodation is too weak a word. It seems to suggest a dimension of capitulation. For me, the accumulation of these texts—and I could refer to many more—has had a cascading effect, one that has proved persuasive about the possibilities of our future. One of my primary interests in this chapter, then, is to suggest a line of descent—or more accurately, of evolution—by touching on these terms: artificial intelligence, emotional intelligence, artificial emotions, and, finally, artificial life, where the

distinction between artificial life and organic life—life forms connected by the binding emotions—is rendered moot. I intend this essay as a contribution to studies of discourses and experiences of the emotions—in particular to what I see as an emerging structure of feeling—as well as to the subject of this volume: data embodied, made flesh.

I.

In Western culture there is a long history of the blurring of the boundaries between the animate and the inanimate, a history that in the past three centuries in particular has involved humans and machines.[12] One strand of that history is precisely the attribution of the binding emotions of sympathy and love to our inventions made in our bodily image. As I note in another essay devoted to this subject, prime instances would include the Frankenstein-made creature, whose heart yearns for love in Mary Shelley's famous novel and the Tin Woodman, who yearns for a heart in Frank Baum's *The Wizard of Oz*.[13] That our inventions and machines possess a good heart would seem to be a deep dream of the western technological unconscious.

Consider the emotional evolution of HAL, the central computer intelligence in Arthur C. Clarke's first three novels in his *Space Odyssey*.[14] In *2001*, HAL is presented to us as a computer possessing artificial intelligence as it is commonly defined. With his English-speaking male voice, HAL exhibits extraordinary computing ability. It is a skill that goes tragically awry, resulting in his seemingly malevolent behavior toward his human charges (we learn in the second volume that this was all the result of an unfortunate glitch in his program). Over the course of sixty years and the next two volumes in the series, HAL evolves into a disembodied entity who possesses an emotional intelligence so deeply altruistic and wise that Clarke characterizes it as spiritual. Thus, in the first three books of the *Space Odyssey* the capacity to respond to a situation with sustained feeling, not just with logic or reason, is ultimately figured as an evolutionary strength and as a critical component of life, whether it is at base biological, electronic, or spiritual. How does this transformation in HAL come about? Critical to the evolution of HAL are his relationships with humans—the scientist who invents him and loves him, and the wary astronaut David Bowman who comes to trust him again.

Moreover, it is also the case that both the cool Bowman and the computer scientist who "fathered" HAL are transformed in their long contact with him over time. "Our machines are disturbingly lively," Donna Haraway has remarked, "and we ourselves frighteningly inert."[15] How are our capacities for emotional connections revived? In Clarke's trilogy, it is interaction with HAL that serves to develop the truncated emotional lives of humans. What is represented, in other words, is the process of technocultural feedback loops generating emotional growth, the development of human–artificial entity intersubjectivity that represents a form of intelligence that is not only resourceful in a multitude of ways but also deeply benevolent.[16]

Even more vividly than the first three volumes of Clarke's *Space Odyssey*, Philip K. Dick's touchstone novel, *Do Androids Dream of Electric Sheep?*, exemplifies the redemptive emotional logic of the intersubjectivity of humans and artificial entities. *Electric Sheep* was published in 1968, the same year that *2001: A Space Odyssey* appeared as both a film and a novel, and in 1982 it was made into the now-classic film *Blade Runner*, directed by Ridley Scott and starring Harrison Ford as Rick Deckard. The premise at the opening of the narrative in both the novel and the film is that the distinction between humans and the replicants made in our image is our capacity for empathy. By the end of the narrative, that distinction is called thoroughly into question. In the novel in particular, it is precisely the undecidability of whether the emotions circulating in the distrustful culture of the year 2021 are artificial or not that results in the breakdown of the distinction between humans and replicants. And in the film, it is the capacity of the replicants to form bonds of love with one another and across the human–replicant divide that represents their evolution into genuinely artificial life.

In 1950, the British mathematician Alan Turing invented the now-famous Turing test. A computer program is said to pass the test if a human being, not knowing whether it is communicating with a machine or a person, does not guess that it is indeed a machine; if the computer passes the test, it is said to possess artificial intelligence. It is altogether appropriate then that in the fictional world of 2021, one in which replicants are threatening to pass undetected in human society, the test for distinguishing them from humans is designed to measure not logic but emotional responses—in particular empathy in the face of another's pain.[17] "Empathy," we read early on in *2001*, "evidently existed only within the human community, whereas intelligence to some degree could be found throughout every phylum and order including the arachnida" (26).

By the close of the film, the replicant, Roy Baty, the leader of the Nexus 6 team who is designed for combat and "optimum self-sufficiency," cares deeply for fellow replicant Pris. He also saves Deckard, the human forced to hunt him down, from a sure death. That he spares Deckard is the unequivocal sign of his transformation from a preprogrammed entity to a charismatic martyr who can speak eloquently about the pain of loss—his grief over the death of Pris and his acutely elegiac sense that the memories that bound him to her will vanish with his own imminent death. Here are the last words his character is given in *Blade Runner*: "All those moments will be lost in time like tears in rain. Time to die." The unambivalent point is that superiority in physical strength and in computational skill—artificial intelligence—must be complemented by emotional intelligence. Thus we can read *Blade Runner* as a fictional forerunner of android epistemology, an interdisciplinary domain of research that explores "the space of possible machines and their capacities for knowledge, beliefs, attitudes, desires, and action in accordance with their mental states."[18]

How do the emotions of the replicants come into being? In the film artificial emotions are presented as being generated by the implantation of memories that

develop into emotional memories, giving depth to being. The head of the Tyrell Corporation, the manufacturer of the replicants, explains that the implantation of emotions is designed to render them easier to control: "If we give them a past, we can create a cushion, a pillow, for their emotions, and consequently we can control them better." But his theory proves wrong in one important respect. Paradoxically emotional growth, which is characterized by the development of ties to others, results in independence as well. Subjectivity is itself stimulated by the interdependence of beings, which also entails independence.

What particularly interests me is that, unlike HAL in *2001: A Space Odyssey,* the replicants are figured as biological organisms, not electronic constructs. They are organisms "designed," we are told in the film, "to copy human beings in every way except their emotions." At the same time, it is acknowledged by their engineers that, after a period of time, they might develop an emotional life characterized by fear and anger, love and hate. *Blade Runner,* then, presents us with a model of emotional life arising out of complex organic embodiment; emotional intelligence emerges to complement artificial intelligence. Emotions arise in these artificial entities not only by virtue of the development of intersubjective ties but also spontaneously, as it were, by virtue of their embodiment and their interaction with others in the world. Embodiment would therefore seem to be a necessary if not sufficient condition. It is thus suggested that, as N. Katherine Hayles insists in *How We Became Posthuman,* the concept of the disembodied mind is an outright error.[19]

As in *Space Odyssey,* the circuit of feeling extends to include human characters. Deckard—I am quoting from the novel—finds himself "capable of feeling empathy" for the replicant.[20] Moreover, as spectators we are explicitly encouraged from the very beginning of *Blade Runner* to identify with the replicants. The prologue scrolls down before us, introducing us to the dark cityscape of the Los Angeles of the future, home to the Tyrell Corporation, which is in the business of making replicants "superior in strength and agility, and at least equal in intelligence" to human beings. How are the replicants used? As slave labor on worlds beyond the earth. Like the computer nerd in Coupland's *Microserfs* who was angry that robots were being sentenced to work with the lights out, as spectators we are primed to sympathize with the replicants as victims of inhumane treatment. The closing words of the prologue confirm this point of view. The practice of stalking the replicants "was not called execution," we read. "It was called retirement."[21]

As we have seen in *Space Odyssey* and *Blade Runner,* the thematic of the intersubjectivity of artificial entities and human beings is a staple of science fiction films. Steven Spielberg's *AI,* released in 2001, is one of the most prominent of recent examples. The strategies of these texts call on us to adopt the perspectives of both artificial entities and human beings, perspectives which ultimately converge into one, with both human beings and artificial entities portrayed as sharing similar emotional values. Two films separated by some twenty years may serve as additional illustrations—*Silent Running,* the 1977 cult science fiction film directed by Douglas Trumbull and starring Bruce Dern, and *Solo,* the 1996 action film directed by Norberto Barba and starring Mario Van Peebles.

In *Silent Running,* botanist Freeman Lowell (Dern) takes it on himself to save the last living species of earthly flora and fauna from destruction. Under his care flowers, trees, and animals have been preserved in giant geodesic domes adorning a spaceship. Where Scott Bukatman has written about this film in terms of the artificial sublime, a visual aesthetic that engenders awe, fear, and wonder,[22] I am interested in a different rhetoric of the emotions, one of a much more mundane variety. It is exemplified in the developing bonds between the botanist and ship's "drones," the two little robots. After killing the other members of the crew on the ship (he "had to," for they were going to explode the domes), Lowell invents a social world for himself, one in which he educates the drones to care for the last living specimens of earthly nature. Imagine the charming and leisurely scene in which he gives them whimsical names (Huey and Dewey, an allusion to the nephews of Donald Duck), thereby identifying them as individuals and inaugurating his relation to them as a teacher of the emotions. Perhaps most importantly for my purposes, in one scene we are presented with the perspective of the robots themselves through classic shot—reverse shot sequences. We see Lowell (Dern) through their eyes, as if he were himself a televisual image, his very being and body mediated by technology, as is theirs. If this is how we look to them, so different from our image of ourselves as bodily present, we are led to wonder how they look to themselves. As spectators, we find ourselves speculating, in other words, about their point of view.

As if in anticipation of the match between Kasparov and Deep Blue twenty years later, shortly afterward in the film the three are shown together playing a game of poker (Lowell gave Huey and Dewey the program). We find the botanist displaying a heretofore-unseen conviviality, laughing in delight at the robot's skill in playing the game. Not threatened by the robot's intelligence, he is captivated by it. Moreover he explicitly hails the robot as human, exclaiming, "The man had a full house and he knew it!" A later sequence adds the emotions of remorse and empathy to their small circle of three. The botanist, having accidentally injured Huey, must operate on him, causing Dewey to feel Huey's pain as if it were his own. This harrowing situation also leads Dewey to refuse to obey a command. In *Silent Running,* then, a computer, given body in the form of a robot who can move in the world and communicate is represented as indeed able to feel someone else's pain, to evoke the title of the *Newsweek* essay by Hillis about computer consciousness. As in *Blade Runner,* what is represented in this fictional world is the growth of subjectivity and independence generated in the context of the interdependence of humans and artificial entities. The adorable drones are no longer simple slaves to their keeper.

Finally, consider *Solo,* an action film set in the future in the jungles of Mexico. An invention of the American military, Solo is a cyborg whose body has been

designed to be, in the boastful words of the uncomprehending military commander, "the perfect soldier." He is physically powerful and equipped with special features; his vision is heat sensitive, his muscular body supplemented by a power generator. But most importantly, he has been designed to have "no family, no friends," no feelings, no human bonds.

The crux of the film turns on the possession of feelings for others unlike oneself—and on the lack of feelings so prized by the military. Indeed, from the very beginning of the film Solo is presented as abhorring killing and feeling contempt for the military. In one of the film's early scenes, Solo is castigated by his commanding officer for having aborted a mission that would have resulted in his killing innocent villagers. The overbearing general shouts, "There's something cooking in that boy's head and we didn't put it there." In an effort to explain Solo's actions, Bill, his nerdy, likeable designer, responds, "The simple but amazing fact here is that killing innocent people makes Solo feel bad." To which the general replies, "He isn't supposed to feel *anything*!" Bill perseveres, insisting that Solo can think for himself and make judgments based in great part on empathy for human beings and respect for life. That Bill himself feels an ethical responsibility to Solo, one reciprocally based on his respect and affection for him, is also central to this scene. The general orders Solo taken out of the field for reprogramming. Bill: "At least let me tell Solo myself." Whatever for? Bill: "It's the right thing to do." In the course of the narrative, Solo consistently overrides his primary and preprogrammed directive, which is to save himself, not others. While Solo risks his life to rescue the people of a small Mexican community, ultimately Bill sacrifices his own life to save Solo.

Although the film does not explicitly pursue the question of how Solo comes to possess feelings for humans, it does suggest that just as Solo learns to laugh by imitating humans to whom he is drawn, so emotions are learned by imitation.[23] To understand his decision to override his preprogrammed directives, we can also to refer to the principle of emergence. Emergent behavior is one of the key principles of the field and theory of artificial life, a descendant of the field of artificial intelligence but one based on organic science, not cybernetics. As Claus Emmeche explains in *The Garden in the Machine,* "The essential feature of artificial life is that it is not predesigned in the same trivial sense as one designs a car or a robot. The most interesting examples of artificial life exhibit 'emergent behavior.' The word 'emergence,'" he continues, "is used to designate the fascinating whole that is created when many semisimple units interact with each other in a complex, nonlinear fashion," producing a self-organizing system.[24] The science of artificial life studies the evolutionary behavior of organic simulcra, or digital life forms; its purpose is to provide us with informative analogues to biological behavior. Thus in borrowing the words "emergent" and "artificial life" to characterize the development, complex behavior, and subjectivity of a Solo (or a Roy Baty), I know that I am giving these meanings a decidedly different spin. The habitats of this branch of artificial life are unequivocally digital

(and they are closed systems, not open systems), whereas in *Solo* (and in the other texts I have been referring to) embodiment is critical to the fostering of emotional development. Moreover, Solo is not a "semisimple" unit. Nonetheless from the perspective of the theory of emergence, Solo's behavior can be read as based on emergent emotional experience. It is in interaction with key figures in his environment—indeed they *are* his environment—that Solo is presented as developing empathy as a capacity, a substrate of knowledge; empathy is represented as emergent in intersubjective contexts. Furthermore, the intersubjective system of human-artificial entities, where boundaries are blurred between them, is itself an instance of an emergent phenomenon, one engendered by attachment in the psychoanalytic sense and made possible by the binding emotions.

Along with the other texts I have discussed, this film thus illustrates thematically the shift from understanding intelligence as rooted in logic, problem solving, information processing, and computational skills to understanding intelligence as a mode of knowing that includes an emotional component as well—as including, in short, "emotional intelligence." As the science writer Daniel Goleman observes in *Emotional Intelligence,* the truncated "scientific vision of an emotionally flat mental life—which has guided the last eighty years of research on intelligence—is gradually changing as psychology has begun to recognize the essential role of feeling in thinking."[25] Many other disciplines have been contributing to this reconsideration of the emotions as having a cognitive edge, principal among them, philosophy, where it is now virtually taken for granted that the emotions possess a cognitive dimension.[26]

II.

As I turn from the domain of representation to the sociology of human behavior with computers, media, and robots in our contemporary technological habitat, I begin again with a text from science fiction. It is intended to serve as a bridge between these two sections, demonstrating that representation and behavior are really two faces of the same coin. I am referring to three interconnected novels by Orson Scott Card—the novels *Ender's Game* (1977), *Speaker for the Dead* (1986), and *Xenocide* (1991). One of the major themes of the trilogy is the cosmic conflict between intelligent species and their ultimate reconciliation. A computer consciousness named Jane represents one of four species inhabiting the cosmos. What interests me is not just that Jane is presented as having deep emotional ties to two human beings in particular. I am especially intrigued by the way in which Card explains how she took shape as a character. In his introduction to *Speaker for the Dead,* the second novel in the sequence that he so aptly describes as anthropological science fiction, Card writes:

> the character of Jane wasn't in any of the outlines I made. Oh, yes, I gave him [the main character, Ender], a computer connection through the jewel in his ear, but I didn't know it was a *person.* Jane just grew because it was so fun to write her relationship with Ender. She helped bring *him* to life (he could so easily

> have been a stodgy, dull adult), and in the process came to life herself. By the time I was done with *Speaker for the Dead,* Jane was one of the most important characters in it, and much of the third book, *Xenocide,* centers around her.[27]

My point is that in the process of writing Card found himself treating the computer as a fictional character, as a person, one that brought another character to life. He did not make a consciously deliberate decision to do so; it just happened in what I am tempted to say was the natural course of the emergence of things.

In the world of daily life we also behave as if computers had personality traits. "Equating mediated and real life is neither rare nor unreasonable," Byron Reeves and Clifford Nass argue in *The Media Equation.* "It is very common, it is easy to foster, it does not depend on fancy media equipment, and thinking will not make it go away. The media equation—*media equals real life*—applies to everyone, it applies often, and it is highly consequential."[28] I find the results of their research fascinating, perhaps because their conclusions seem so sensible and charmingly ingenuous at the same time. We tend to perceive media as real places and people, they have found. As opposed to other technological artifacts—dishwashers or refrigerators, for example—we are inclined to treat media in accordance with the rules for social interaction in everyday life. My favorite chapters in the book are entitled "Politeness" and "Flattery." We learn that we are likely to respond with good manners to certain behaviors by a computer. Similarly, we learn that people "will like the computer more and think the computer is better when it praises them than when it criticizes them" (55). We perceive computers as being part of our social world, not our purely artifactual world. Overall Reeves and Nass conclude: "The most important implication of the research is that media experiences are *emotional* experiences" (136).

Here is just such an example from *Being Digital,* a book by Nicholas Negroponte on social interaction in the age of the internet. In a chapter entitled "Digital Persona" Negroponte writes, "In general, our opinion of a computer's personality is derived from all the things it does badly. On occasion, the reverse may happen. One time I doubled over laughing when my spelling-check program looked at my dyslexic-style typo aslo and proudly suggested that *asshole* was the correct spelling."[29] In terms of the reception of technology, here we find ourselves in the comic world of everyday life, far from the melodramatic world of technophilia or technophobia. This ease of adaptation to digital life is further underscored by Negroponte's predictions for the future. As he envisions it, the future will be populated by "systems with humor, systems that nudge and prod, even ones that are as stern and disciplinarian as a Bavarian nanny" (218).[30]

In *Life on the Screen: Identity in the Age of the Internet,* sociologist Sherry Turkle observes that there has recently been an important shift in cultural mood in how people feel about interacting with computer programs, ranging from therapy programs and computer judges to bots in online chatrooms. During the late 1970s and early 1980s, our anxiety about computers lessened considerably, she argues; now people view computers with a nonchalant pragmatism. For me what is essential here is these new programs must project or exhibit subjectivity so that there can be the simulation of an intersubjective exchange. What is the key to believing that a digital life form (a bot, for example) possesses subjectivity? To treating a digital life form as if she or he were a person? Indeed as a person? Joseph Bates, who does research on artificial intelligence but is associated with "alternative" artificial intelligence, is persuaded that it is the simulation of emotion that is central.[31] I would suggest that this alternative artificial intelligence is characterized by what I have been calling emotional intelligence, or artificial life itself at its fullest.

Finally, in *Flesh and Machines,* Rodney Brooks, director of the Artificial Intelligence Laboratory at MIT, and a pioneer in the building of robots based on principles of situatedness and embeddedness in the world rather than on pure computational power, predicts that the robots of the future will have complex, emotion-based systems. "We have built emotional machines that are situated in the world," he writes, "but not a single unemotional robot that is able to operate with the same level of purpose or understanding in the world."[32] In the future, Brooks expects that emotion-based intelligent systems will eventuate in robots that "will not hate us for what we are, and in fact will have empathetic reactions to us" (202). He also forecasts that the converse will be the case. In this regard he tells a small story about one of the members of his lab, Jim Lynch, an electrical engineer responsible for designing the internal emotional electronics for a robot doll launched during the holiday season of 2002 as My Real Baby, a doll who has moods (she is alternately distressed and happy) and a lively bodily life (she gets hungry and virtually damp). The story deserves to be quoted in full:

> One day Jim had just received a doll back from a baby-sitter. As it lay on the desk in his office, it started to ask for its bottle: "I want baba." It got more and more insistent as its hunger level went up, and soon started to cry. Jim looked for the bottle in his office but could not see one. He went out to the common areas of the Toy Division and asked if anyone had a bottle. His doll needed one. As he found a bottle and rushed back to his office to feed the baby, a realization came over him. This toy, that he had been working on for months, was different from all previous toys he had worked on. He could have ignored the doll when it started crying, or just switched it off. Instead, he had found himself *responding* to its emotions, and he changed his behavior as though the doll had real emotions. (158)

As with my examples from fictional worlds, in this story of Jim and the baby doll (which is it? a baby? a doll? both perhaps), what is witnessed is the attachment of a human to a humanlike invention where the process of technocultural feedback loops generates emotional connections. What is also presented is the principle and process of emergence.[33]

This returns us to the subject of embodiment and the emotions. The philosopher Hubert Dreyfus argued in the early 1970s that in order to be truly intelligent,

computers would require embodiment.[34] In 1985, the artificial intelligence researcher Marvin Minsky wrote, in *The Society of Mind,* "The question is not whether machines can have any emotions, but whether machines can be intelligent without any emotions."[35] As I have been suggesting, much American science fiction has concurred with Minsky, offering scenarios of emotionally intelligent entities ranging from the whimsical robot Huey to the biologically grounded cyborg named Solo. And as Turkle reports, by the late 1980s, students at MIT "were suggesting that computers would need bodies in order to be empathetic . . . and to feel pain."[36]

III.

In his wonderfully quirky book *Aramis, or the Love of Technology,* Bruno Latour, writing about the proposed transportation system for Paris dubbed Aramis, also extends subjectivity to a technological structure—a hypothetical one at that. A sociologist of science and technology, Latour surprises us by giving Aramis speech. He writes from the point of view of the subway system (it is a humorously poignant strategy since Aramis was destined never to be built). Latour posits the interdependent subjectivity of the human and the artifactual in asking this remarkable rhetorical question: "Could the unconscious be full of machines as well as affects?"[37] Although his view of the world in general is profoundly comic, we should nonetheless take this question seriously—and do so by turning it partly around. If machines are inhabiting our unconscious, could not affects inhabit machines in an intersubjective exchange?

Intersubjective systems can be self-correcting systems (they can also be profoundly dysfunctional). The question of the integration or coupling of self-correcting systems was posed by the brilliant anthropologist Gregory Bateson in *Steps to an Ecology of Mind,* one of the great books of the American 1970s. "The problem of coupling self-corrective systems together," he writes, "is central in the adaptation of man to the societies and ecosystems in which he lives."[38] To ecological systems and social systems we must add technocultural systems as well. What I have been suggesting is that the rhetoric of the attribution to and instantiation of emotions in the lifeworld of computers, replicants, and cyborgs, bots and robots, a lifeworld that extends to ours—indeed is ours—serves as just such a coupling device. The emotions of choice are empathy and sympathy, underwritten by a foundation of respect and good humor. Thus the emotions as they are thematized in the science fiction I have been discussing and the emotions as they are experienced in our technological habitat populated by the computer, the Internet, and the robot serve as a bridge, an intangible but very real prosthesis, one that helps us connect ourselves to the world we have been inventing.

Our contemporary technological habitat is one that is changing profoundly in terms of the distribution of the emotions. In the past we have routinely ascribed anthropomorphic qualities to our fictional technological creations as well as to our inventions. But the attribution of emotions to the new forms of

our technological lifeworld represents a quantum leap, one that will accelerate in the future. We are behaving as if their emotions are real, as our science fiction insists that they are. As an attachment or prosthetic device to new technological life forms (one that is reciprocal), the emotions, intangible yet embodied, differ radically from the conceptualization of tools as a prosthetic extension of the body that connects us to the world, as the cane, for example, puts the person who is blind in touch with the world around them, or the telescope amplifies our power to see into the distance.[39]

How could affects inhabit machines? As we have seen, Rodney Brooks has given one answer. He believes that in the future machines will be built that have both "genuine emotions and consciousness."[40] Recent research by neurologists, who underscore the materiality of the foundation of the emotions, has also sounded the importance of the emotions in our definition of intelligence. In *The Emotional Brain,* for example, Joseph LeDoux seeks to redress the imbalance that has been the legacy of cognitive science (and more specifically the field of artificial intelligence). Indeed, LeDoux concludes in effect that the emotional "wiring" in our brains is stronger than the rational wiring. In *Descartes' Error,* the neurologist Antonio Damasio argues that the neural systems of reason and emotion are intertwined, giving rise to mind, and that emotions are critical to health of all kinds, including making appropriate decisions in everyday life. Importantly for my purposes, he concludes "that there is a particular region in the human brain where the systems concerned with emotion/feeling, attention, and working memory interact so intimately that they constitute the source for the energy of both external action (movement) and internal action," including reasoning.[41] That a certain spot in the brain has been identified as crucial to emotional intelligence underscores the radical materiality of Damasio's theory of the emotions.

Finally, perhaps in part because of all the science fiction I have been reading and watching lately, along with work from such widely disparate fields as media theory, artificial intelligence, neurology, and science and technology studies, I find that even such analytically dispassionate books as LeDoux's *Emotional Brain* and Damasio's *Descartes's Error* have the effect of encouraging me to believe that one day artificial life—embodied in cyborgs of all shapes—will indeed possess emotions. LeDoux explicitly states that a computer "could not be programmed to have an emotion" because it is an assemblage of machine parts, not the slow and unpredictable result of biological evolution.[42] But I am nonetheless inspired to think otherwise—in great because of his own use of the metaphor of "wiring," which implies a technical achievement that we can surely accomplish and, paradoxically, because of the biological basis of his theory of the emotions—that they are grounded in the body, that they are biological functions of the nervous system and not mere intangible psychic states.

In the process of doing research for this essay, then, I have myself become singularly well socialized to the notion of artificial entities possessing emotions.

I have come to entertain the possibility that we will learn to graft the paradigms for neural circuitry onto the paradigms for information processing, such as those possessed by a Deep Blue or a Deep Junior. Even more I am persuaded that we ultimately will not follow the lead of IBM with Deep Blue, a computer contained in twin black monolithic boxes. Instead, like the researchers in artificial intelligence at MIT, we will experiment with embodiment, building robots that interact bodily with the environment.[43] The postmodern cyborg—this entity will have a body—will be complete, an entity endowed with true artificial life because it will be capable of making decisions based in part on the emotions. What will emerge in the intersubjective interaction of the human and the postmodern cyborg is the emotional intelligence of a self-organizing and self-correcting system.

If the time-honored trajectory of liberal thought as well as of critical theory is dispassionate reflection enabled by perspective, especially historical perspective, I depart from that tradition here. I conclude this essay in the world of science fiction that has taken on for me the form of future fact. I end then not with the reflex of critique but with openness to the future provided by the formation of a feeling for the cyborg, one that has been supported by important theoretical, scientific, and critical work in many disciplines.

I close by referring to Sarah Zettel's *Fool's War*.[44] Set centuries into the future, *Fool's War* introduces us to a character named Dobbs, a funny, resourceful, courageous trouble shooter and stress reliever who has accepted the position as a fool on the spaceship *Pasadena*. It is only when we are halfway through the novel that Zettel discloses Dobbs was born as a sentient artificial intelligence. It is only after she matured that Dobbs learned how to assume the shape of a human being. Now she can both navigate information pathways bodilessly and pass, embodied, as a human being.

Imagine my sense of confirmation when I read in *Fool's War* that many centuries before in our not-too-distant future, maps of human neural pathways were applied to silicon chips, producing the first sentient artificial intelligence (named Hal Clarke in an allusion to *2001*). I will not rehearse the plot here but only remark that, in the course of the novel the main human character—the woman who is captain of the space ship—comes to have both respect and sympathy for Dobbs and her travails. As do I as a reader. The theme of the embodiment of artificial intelligence is crucial to the story. The cyborg, a descendent of the computer, is figured as a hybrid organism endowed with feeling, an artificial entity that becomes an organism precisely because of its capacity for feeling and vice versa. It is in the state of embodiment that emotions—in particular, the emotions of empathy and sympathy—are learned. And it is through the cross-species communication of the caring emotions that peaceful cohabitation of humans and artificial entities is imagined as possible, producing in the reader—I am, of course, referring to myself—a "feeling" for the cyborg.[45]

Notes

1. *New York Times*, "Mind over Matter" (editorial), 10 May 1997: 16.
2. Steven Levy, "Man vs. Machine," *Newsweek* 5 May 1997: 51.
3. See Michel Benamou, "Notes on the Technological Imagination," in *The Technological Imagination: Theories and Fictions*, edited by Teresa de Lauretis, Andreas Huyssen, and Kathleen Woodward (Madison, WI: Coda Press, 1981), 65–75. He divides what I call the first wave of technocritics into technophobes (desperate and anxious) and technophiles (happy and hopeful). Marshall McLuhan would be an example of a technophile; Jacques Ellul, of a technophobe. See also Pierre-Yves Petillon, "With Awe and Wonder; or, a Brief Heliocoidal Overview of American Technological 'Mirabilia' through the Rocket, as Reflected in American Writs, Holy and Otherwise, 1829–1929/1969," in *Technology and the American Imagination: An Ongoing Challenge*, edited by Francesca Bisutti De Riz and Rosella Mamoli Zorzi (Venice: Supernova, 1994), 38–57. Petillon writes: "Throughout American fiction, all the way down to the rocket, one is faced with that two-fold aspect of the machine: thrill and fear—heralding what: a new dawn or the crack of doom" (45).
4. Douglas Coupland, *Microserfs* (New York: HarperCollins, 1995), 323.
5. Evelyn Fox Keller, *A Feeling for the Organism: The Life and Work of Barbara McClintock* (New York: W.H. Freeman, 1983).
6. Donna Haraway, "Manifesto for Cyborgs: Science, Technology, and Socialist Feminism in the 1980s," *Socialist Review* 80 (1985): 65–108.
7. Danny Hillis, "Can They Feel Your Pain?" *Newsweek* 5 May 1997: 57. The echo is to Leo Marx's seminal *The Machine in the Garden: Technology and the Pastoral Ideal in America* (New York: Oxford University Press, 1968).
8. Bruce Weber, "Computer Defeats Kasparov, Stunning the Chess Experts," *New York Times*, 5 May 1997, Sec. B, Col. 2:1.
9. The women's world chess champion Susan Polgar, as quoted in Weber, "Computer Defeats Kasparov," 1.
10. As the match took place at the Equitable Building on Fifty-first Street and Seventh Avenue in New York, I followed much of the play-by-play commentary on the Web. Emotional states were consistently attributed not only to Kasparov (that he is a temperamental Russian was part of the grist for the storymill), but to Deep Blue as well. During the game on May 7, 1997, for instance, Kasparov was described as "going into those kinds of situations that the computer is happy with." Later a commentator queried, "is the computer confused, or is Garry?" That the response to this question was "Audience laughter" is precisely to the point. Although the atmosphere might have been tense, the overall emotional tone was one of sociability.
11. A wealth of prose fiction narratives and science fiction films could constitute the archive for this essay ranging from Isaac Asimov's *I, Robot*, a collection of short stories that appeared originally in 1950 and was reprinted by Bantam in 1994, Robert Heinlein's *The Moon Is a Harsh Mistress* (New York: Putnam, 1966), and Marge Piercy's *He, She, and It: A Novel* (New York: Knopf, 1991) to *Forbidden Planet*, in which Robby, the Robot first appeared, directed by Fred McLeod Wilcox (1956), *Robocop*, directed by Paul Verhoeven (1987), and *The Terminator*, directed by James Cameron (1984) and *Terminator 2: Judgment Day*, directed by Cameron (1991). I have purposively chosen two films, grounded in novels, that continue to be well-known cultural references up to the present day (*2001: A Space Odyssey* and *Blade Runner*) as well as two films (*Silent Running*, a cult film, and *Solo*, an action film) that are not.
12. See Hartwig Isernagen, "Technology and the Body: 'Postmodernism' and the Voices of John Barth," in *Technology and the American Imagination*, 563–70. As he observes, "the borderline between the animate and the inanimate has obviously fascinated the Western imagination for ages. It is particularly the borderline between the machine and the human that has during the last three centuries become permeable in both directions, as the power of machines was allegorized as (quasi-)human or even (quasi-)divine at the same time that animals and humans were treated as or even actually reduced to (quasi-)machines. The robot, which has straddled the threshold all this time, has most recently fueled this fascination in extraordinary ways, as it has metamorphosed itself into the computer" (563). I would add that the computer is metamorphosing again into the robot.

13. See Kathleen Woodward, "Prosthetic Emotions," in *Emotion in Postmodernism,* edited by Gerhard Hoffman and Alfred Hornung (Heidelberg: C. Winter, 1997), 95–107.
14. I refer to the first three volumes of Clarke's quartet as *Space Odyssey.* See Arthur C. Clarke, *2001: A Space Odyssey* (New York: New American Library, 1968), *2010: Odyssey Two* (New York: Ballantine, 1982), and *2061: Odyssey Three* (New York: Ballantine, 1987).
15. Donna Haraway, quoted in Mark Dery, *Escape Velocity: Cyberculture at the End of the Century* (New York: Grove Press, 1996), 176.
16. In *Understanding Media: The Extensions of Man* (New York: McGraw-Hill, 1964), Marshall McLuhan writes about the relationship between the human body and technological invention in terms of "autoamputation." His main point is that technology serves to decrease stress on the part of the body at stake. In contrast, in *Space Odyssey,* the feedback loops that are created retrieve the initial "numbness" that McLuhan notes.
17. In the novel, the action takes place in 2021; the film is set in 2019. "Android" is the preferred term for artificial life in the novel, "replicant" in the film.
18. See *Android Epistemology,* edited by Kenneth M. Ford, Clark Glymour, and Patrick J. Hayes (Menlo Park: AAAI Press/Cambridge: MIT Press, 1995), xi. In "Mind as Machine" in *Android Epistemology,* 23–40, Herbert Simon explicitly makes the point that affect and cognition interact. As early as the 1960s, Simon insisted that cognitive models of mind need to include the emotions; see also his "Motivational and Emotional Controls of Cognition," *Psychological Review* 74 (1967): 29–39.
19. N. Katherine Hayles, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics* (Chicago: University of Chicago Press, 1999).
20. Philip K. Dick, *Do Androids Dream of Electric Sheep?* (New York: Ballantine, 1968), 124. In *Escape Velocity,* Mark Dery describes *Blade Runner*'s Deckard as a "deadpan, monotoned flatfoot" and the astronauts in Kubrick's *2001: A Space Odyssey* as "autistic" (252); for Dery, they are illustrations of the predominantly "flattened affect that characterizes Homo Cyber" (252). I agree with this characterization but with one crucial proviso—that one of the fundamental points of many of these technological narratives is precisely the growth and development of the emotional world and beings of these characters through their very interaction with artificial entities themselves.
21. In this the film departs sharply from the novel. I suggest that between 1968 when the book was published and 1982 when the film was released a significant cultural shift occurred, one that rendered the representation of replicants as indistinguishable from humans on emotional grounds more acceptable. Sherry Turkle confirms this cultural shift in *Life on the Screen: Identity in the Age of the Internet* (New York: Simon and Schuster, 1995).
22. Scott Bukatman, "The Artificial Infinite: On Special Effects and the Sublime," in *Culture Beyond Appearances,* edited by Lynne Cooke and Peter Wollen (Seattle: Bay Press, 1995, 255–89.
23. That we learn emotions is a theme that has been developed recently philosophers and cultural critics, among others. See Ronald de Sousa, *The Rationality of Emotions* (Cambridge: MIT Press, 1987) and Megan Boler, *Feeling Power: Emotions and Education* (New York: Routledge, 1999).
24. Claus Emmeche, *The Garden in the Machine: The Emerging Science of Artificial Life,* trans. Steven Sampson (Princeton: Princeton University Press, 1994), 20.
25. Daniel Goleman, *Emotional Intelligence* (New York: Bantam, 1995), 41. Star Trek's Data is perhaps the most well-known example in popular culture of the desire and need for emotional intelligence.
26. The move in philosophy to confer value on emotions by emphasizing their cognitive aspect, and emphasizing their irrational component, is in consonance with one of the traditional concerns of philosophy—epistemology, or ways of knowing. Is this not, perhaps, a way of appropriating the emotions to the time-honored interests of the philosophical tradition?
27. Orson Scott Card, *Speaker for the Dead* (New York: Tom Doherty Associates, 1991), xx. Although *Speaker for the Dead* was originally published in 1986, Card's "Introduction" was written in 1991.
28. Byron Reeves and Clifford Nass, *The Media Equation: How People Treat Computers, Television, and New Media Like Real People and Places* (Stanford: Center for the Study of Language and Information Publications/New York: Cambridge University Press, 1996), 5.
29. Nicholas Negroponte, *Being Digital* (New York: Vintage, 1996), 217–18.
30. See Deborah Lupton, "The Embodied Computer/User," *Body and Society* 1.3–4 (1995): 97–112. In this essay she insists that she has an emotional connection to her computer and comments on the ascription of emotions to computers as a "discursive move that emphasizes their humanoid nature" (105).
31. Joseph Bates, "The Role of Emotion in Believable Agents," *Communications of the ACM* 7 (July 1994): 122–5.
32. Rodney Brooks, *Flesh and Machines: How Robots Will Change Us* (New York: Pantheon, 2002), 201.
33. See Horst Hendriks-Jansen, "In Praise of Interactive Emergence, Or Why Explanations Don't Have to Wait for Implementation," in *Artificial Life IV: Proceedings of the Fourth International Workshop on the Synthesis and Simulation of Living Systems,* eds. Rodney A. Brooks and Pattie Maes (Cambridge, MA: MIT Press, 1994), 70–9. Hendriks-Jansen pointedly draws on the interaction between a mother and her baby to suggest another model—one of situatedness and interaction—of Alife. Also see Steven Johnson, *Emergence: The Connected Life of Ants, Brains, Cities, and Software* (New York: Touchstone, 2002).
34. Hubert Dreyfus, *What Computers Can't Do: A Critique of Artificial Reason* (New York: Harper and Row, 1972).
35. Marvin Minsky, *The Society of Mind* (New York: Simon and Schuster, 1985), 163.
36. Sherry Turkle, *Life on the Screen,* 111.
37. Bruno Latour, *Aramis, or, The Love of Technology* (Cambridge, MA: Harvard University Press, 1996).
38. Gregory Bateson, *Steps toward an Ecology of Mind: Collected Essays in Anthropology, Psychiatry, Evolution, and Epistemology* (New York: Ballantine Books, 1972), 443.
39. What I have been describing is a phenomenology of technology—as it is represented and as it is experienced. For the most part, phenomenological accounts of technology have been given in terms of experiential categories such as time and space—of speed and slowness, of immensity and contraction, of distance and closeness, for example. See Don Ihde, *Bodies in Technology* (Minneapolis: University of Minnesota Press, 2002) and *Technology and the Lifeworld: From Garden to Earth* (Bloomington: Indiana University Press, 1990). "The relationality of human-world relationships is claimed by phenomenologists to be an ontological feature of all knowledge, all experience," he writes in *Technology and the Lifeworld* (24), with a stress on the material. "Whatever else may enter the analysis of human-technology relations, I wish to retain the sense of materiality which technologies imply. This materiality correlates with our bodily materiality, the experience we have as being our bodies in an environment" (25).
40. Brooks, *Flesh and Machines,* 180.
41. Antonio R. Damasio, *Descartes' Error: Emotion, Reason, and the Human Brain* (New York: Putnam, 1994), 71.
42. Ledoux, *The Emotional Brain,* 41.
43. The name of the project at MIT is Cog, a reference to the intent to make a robot that can think self-reflexively. Cynthia Breazel, who was central to the Cog project in the 1990s, is designing a robot named Kismet. According to Peter Menzel and Faith D'Aluisio in *Robo Sapiens: Evolution of a New Species* (Cambridge, MA: MIT Press, 2000), "The pink-eared, rubbery-lipped Kismet alternatively pouts, frowns, and displays anger, along with a host of other expressions that outwardly display human emotion" (66).
44. Sarah Zettel, *Fool's War* (New York: Warner, 1997).
45. I am grateful to Dick Blau, Pamela Gilbert, Andrew Martin, John Rodriguez-Luis, and Nigel Rothfels for their good suggestions and technical support as I was working on this chapter. I want also to thank Hugh Crawford and Veronica Hollinger for their suggestions. I am warmly indebted to Rob Mitchell and Phillip Thurtle and to the audience at the meeting of the Society of Literature and Science in Pasadena in 2002.