

## TECHNOLOGY AND HUMAN BECOMING

by Philip Hefner

*Abstract.* Technology is a mirror that reflects human nature and intentions: (1) we want certain things done and we want tools to do those things; (2) we are finite, frail, and mortal; (3) we create technology in order to bring alternative worlds into being; (4) we do not know why we create or what values should guide us. Imagination is central to technology. Human nature and human freedom are brought into focus when we reflect on the central role of imagination in technology.

*Keywords:* *A.I.; Bladerunner; Mihaly Csikszentmihalyi; death; denial; finitude; freedom; Gattaca; Donna Haraway; imagination; Stanley Kubrick; Steven Spielberg; technology; Alan Turing.*

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### SEEING OURSELVES IN THE TECHNO-MIRROR

“Mirror, mirror, on the wall, tell me. . . .” Tell me who I am. Imagine for a moment that technology can be that mirror. Does technology tell us what we want to do, our desires for accomplishing things? Or does it tell us who we are and what we wish to be? These questions are at the center of any consideration of technology. These questions—what we want to do and who we are—are inseparable. In some ways, they are the same question viewed from different angles. Both of them show up in the techno-mirror.

How did this happen, that technology became a mirror? Let’s begin with Alan Turing, an Englishman who was born in 1912 in the midst of World War I, was honored for his inventions that helped to win World War II, and died in the midst of the Cold War in 1954. He was a key

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[*Zygon*, vol. 37, no. 3 (September 2002).]

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figure in the development of information technology and computers, what he called “thinking machines.” He suggested the famous “Turing test,” by which he meant a kind of guessing game: “If a computer, on the basis of its written replies to questions, could not be distinguished from a human respondent, then ‘fair play’ would oblige one to say that it must be ‘thinking’” (Hodges 1992, 415). Turing was interested in machines for their own sake, with the ability to resolve problems of thought, specifically problems of mathematics and the philosophy of mathematics as posed by thinkers such as Hilbert and Goedel. In order to resolve such problems, machines would have to imitate human thinking, including the ability to learn, teach, search, and make decisions (Hodges 1992, 406, 413). Thus, Turing placed the mirror at the center of his computer technology—the computer is a reflection of human thinking.

Turing rejected the notion that there is a force or “mind” behind the brain that is responsible for what the brain does. Rather, what the brain does is all there is (Hodges 1992, 292). Turing made certain basic decisions that guided his brilliant, innovative work. First, it is not the biology or the physics of the brain that is critical for what it does but rather the *logical structure of its activities*. Therefore, those activities can be represented in any medium that replicates that structure of logic, including machines (Hodges 1992, 219). Second, since thinking is the critical human characteristic that interests him, he constructed his mirror with thinking at its center—and this plays a role in determining what his mirror will reflect back to us.

Turing wanted his technology to resolve classic thought problems. The British government wanted that technology to crack German codes during the Second World War. The United States government wanted it to replace human workers in the postal system. The first desire is purely intellectual, the others are practical. All assume that technology should imitate human beings and further assume that thinking is the critical human trait. The result has been three-quarters of a century of discussion of how humans think and how that thinking can be replicated in a nonbiological medium. Consider the billions of dollars that have been invested in this technology and the thousands of our most brilliant thinkers and inventors who have spent their lives developing it. The mirror is neither small, nor unpretentious, nor inexpensive.

Turing and his colleagues and their descendants have created a significant mirror of ourselves. What we want and who we are coalesce in this mirror. Whether we think this mirror is adequate is another question.

In the Stanley Kubrick–Steven Spielberg movie *A.I. Artificial Intelligence* (2001) we see a different line of Turing’s descendants. This technology for producing robots accepts the assumption that imitating human behavior is fundamental, and it works equally on the hypothesis that humans are what humans do. But *thinking* is not the critical mark of being

human; *loving* is. Robot boy David is unique, or at least the first of a unique line of robots, because he can be programmed to be imprinted and to love forever the person who imprints upon him. After his foster mother Monica performs the imprinting ritual, David's total existence is driven by his love for her, throughout the two-thousand-year time span that the movie covers. Turing and Kubrick-Spielberg agree that the technological robot must be able to learn and make decisions, and that biology is not essential for the hallmark of human behavior, love. They disagree sharply on what they want to do and on what is most important about humans. David is designed to meet the human need for love. Joe, a robot gigolo who approximates David's level of achievement, also exists for serving that need. Kubrick and Spielberg, working on Turing's principles, have created a mirror that reflects images quite different from Turing's.

Think for a moment how the mirror presented by *A.I.* is both similar to Turing's and different. Note the responses that the two robots elicit from humans. Turing asks us whether we can think as well as the computer—beat Big Blue at chess or resolve a mathematical problem too complex for ordinary minds, or, perhaps, simply accept the usefulness of speedy calculations. David and Gigolo Joe bid us to respond with love, whether parental or sexual. The negative responses to these forms of computer technology are equally revealing in the mirror. David and Joe elicit fear, hatred, and savagery. David's foster parents and brother fear him (and, to an extent, hate him), leading them to abandon him to the Flesh Fair. One of Joe's clients is afraid to have sex with him, even though she engaged his services. Replicating our emotions seems to affect us at a different level than replicating our thinking processes. Or perhaps we should say that thinking with our hearts represents a different dimension of our being than thinking with our intellects.

Efforts to create virtual reality (VR) also focus on replicating humans. In VR, however, it is neither thinking nor loving that is replicated but rather experience of the world—perceptions of the world, to be more exact.

Let us be specific: If technology is the mirror, mirror, on the wall, what are the main images it reflects back to us as we peer into it? I call attention to four such images.

1. *The techno-mirror shows us that we want tools to do things for us, and it shows us what we want done.* We want these things for our survival and also for our pleasure. We want tools that will cure our diseases, correct our defects, and make us more beautiful. We want tools that will extract the useful products that are embedded in the earth and sea and atmosphere. We want to live complex lives and accomplish complex goals, and we want the tools that will make that possible—cars, planes, phones, faxes, computers, and intellectual agents. We invest all of these with urgency; we consider them to be basic needs. Curing disease and extracting resources

have become quasi-religious activities. While we do not yet pray for better oil rigs or cell phones, we pray regularly for new cures and good doctors.

2. *The techno-mirror shows us that we are finite, frail, and mortal.* Technology is about being finite and mortal. We create technology in order to compensate for our finitude. That could almost serve as a definition of what tools are: devices for compensating for human finitude.

Because technology can outlive us and be stronger than we are, more accurate, and faster, the very existence of our technology reminds us of our finitude and mortality. Frank Tipler theorizes about computer technology in his book *The Physics of Immortality* (1994). Simply by being there, technology of all kinds expresses the truth that we need technical assistance in order to become who and what we want to be, because our finitude does not carry us as far as we want to go.

In the classic film *Bladerunner* (1982) we see this clearly. Robots, known as “replicants,” are designed and built in order to live and work in extraterrestrial environments that are hostile to human beings. Since those robots must be designed to be stronger than their creators, and at the high end of human intelligence, they constitute a potential threat to humans. Therefore, they are programmed to self-destruct after a few years. Since the assumption here, in contrast to Turing and Kubrick-Spielberg, is that human intelligence is necessarily biological, the robots are genetically engineered. Consequently, the entire movie is about dying. The replicants become aware of their programmed mortality and rebel. The human creators lack the knowhow to reverse the programmed self-destruction. The movie focuses on two replicants: one who, after his rebellion, acknowledges his death and dies with grace and nobility in the climactic finish, and the other, programmed with a high-level emotionality, who becomes romantically involved with a human being (there is a suggestion that he, too, is a replicant). The romance is thwarted by her self-destruct programming. (These comments are based on the director’s cut of *Bladerunner*, which differs from the theater version, which imposed a happy ending on the story.)

The robot boy in *A.I.* desires to be human, only to discover that being human means to be mortal, and when he finally fulfills his dream to be a real human boy, he dies. *A.I.*, in a sense, is also about dying.

It is not surprising that movies such as these should give so much attention to death, since a good deal of our technology seems to be a denial of death and an attempt to escape it. Think of genetic engineering and genetic medicine, extraterrestrial exploration and colonization. Genetic engineering and medicine enable us to live longer. Extraterrestrial exploration and colonization may enable our species to escape the destruction of planet Earth, whether that is by our own hands or by the sun, when its evolution brings it to the Red Giant phase, in which it consumes the earth.

In its engagement with finitude and death, technology becomes almost explicitly religious. Paul Tillich has said that religion focuses on what we care about most, what we are dependent on. This is his concept of *ultimate concern*. He also said that the mark of a theological issue is that it deals with what makes for our being or not-being. The struggle with finitude and death meets these criteria: it is a matter of religion, and it raises theological questions. Since it is a medium for these concerns and questions, technology is both religious and theological. Indeed, technology may be more religiously gripping than a sacred liturgy and more theologically urgent than a sacred dogma.

The *Bladerunner* replicant's rebellion against death results in his murdering the human designer, a religious response—lashing out at God, cursing God. The replicant's acceptance of death is also a religious response, even though it is not clear whether it marks a peaceful, confident coming to terms with death or futility and resignation.

Ernest Becker chronicled our culture's denial of death. He said it is a driving force in American life. The movie *Gattaca* (1997) articulates Becker's point: genetically engineered perfect babies, with educational and job opportunities given only to those genetically superior men and women. All the more interesting that in so many of these movies—*Gattaca*, *A.I.*, *Bladerunner*—the victory goes to the mortals and the "defectives." *Gattaca* is an especially vivid example: Two brothers are in competition—one perfectly engineered, the other, a defective love child conceived in a moment of his parents' backseat passion. The defective brother successfully hides his genetic identity and finally surpasses his brother when he saves him from drowning and is later selected to be an astronaut. It is as if these movies are repudiating denial and finding deeper value in finitude and mortality. There is at least one world religion that also suggests that a man who was defeated and executed on a cross turned out, finally, to be the victor. Or perhaps these movies are a sturdy witness to the belief that mortal, finite creatures have intrinsic worth of their own. In my Lutheran tradition, we call this Justification by Grace or, as it is known more technically, "It's okay to be mortal."

3. *We see in the techno-mirror that we create technology in order to bring alternative worlds into being, worlds that differ from the actual world in which we live.* We insist on creating a virtual reality to counterbalance the reality that is given to us. The genetic technology that may well be a denial of our mortality can also be a means to create an alternative state of life. Later in this essay I reflect more on the close relationship between behaviors of denial and behaviors that create new, alternative worlds. The ability to create alternative worlds underscores Teilhard's comments on technology as "supercreative." We can rearrange matter, we can put the pieces of nature's jigsaw puzzle together in unusual ways, in order to create new combinations

and realities. We are not at all reluctant to say that these new realities are religiously charged.

4. *We see in the techno-mirror that although we are busy creating new realities, we do not know why we create or according to what values—so we have to discover the reasons and the values.* The mirror reveals to us that we do not with certainty know the answers to questions of “Why do we do this?” and “Is it a good thing to do?” The mirror shows us, further, that as human creators we do not even agree on the possible answers to questions such as these:

- Pro-life/pro-choice?
- Cloning?
- Genetic engineering aims at reshaping ourselves. What models of personhood should guide us?
- Should we genetically engineer other creatures?

These questions take us to yet a deeper level of our journey of human becoming; we realize that our journey is unavoidably technological, and we know that technology shapes our self-image. Now we see that technology intensifies the perennial ambiguities of our human journey, because it poses the issues of finitude and death, of the purposes of the journey and its morality—the rights and the wrongs. The answers to these questions are not given to us; we must discover them.

Now we come to the most perplexing question of all reflected in the techno-mirror: *Do the virtual selves that we create in our technology help us to understand who we are, bring us closer to knowing ourselves? Or do they distract us, raising even more difficult questions of what it means to be human?* Does it really help to see our images in Turing machines? or in genetically modified embryos or tomatoes? Should we take the techno-mirror from the wall and throw it to the ground? Would breaking the mirror actually bring bad consequences? or would it be desirable to break it?

The techno-mirror drawn by Teilhard reflects images of excitement, adventure, cosmic significance, and liberation. The techno-mirrors drawn by Kubrick and Spielberg in *A.I.* and by Ridley Scott in *Bladerunner* do reflect beauty, but also weakness, ignorance, greed, savagery, and death.

Techno-mirror on the wall—tell me, who am I? Who is the “me” that you reflect?

TO BE FREE AND FREE TO IMAGINE—THE ONE  
ESSENTIAL THING

In his reflections on the atom bomb, Teilhard writes,

The fact of the release of nuclear energy, overwhelming and intoxicating though it was, began to seem less tremendous. Was it not simply the first act, even a mere

prelude, in a series of fantastic events which, having afforded us access to the heart of the atom, would lead us on to overthrow, one by one, the many other strongholds which science is already besieging? Is not every kind of effect produced by a suitable arrangement of matter? And have we not reason to hope that in the end we shall be able to arrange every kind of matter, following the results we have obtained in the nuclear field? . . . In exploding the atom we took our first bite at the fruit of the great discovery, and this was enough for a taste to enter our mouths that can never be washed away: the taste for super-creativity. (Teilhard 1964, 144, 146)

Technology is portrayed as the rearranging of matter, the taste for super-creativity. What is the significance of this super-creativity? What is it *about*? There's a clue, once again, in *A.I.*, when one of the forty-first-century robots speaks about humans. By this time, humans have gone the way of the dinosaur, and robots have surpassed them in most respects. Twentieth-century robot boy David has been in hibernation for two millennia, and when he is awakened he discovers that he is instantly a "treasure," because he is the only robot in existence who has had direct contact with humans. What is so important about humans? David is told: The greatest gift of humans is that they wish for things that do not exist. *Only humans can believe in what is not actual.*

Earlier, I said technology is about our being finite, frail, and mortal. Technology is also about being free and about imagining things and conditions that never were, things that do not exist and conditions that can be different. Teilhard was wrong about one thing—this did not happen only with the atomic age. The first stone tool was the product of the imagination, of picturing the nonexistent into existence—the skinning of a mammoth, the scaling of a fish. Genetic engineering, whether for reasons of therapy, improvement, or personal preference, rests on our imagining that which does not actually exist. The same can be said of computer technology. Virtual reality is reality conditioned by our dreaming of what is not yet actual but might become so. When it is not possible or feasible to rearrange actual walls and cities, we move virtual objects by replicating perceptions that correspond to what we imagine. I'll go out on a limb and say that technology is entirely the product of our imagination, and what we want it to be is likewise conditioned by imagination and by our free decisions to imagine what we want done and the tools for getting it done. It may be as solid as a big yellow bulldozer, as massive as a cyclotron, or as fragile as a computer or laser knife, but its foundations are laid in the human imagination.

In addition, I said that technology seems to be carried out as a strategy for denying our mortality and death. It is also a means for surpassing finitude and death, in that imagining what is not but might be is a form of transcendence within our mind and spirit. The line between denial and surpassing or transcending is not an easy one to see. Perhaps there is no line. Perhaps denying and transcending are two sides of the same coin. Perhaps denying what is, is the presupposition for transcending it.

When we consider how fundamental imagination is to technology and to human life, we also broaden our idea of technology. In his series of “fantastic events” of which the atom bomb is but the first, Teilhard listed chemistry, genetics, and psychotherapy. He is not the only one who has interpreted psychotherapy as a kind of technology. It certainly rests on the foundation of human imagination, in its conceptualizing what the self is as well as in its ideas of what the self can become. Ralph Burhoe spoke of religion as a technology. Some anthropologists say that practices using alcohol and hallucinogenic drugs originated within religion. Their purpose may have been to actualize imaginary states of mind and spirit that we believe are desirable or even necessary for our transcendence. Dreams and rituals fall in this category as well. Rituals of passage and puberty aim to make idealized states as real as actual ones.

Examples of ritual virtual reality can be taken from every religion. I think of the rites of early Christian initiation. For forty days prior to Easter, a group of persons has undergone intensive instruction, or catechesis. On Easter eve, late at night, they undergo their rite of initiation, coinciding with the remembrance of the night when Jesus made his transition from the death of the grave to new life in the resurrection. The initiates strip off their clothes and are plunged into the water of the baptismal pool. When they emerge, they are given identical white robes, and they participate in their first Holy Communion, eating the bread and drinking the wine that symbolize unity with Jesus and with the community of his followers. Note what alternative reality is being imagined and created: (1) each initiate sees the others stripped; a bond of common humanity is thereby formed, distinctions of class and status are leveled away; (2) all are washed, purified in the same baptismal bath; (3) all dress in identical pure white robes; and (4) all share the sacrament of unity with Jesus and their fellow Christians. This is their new world—they are now brothers and sisters, stripped of their old garb and given identical new clothes; they are *new* people cleansed in the same water; their primary reference group is now the community of Christians. Is this new world actual or virtual? Is it real? Is it a dominant feature of their identity? The aim of this ritual is to make the passage into a new state that is as real as the actual world that preceded it in the lives of the initiates.

Rituals are meticulously put together in ways that suggest the intricacies of technology. The style of a book of liturgical rubrics may not be much different from a manual for building or repairing a complex machine. Even though the form and means are quite different, the principle is the same: how to actualize something that does not exist but that has been created by the human imagination.

Emphasizing freedom and linking it with imagination is worth thinking about. Robot boy David’s creator, Professor Hobby, tells him that his uniqueness as a robot lies in his ability to enter into the process of self-



discovery even though he was not programmed to do so. For David, this process is the quest to become a “real, human boy,” replicating the fairy tale of Pinocchio and the search for the Blue Fairy. He was not programmed for this. In fact, Hobby tells him, “we lost you for a few days,” precisely because the robot was not expected to embark on such a quest. Turing also accepted this premise in his belief that a thinking machine must learn, search, and make decisions beyond the calculations it was programmed to make, because this is the way human brains operate.

Here we discover one way of defining freedom: behaving in unprogrammed ways—programming, of course, playing the role of determinism. This is a major motif for us today. We are reading this freedom, defined as unprogrammed behavior, into the natural world, in nonequilibrium thermodynamics, elements of chaos theory, and the sciences of “complexity” that incorporate the biochemistry of self-generating processes. The terms *self-generating*, *autocatalytic*, and *autopoiesis* are gaining prominence in physics, chemistry, biology, the neurosciences, philosophy, and theology. They refer to the fact that natural processes and things appear, in a way, to make themselves, in that novelty emerges without direct intervention by outside forces. Thinking about emergence has focused on this same phenomenon for a hundred years or more in the sciences, philosophy, and theology. Brain scientists speak of the human brain’s success in creating novel frameworks or pictures in which it can organize the stimuli it receives from the world in original and significant ways. It has been said that the human brain succeeds so well because it can supply what isn’t really there. That is another way of describing this same phenomenon.

By projecting this freedom into nature, into our physics, chemistry, biology, and neurobiology, we are not only taking a giant stride in our way of thinking about nature, we are also abolishing dualisms, crossing the boundaries between humans and nature, between technology and nature, and between humans and technology. This kind of freedom is what nature and technology and humans share. We could also refer this insight to our image of the techno-mirror. That mirror tells us how important freedom is for humans. It is so important to us that we strive to create technology that is also free.

Donna Haraway reminds us (1991, chap. 8) that even though breaking down barriers and crossing boundaries is important, what we do after we have crossed the boundaries is even more important. Imagining conditions that are not actual, and believing in them, is one of the most significant things we do when we cross the boundary between humans and technology, between denying and transcending our actual situation.

Perhaps this imagining is the most important way to define and use our freedom. This freedom is not the lack of restraints, the don’t-tread-on-me liberty that is so congenial to Americans, particularly to New Englanders.

It is not the license to do and create whatever we wish—the freedom of Prometheus, for example. No, this freedom is defined by imagination, the capacity to imagine what is not actual and to take that imagination seriously. It is not detective Joe Friday’s “the facts, ma’am, just the facts”; rather, the emphasis is on what the facts can become. Psychologist Mihaly Csikszentmihalyi believes that it is not possible to live adequately in the world only on the basis of what we know empirically. We also require visions of what the empirical present can become, what its possibilities are. When we envision possibilities, we are in the domain of spirituality. Csikszentmihalyi writes: “Spiritual values, . . . ideas, symbols, beliefs and instructions for action point to possibilities which our material nature is not sensitive to. The sensate deals with what is, the spiritual deals with what could be. Spirituality is the focus on the stories and the myths of something more that go beyond the here and now and tell us what the here and now can become” (1991, 17–18). Most of the students and practitioners of spirituality that I talk to agree with Csikszentmihalyi’s idea.

What I am calling the imagination merges with what Csikszentmihalyi calls the “spiritual.” The point is that humans are defined by this imagination or spirituality, freedom is defined by it, and now we see that technology is also defined by this imaginative probing of what actual things and actual states can become—and believing in it, acting on it. That is true spirituality.

Viewed in these terms, technology is a spiritual realm. The question is: What guides the imaginative spirit? I can look out over a hundred acres of forest and imagine those trees becoming thousands or millions of board feet of lumber or rolls of newsprint. Or, I can see it as an ecosystem that is home to spotted owls and other diverse species, and imagine it being cared for as such. Changing the venue, I may look out over a city neighborhood and imagine possibilities for development and profit from exploiting the inhabitants. Or I may imagine it as a community of persons, a home for families and individuals, and think of the ways it can be made more wholesome for them. These differing imagined alternative worlds are equally spiritual, and it makes a difference which world I believe in and commit to. The imagination must also create larger stories and guiding principles that will direct our beliefs, and these, too, are products of our freedom.

If imagination is the way we spell freedom and humanness and technology, it is also the way we spell vulnerability. David walked the knife edge of vulnerability in his quest for the Blue Fairy who could make him what he was not programmed to be. This vulnerability resulted in his imprisonment under the sea in what was formerly Manhattan, Manhattan having been engulfed in the rising seas created by global warming. For two thousand years, David was trapped by a Coney Island Ferris wheel that had collapsed on his helicopter as it hovered before a plaster statue of Pinocchio’s Blue Fairy—the fairy who could transform David into a real boy. One

writer has identified this blue figure with the Virgin Mary. The association is not absurd, since Mary is in some traditions pictured as the epitome of humanity.

His robot friend Gigolo Joe had agonized over David's vulnerability. Professor Hobby agonized as well, because if the robot were open to destruction through this vulnerability, so was his human creator. In *Bladerunner*, the human designers were threatened by their robots' rebellious search for their real humanity. Those designers were murdered by their replicant offspring. In *A.I.*, the vulnerability of the human designers is of a different order. It is not their lives that are threatened so much as the hopes and imagination they have invested in David.

Freedom to be, freedom to imagine, and vulnerability—they go together. Whether the issue is atom bombs or abortions or genetically altered vegetables, human persons, stem cells, embryos, or clones—we know ourselves to be both free and vulnerable.

When David, at the end of the movie, lies next to his mother and hears her say those magic words, "I love you, David," he knows that he has at last become a real boy. For the first time in his life, he is able to sleep and dream; he has achieved his goal, and in that moment when he falls asleep, he dies. The mortality that belongs to all humans now belongs to him as well. This does not mean that freedom was bad for him, or demonic. It does not mean that the imagining was the wrong thing to indulge. It does mean that when freedom is really free, and when it is free to imagine things that are not actual—and to believe in them—vulnerability is always part of the mix. It is inherent in the rite of passage into the new that is the future. As Galway Kinnell puts it, "the wages of dying is love" (1983).

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