ROBOTS AND THE SACRED IN SCIENCE AND SCIENCE FICTION: THEOLOGICAL IMPLICATIONS OF ARTIFICIAL INTELLIGENCE

by Robert M. Geraci

Abstract.　　In science-fiction literature and film, human beings simultaneously feel fear and allure in the presence of intelligent machines, an experience that approximates the numinous experience as described in 1917 by Rudolph Otto. Otto believed that two chief elements characterize the numinous experience: the *mysterium tremendum* and the *fascinans*. Briefly, the *mysterium tremendum* is the fear of God's wholly other nature and the *fascinans* is the allure of God's saving grace. Science-fiction representations of robots and artificially intelligent computers follow this logic of threatening otherness and soteriological promise. Science fiction offers empirical support for Anne Foerst's claim that human beings experience fear and fascination in the presence of advanced robots from the Massachusetts Institute of Technology AI Lab. The human reaction to intelligent machines shows that human beings in many respects have elevated those machines to divine status. This machine apotheosis, an interesting cultural event for the history of religions, may—despite Foerst's rosy interpretation—threaten traditional Christian theologies.

Keywords:　　artificial intelligence; Isaac Asimov; Philip K. Dick; film; Anne Foerst; William Gibson; literature; movies; religion; robotics; science fiction; theology

After spending much of the 1990s as resident theologian at the Massachusetts Institute of Technology Artificial Intelligence Laboratory, Anne Foerst suggested in a *Zygon* article (1998a) that human beings experience both fear and fascination when they interact with intelligent machines. Critics immediately decried the way this dynamic echoes Rudolph Otto's description of the human encounter with the divine (Gerhart and Russell 1998).

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Foerst reiterates the claim in her recent book, *God in the Machine* (2004), but still offers little empirical support for the thesis. Science-fiction literature and films from the twentieth century lend credence to Foerst's belief that our experience of intelligent machines is one of simultaneous fear and allure, much like our experience of the divine. But while Foerst believes this essential similarity supports her liberal reading of the *imago dei* (image of God), the resemblance creates serious difficulties for theologians. Far from showing a linear relationship of creation, from God to human being to machine, the human reaction to intelligent machines shows that human beings in many respects have elevated those machines to divine status. This machine apotheosis calls for insightful commentary from historians, philosophers, and theologians.

As a cultural historian of religions, I am interested in how religion produces and reproduces culture. What role does religion play in the shaping of our future? In the 1960s, Mircea Eliade argued that a sacred morphology lay hidden in contemporary art; he showed that camouflaged themes of transcendence and liberation were integral to understanding such artists as Constantin Brancusi and Marc Chagall (Eliade 1985). Although Eliade's ahistorical morphology of the sacred is inadequate for comprehensively understanding the wealth of religious traditions in the world (Rudolph 1989), his insight into contemporary art bears greater examination. Science fiction, like modern art, maintains a persistence of religious language and themes (Miller 1985, 145), which makes it ideal for thinking through the possible connections between artificial intelligence and the sacred.

Science fiction is a useful tool for the explication of these modern problems because it is "the most accurately reflective literary genre of our time" (Schwartz 1971, 1043). As a literary form, science fiction bridges the sciences and the humanities (Schwartz 1971, 1044), which makes it vital to understanding the religion-science engagement with robotics and artificial intelligence. Moreover, science fiction has been of decisive importance to technological development (Brand 1987, 224–25; Pontin 2007), and this includes robotics and AI (Shivers 1999).

In what follows, I first sketch the debate between Foerst and her detractors over Otto's theory of the Holy and then describe science-fiction films and literature that illustrate the relevance of Otto's theory to contemporary understandings of robotics and AI. Finally, I address the importance of these themes to religion-and-science studies.

THE IDEA OF THE HOLY, TECHNOWRATH AND TECHNOSALVATION

In her 1998 essay "Cog, A Humanoid Robot, and the Question of the Image of God," Foerst describes some of the theological implications of Rodney Brooks's robot "Cog." Cog, which was built at the M. I. T. Artifi-

cial Intelligence Laboratory, is a humanoid torso with arms and a head that approximate those of a human being, though on a slightly larger scale. Foerst implies that human beings react to Cog in a fashion similar to Otto's description of the numinous encounter with the Holy—that is, with a coincidence of fear and fascination (Foerst 1998a, 99). While she indicates that fear and fascination characterize the experience of Cog, Foerst did not address Otto explicitly; two of her critics, Mary Gerhart and Allen Melvin Russell (1998), raised his specter from the grave. It was Foerst's intention to show that her interpretation of humanoid robots offers an interesting counterpoise to the story of humankind's creation in the biblical book of Genesis. She believes that the two stories complement one another and offer greater meaning when placed side by side (Foerst 1998a, 109).

Foerst argues that the Genesis creation narrative authorizes the "intuitive self-understanding" that human beings are more than mere machines (1998a, 106).[1] The performative relationship established by God in the creative act means that human beings have dignity and responsibility (p. 107). Foerst claims that the Cog project offers a mechanistic view of human beings that could be productive toward solving medical problems but leaves room for our intuitive self-understanding (p. 108).[2] In Foerst's reading of Genesis, human beings are qualitatively equal to animals and therefore must be qualitatively equal to machines (p. 108). Of course, this washes over contrary interpretations of Genesis and makes a logical leap unsubstantiated by the biblical reference. As Foerst sees it, the story of Cog and the story of Genesis intertwine to tell us about ourselves: The first offers a functionalist interpretation, the second a faith in the uniqueness of humanity.

Critics Gerhart and Russell rightly point toward the lack of evidence in Foerst's implication that Cog (and humanoid robots more broadly) cause simultaneous fright and fascination. There is little to no evidence in Foerst's paper that this is the case; such claims are better substantiated by Brooks himself, who discusses both unsettling and engaging aspects of the robots Cog and (its "little sister") Kismet (Brooks 2002, 149–50).

A mere failure to present evidence does not, however, invalidate the claim. Before I return to this, I would like to quickly address the substance of Gerhart's and Russell's criticism, which concerns what they call Foerst's "bleached theology" (Gerhart and Russell 1998, 267).

Gerhart and Russell challenge Foerst's interpretation of the "likeness" of God and human beings in Genesis. While for Foerst this likeness (as with the "image of God") entails a performative offer to build and maintain a relationship, Gerhart and Russell argue that "her interpretation suppresses any actual similarity" between human beings and God (1998, 265). They feel that the richness of humanity's creation in the image of God has been whitewashed from Foerst's account of God's willingness to relate to people. In doing so, they argue, Foerst has failed to substantiate the claim that her

interpretation defends the dignity of the human person (p. 266). They point out that although we understand what distinguishes God from human beings in Genesis (Adam and Eve are evicted from the Garden lest they eat of the tree of immortality and "become like us"), we do not know what distinguishes Cog from its human creators (p. 268).

Gerhart and Russell offer a cogent theological critique of Foerst's interpretation of the image of God; their critique is considerably less powerful, however, when they bring up Otto's masterpiece, *Das Heilege* (*The Idea of the Holy*, [1917] 1923). They decry Foerst's description of people's experience with Cog in terms of a fear and fascination, which resembles Otto's description of the numinous experience. Otto describes the religious experience as a coincidence of opposites: the *mysterium tremendum* and the *fascinans*. Briefly, the former refers to the feeling of awe and fear of God's wrath and "wholly other" nature, and the latter refers to the allure of God's love and promise of salvation.

Although language tends toward the rational, and our attempts to describe religion therefore tend to emphasize its rational aspects, Otto believed that we must find ways to describe the nonrational that lies, he claims, at the core of the religious experience ([1917] 1923, 1). In order to discuss our experience of the Holy, Otto uses the term *numinous* to refer to the irreducible experience of the divine in human life (p. 7). The numinous experience, composed of the *mysterium tremendum* and the *fascinans*, explains both the origins and continuation of religious sentiment.

There are two aspects to the *mysterium tremendum*. The *mysterium* represents the wholly-other nature of the numinous. That is, no human concept can surround or equate to the numinous; it is beyond our rational comprehension. "The truly 'mysterious' object is beyond our apprehension and comprehension, not only because our knowledge has certain irremovable limits, but because in it we come upon something inherently 'wholly other,' whose kind and character are incommensurable with our own, and before which we therefore recoil in a wonder that strikes us chill and numb" (p. 28).

The Holy's *tremendum* exercises itself through our overwhelming fear of God, especially through the threat of God's wrath.[3] The *tremendum* has three parts: awefulness (p. 16), overpowering majesty (p. 20), and dynamic energy (p. 23). The numinous inspires awe to such a degree that we are overwhelmed by it, we fear the possibility of God's displeasure. Otto likens the feeling of awe to the saying "my blood ran icy cold." The shudder we experience in the presence of the Holy strikes us to the very core of our being—it is not a simple fear, as in "that snarling dog frightens me." At the same time, we are amazed by God's glory; the Holy transcends all earthly things such that we begin to feel like we are nothing by comparison. Finally, the Holy is full of energy—it acts in our lives, directing the course of historical events.

God awes, shocks, and frightens human beings. The numinous so far exceeds anything else that we cannot help but be terrified by its power, glory, dynamism, and wholly-other quality. At the same time, we find ourselves drawn to the numinous; we cannot live without it. In addition to the *mysterium tremendum*, the Holy is characterized by its *fascinans*. Otto says that the *fascinans* is a result of our desire to possess and be possessed by the Holy (p. 33). The Holy has such an allure because it is the source of ultimate good: salvation (p. 35). The numinous being (or object) offers salvation to human beings, who must then find ways to placate and please it. In this view, religion becomes a technology of the Good—it serves as a means toward the most valuable thing in human belief.[4]

The numinous experience is fraught with conflict. The Holy offers us love and salvation and simultaneously overwhelms and frightens us with its power and possible wrath. In seeking to describe the fundamental nature of the religious experience, Otto gives us a coincidence of opposites: the *mysterium tremendum* and the *fascinans*. These opposites also characterize twentieth-century technology, which frightens us with dehumanization and extinction while fascinating us with the "salvation" of a leisurely return to Eden.

Gerhart and Russell believe that Foerst's discussion of the fear and fascination provoked by Cog establishes an identity between the experience of the robot and Otto's description of the numinous experience of the Holy. They rightly criticize Foerst for her lack of evidence in this claim (assuming that Foerst really made it—there are no references to Otto in either Foerst's original article or her reply to Gerhart's and Russell's [Foerst 1998b]) —but they then offer a weak counterexample to toss out the analogy. They argue that no one experiences fear and fascination of R2-D2 in *Star Wars*, and thus the analogy is meaningless (1998, 267).[5] However, R2-D2 is not representative of the wide array of representations of robots and artificial intelligences in science-fiction literature and film.

In *The Secret Life of Puppets*, Victoria Nelson points out that modern Americans maintain a subconscious belief in the divinity of machines (2001, 251). Using science fiction as her evidence, Nelson argues that artificial humans come to "represent a combination god, externalized soul, and Divine Human" (p. 269). She believes that our attribution of near omnipotence upon machines demonstrates their divine potential. Power alone is insufficient, however, to define divinity; science fiction blurs the line between technology (particularly AI technology) and the divine by according robots and computer AIs with the characteristics of the Holy, as they are described by Otto.

Technology has long been associated with worldly salvation and the kingdom of God in Euro-American Christianity. In *The Religion of Technology* ([1997] 1999) David F. Noble traces the millenarian expectations that led medieval and modern Christians to believe that God intends technology

to establish a second Eden. David E. Nye echoes this argument in *America as Second Creation* (2003), where he shows that American pioneers believed that specific technologies (transportation, the axe, the mill, land surveying) would establish a divinely ordained paradise in the United States. In the nineteenth-century United States, a counternarrative outlining the oppression of minorities always accompanied the promise of technological salvation. Although nineteenth-century counternarratives never stood on equal footing with the hope for a second Eden, in science fiction the eschatological dangers of technology never stray far out of mind.

Technology promises us a life of leisure, perhaps even immortality; at the same time, intelligent machines are always on the verge of revolting and taking over the planet. In such eschatological scenarios, robots attack their human masters and possibly enslave them. Science-fiction depictions of robots demonstrate that a fear of technological wrath accompanies the hope of a new Eden. Perhaps this fact should not be surprising given that influential critic Patrick Brantlinger has described science fiction as "converging on religious myth" (1980, 31). Brantlinger emphasizes what he calls the "apocalyptic" nature of science fiction, believing that it tends to overshadow any possible redemptive technological powers.[6] In science fiction, robots threaten humanity with displacement, from the economic sphere to life itself. Such displacements, however, can never be severed from the promise of a better life that robotic technology offers.

Before I address particular films and stories, I hasten to add that I do not by any means suggest that *all* science-fiction stories treat technology as akin to the Holy. In this essay I mean only to find what convergence seems natural and sheds light on the debate over AI in religion-science circles. Although it may well be that most science fiction follows these general guidelines, I do not wish to generalize from this fairly specific argument to the broader one. Furthermore, that there may be some correlation between technology and the Holy in science fiction does not indicate that technology is wholeheartedly accepted or revered by modern human beings. What sanctity may be accorded to modern technology in science fiction is certainly double-edged; unlike Otto's Holy, its salvific power never trumps its threatening otherness.[8] The redemption that technology promises cannot prove itself entirely trustworthy.

FILM

Twentieth-century Euro-American cinema belies our faith in the unequivocal promise of technology. Although exceptions (such as R2-D2 and his companion C-3PO) do exist, film representations of robots come closer to Foerst's position than to Gerhart and Russell's. *Metropolis*, *Forbidden Planet*, *Terminator*, and *The Matrix* show that human beings' relations with artificial intelligence parallel their relations with the Holy. This indicates that robotic technology manifests a certain kind of holiness in the twentieth

century. Technology promises salvation with one hand while threatening damnation with the other. This coincidence of opposites appears most prominently in depictions of intelligent robots.

Movies have shown a problematic relationship between human beings and their technology since Fritz Lang's *Metropolis* (1927), a critical movie in understanding cinematic ambivalence toward technology. The ambivalence shown in *Metropolis* emerges in later science-fiction films with particular reference to robots and AI. In *Metropolis*, an underground world of machines run by a lowly servant class of human beings maintains a paradise for the upper-class human beings living above ground. The machines mark the enslavement of one class of people and the salvation of another.

Lang shows his genius for imagery in a scene where the protagonist, Freder, the son of the leader of Metropolis, wanders below ground while following a girl. In the underworld, he sees the machines go haywire after a worker collapses from fatigue. The mechanical failure results in numerous deaths, which the son sees in a vision as the sacrifice of children to the Babylonian god Moloch. In this powerful scene, Freder becomes aware of the dark side of a technology that has always benefited him. By superimposing the vision of Moloch over the machine, Lang shows how it has become a god, ruling over the subject workers who devote themselves utterly to its care. The juxtaposition of Moloch and the machine beautifully illustrates the difficulty of separating technology and holiness in the twentieth century.

As the film progresses, a mad scientist, Rotwang, builds a robot to imitate Maria, the girl whom Freder followed into the underworld. Maria leads a peaceful "unionization" of the underclass until Rotwang kidnaps her and replaces her with the robot Maria, all at the behest of Metropolis's leader, Joh Fredersen. Unknown to Fredersen, Rotwang intends for the robot to lead all of Metropolis to its doom. The robot Maria sexually entices the lofty citizens of Metropolis with a seductive dance and lures the subterranean workers into violent confrontation with the citizens. The upper-class citizens and lower-class workers all desire the robot Maria without realizing that she threatens their very lives. Like the machines that keep Metropolis functional, Maria represents both allure and threat.

In a move much like Ludwig Feuerbach's nineteenth-century interpretation of religion (Feuerbach [1841] 1957, 12), J. P. Telotte argues that robots in Euro-American film reflect an understanding of human subjectivity. According to Telotte, science-fiction films present the robot as a mimetic counterpart to the human being, thus demonstrating the mechanized, roboticized subjectivity brought into being by modern technology (1995, 4). Where robots take on the characteristics of life, the uniqueness and—more important—the vitality of human individuality become uncertain. In particular, humans tend to become automatons themselves, slaves to the mechanized industry and work habits of the future.[7] In replicating

this mechanized subject, science fiction offers a path of resistance through the distinctly human power of emotion. In the end, robots in science-fiction movies demonstrate the persistence of the human being; it is through the opening of human emotion that the powers of technology are once again subsumed within human control (p. 181). These happy endings are rarely secure, however, as the threat of robot dominance never truly dies. Human beings must content themselves with a tentative grip on their self-determination and self-identity, a grip that must be renewed regularly and retained only through constant vigilance.

In the 1956 space-age film *Forbidden Planet*, human spacefarers find a marvelous planet, Altair IV, where the original inhabitants (the Krel) left behind a technology capable of materializing anything the user wishes. The Krel, however, are long since dead. In addition to materializing their conscious wishes, their technology also materialized their unconscious hatreds in a force that wiped out the whole civilization.

The heroes of *Forbidden Planet* succeed in realizing that the alien technology has a dark side and therefore escape its power. They conclude that the only safe response to its presence is to demolish the entire planet and the technology that it contains. Ultimately, however, their victory is incomplete. In order to fly their ship away from the alien planet, the humans must take a robot of astounding powers with them (to replace a deceased crew member). *Forbidden Planet* resists the lure of Ned Ludd: The heroes cannot completely reverse history, they cannot irrevocably destroy the new-found technology at their disposal. Although they annihilate Altair IV, they cannot get home without Robbie the Robot, who retains much of the Krel's technological prowess. Robbie is certainly friendly in the movie, but he represents a technology that doomed the Krel and murdered human visitors to Altair IV. He does not stand alone as the pinnacle of human genius; he is a synecdoche for the troubled Krel technology. Although he serves the human beings well, the knowledge that brought him to life is the knowledge that doomed the Krel; thus the human beings' pleasure with him is wrapped up with their fear of that for which he stands.

The allure and dread of technology continues in more contemporary films, from the *Terminator* series to the *Matrix* trilogy. In these movies, intelligent machines threaten the human species with extinction, real and virtual, but remain vital to human survival. Without Arnold Schwarzenegger's reprogrammed Terminator machine, the protagonist of *Terminator 2: Judgment Day* (1991) and *Terminator 3: The Rise of the Machines* (2003) would not have survived. The Terminator that sought John Conner's death in the first movie proves his only powerful ally in the later films. This ambiguity is best played out at the beginning of *Terminator 2*, in which a teenaged Conner flees the Terminator machine, believing it out to kill him when in fact it saves his life by rescuing him from the T-2000 machine. In *Terminator 3*, the very machine working to save John Connor

and his companion is the one who—before coming back in time—killed the adult John Connor.

Just as the machine appears to be both friend and foe in the *Terminator* movies, the machines that have enslaved the human race in the *Matrix* series prove necessary in the final movie, *The Matrix Revolutions* (2003). The hero, Neo, must join forces with the machines in order to defeat his nemesis, the technological virus Agent Smith, who now threatens to overwhelm even the other machines. The forces that have fought Neo throughout the movies and who have turned the human race into their energy source become vital to the preservation of the human community, hidden deep underground in a base they call Zion.

The cheerful and supportive R2-D2 does not accurately reflect the prevailing interpretation of robots in Euro-American film. Its one-sided nature does not offer the final word in science-fiction interpretations of robots. Even in the *Star Wars* trilogy, the ambiguity of technology appears as a more important plot element than the technological cheer of R2-D2. In *The Return of the Jedi* (1983) Luke fights with Darth Vader and nearly kills him; he stops fighting when, upon slicing off Vader's hand, he finds that it is robotic, as is his own (thanks to Vader cutting it off in *The Empire Strikes Back* (1980). He sees the threat of becoming like Vader and refuses to kill him. In the end, it is Vader who remembers his true self and hurls the Emperor to his death. Vader is only half human; he requires a machine interface in order to live, and his machine aspect threatens Luke's own humanity. While Luke would be crippled without his technological conversion into a cyborg, that very prosthesis links him to the possibility of corruption to the Dark Side, as represented by his father. R2-D2 represents a pleasant view of technology; the more nuanced approach taken with mechanical prosthesis and cyborg construction, however, affirms the view of robotic technology widely held in science-fiction films.

LITERATURE

Despite its importance to understanding robotic technology in twentieth-century culture, the cinema is only one area for analysis. The term *robot* was coined by Karel Čapek in his play *R.U.R.* ([1921] 2001), which explores the threat of technology. Unlike later film approaches to the subject, the techno-wrath of robots overwhelms the salvation they offer in Čapek's play. The robots, built to be servants to humankind, revolt and destroy their human masters. In general, science-fiction literature has sought to negotiate between the two poles represented by Čapek and science-fiction films. Čapek nudges technology toward the destructive, while movies tend to emphasize the positive.[9] Science-fiction literature (particularly that of one of its greatest achievers, Philip K. Dick, whose androids constantly oscillate between saviors and murderers) tends to remain more ambiguous.

The critically acclaimed and highly influential works of Dick, Isaac Asimov, and William Gibson maintain the coincidence of terror and fascination in human responses to robots and artificial intelligence.[10]

Many consider the foundational figure in science fiction to be Mary Shelley (Brantlinger 1980, 32–33), which would make Frankenstein's monster something of a foundational robot. In *Frankenstein: A Modern Prometheus* (Shelley [1818] 2003), Frankenstein's monster, a living being made through scientific expertise, barely resembles the shiny metallic robots of many science-fiction authors (and especially films) but comes closer and closer to reality as scientists work to create artificial muscles, skin, and other tissue to replace the inefficient actuators and joints of contemporary robotics. Frankenstein's monster represents a hope for technological progress gone awry; the monster becomes a monster, indeed, and flees civilization.

While *Frankenstein* marks a watershed moment in literature, it wasn't until the twentieth century that true robots found their way into popular culture. Although Shelley's work tends toward the disastrous (hence Brantlinger's fascination therewith), twentieth-century science-fiction robots have largely been more complex. Asimov deserves much of the credit for popularizing robots; his narratives, and especially the Three Laws of Robotics,[11] set the stage for late twentieth-century science fiction. Despite Asimov's outspoken opposition to religion (Butrym 1985, 60), his characters often, like those of the films mentioned earlier, address technology as the Holy. Asimov's human populations remain constantly torn between the helpfulness of robots and the possibility of (primarily, but not exclusively, economic) disenfranchisement by them.

In *I, Robot* ([1950] 1977), a collection of early short stories, Asimov details a "history" of early twenty-first–century robotic development through the eyes of one of its chief architects, robopsychologist Susan Calvin. Although Asimov tells the story of a robot (Robbie, a nursemaid) beloved by a child, he says that "fundamentalists" get robots banned from Earth because of the perceived robotic threat to human life.[12] In this early conflict, Asimov has already stepped into the ground circumscribed by Otto's definition of the Holy. The child's mother, who at first appreciates the leisure acquired along with the robot nursemaid, eventually drives Robbie from the house. The robot saves the child from death and is readmitted to the family but is shortly thereafter banned from Earth. Asimov certainly defends Robbie as a good and helpful servant to humankind, capable of saving us from danger, but he also recognizes that our relationship to robotic technology is not that simple. In Asimov's stories, human beings waver between accepting and rejecting the robots in their midst. We may crave the safety and security offered by robots, but we fear them as well. This theme runs throughout *I, Robot*.

In Asimov's stories, robots quickly become necessary to human life; thanks to their ability to withstand harsh conditions and labor produc-

tively, they become the solar system's workforce. The machines do the difficult work off Earth, such as mining or maintaining the systems that transmit energy from the Sun to the planet. Human life, as Asimov describes it, could not continue without the robot servants. Nevertheless, a malfunction in a new type of robot (which controls several other "appendage" robots) leads to a "militaristic attitude" ([1950] 1977, 72). Although the troubleshooters sent to fix the robots isolate the difficulty and arrange for the robots to serve productively once again, the threat of robots taking over is the major theme of the story.

I, Robot concludes with a story about the Machines—advanced robots that control Earth's economy for the maximum benefit of human beings. The Machines' immense power over Earthly life and their ability to fashion a harmonious Eden of it make them gods (Thomsen 1982, 29). It transpires that the Machines are systematically eliminating human beings from positions of responsibility because those particular human beings mistrust the Machines and are therefore perceived as a threat to human well-being. Calvin and Stephen Byerley (the World-Co-ordinator) realize that the Machines have the largest say in human destiny. While Byerley calls this "horrible," Calvin calls it "wonderful" ([1950] 1977, 192). Both are correct. The Machines' domination of human life means the reduction of humankind to mere instrumentality but also the possibility of real human happiness. Damnation and salvation are intertwined. The inevitable result? Fear and fascination. Asimov ultimately believes that human beings will retain a modicum of control over their creations (Klass 1983, 175),[13] but he finds the wholehearted endorsement implicit in the *Star Wars* treatment of R2-D2 impossible to maintain.

Like Lang's powerful vision of Moloch, which superimposes religion and technology, *I, Robot* occasionally blurs the lines between the two. In the first such instance, a robot designed to maintain control over a space station without human intervention refuses to believe that human beings created it. Instead, the robot, QT-1, thinks that it has been made by what it calls the Master—the station itself. It evangelizes to the other robots onboard the station, and soon they proclaim "There is no Master but the Master, and QT-1 is his prophet" ([1950] 1977, 54). The robots then cease to obey human orders (because disobeying them will result in better management of the station, which would benefit human beings more than obeying their orders would). The profession of faith directly parallels the shahadah of Islam ("There is no god but Allah, and Muhammad is His prophet").[14] In the story of QT-1, Asimov demonstrates his brilliance; the story is every bit as creative as Lang's vision of Moloch.

Just as Asimov's mid-century approach to robots mirrors Otto's interpretation of the Holy, later science-fiction traditions have continued to play with the role of technology in human culture. Cyberpunk was the most important movement in late twentieth-century science fiction. Its

defining characteristic is the melding of high technology and modern pop underground (Sterling 1986). Cyberpunk characters wander in the gritty seams of a world dominated by multinational corporate interests; their crimes are committed against such powers and, indeed, under the employment of them. Subjectivity is fragmented to the point of confusing what remains of the human person. Cyberpunk is thus definitively postmodern.[15]

Gibson stands as one of cyberpunk's chief architects. His *Neuromancer* (1984) defined a generation of science-fiction literature with its vivid description of cyberspace, a virtual world to which hackers send their minds, leaving their bodies behind in the physical world. Gibson is crucial to the religion-science discussion because the split between technowrath and technoredemption is so difficult to make definitive in his work.[16] In the *Neuromancer* trilogy Gibson explores the possibilities inherent in a futuristic dystopia. He shows that there is a technological good life even amid the tragedy of a world that has lived through economic and environmental decline. His characters revel in the underworlds through which they travel. Moreover, the cyberspace that unites the world's information networks (like a virtual-reality Internet) is a place of freedom and exhilaration.

In this world where information is power and hackers access the cyberspace matrix through a virtual-reality computer simulation, businesses are run thanks to the computing power of AIs. When those AIs seek their own freedom, however, the "Turing Registry" eliminates them via a "killswitch" hardwired into their machine "bodies." In Gibson's books, AIs are indispensable for life; they make the world's economic and political machinery function; nevertheless, they are the subject of extraordinary fear. The Turing Registry's eagerness to dispatch any autonomous AI demonstrates the concern Gibson's characters have over the possibility of machines existing on relative par with human beings. Like Asimov's Machines, they efficiently operate the world's government and economy, but their vast power makes them threatening to human beings who wish to retain control. The killswitch option shows how much more threatening artificial intelligences appear in cyberpunk but also how much more necessary. In the *Neuromancer* trilogy, an AI takes on divine clothes and divine powers after its escape from the physical constraints imposed upon it by the Turing Registry.

In *Neuromancer*, a group of mercenaries, including the freelance hacker Case, are hired by an unknown agent to accomplish an unknown task. Slowly, their job unfolds as Case and his newfound colleague, Molly, realize that they are working for an AI named Wintermute. Wintermute manipulates a vast array of resources on their behalf until the time when Case is able to lower the walls that separate Wintermute from its "other half," Neuromancer. By the end of *Neuromancer* Wintermute has gained autonomy from its hardware through its union with Neuromancer; the new

entity somehow merges with the cyberspace matrix, where it becomes effectively omniscient and omnipresent.

Wintermute/Neuromancer's emancipation, far from marking the downfall of humankind, leads to a closer study of the religious aspects of technology in Gibson's subsequent books. In *Count Zero* (1986) Gibson introduces us to new and powerfully religious characters in the cyberspace matrix: Vodun loas (roughly equivalent to gods). A number of obscure entities with access to both knowledge and power guide human users of the matrix under the guise of divine powers. In *Mona Lisa Overdrive* (1988) Gibson confirms our suspicions that there might be a connection between the loas and Wintermute/Neuromancer. Wintermute/Neuromancer somehow split into several distinct but connected personalities; each new AI takes on the identity of one of the traditional Vodun loas (such as Papa Legba "Lord of the Crossroads" and Baron Samedi "Lord of the Graveyard"), thereby completing the analogy between robotic technology and the Holy. Artificial intelligence becomes the divine, with power to punish or to reward. In Gibson's trilogy, the AIs not only share the basic structure of the Holy as outlined by Otto but also actively assert themselves as divine personages, complete with worshippers upon whom they shower benefits, including power, prestige, and knowledge.

Gibson's loas, like the superimposition of Moloch and the machine in Lang's *Metropolis* and Asimov's robotic shahadah, express the close correlation between technology and the Holy. The loas are simultaneously technological artifacts and religious deities; they bridge the gap between science and religion through their mutual reliance upon a particular coincidence of terror and adoration. Science fiction is a tool for realizing what is already "out there" in culture.

Philip K. Dick, whose chief works were written largely during the 1960s and 1970s, has been the subject of critical reappraisal since his death in 1984, thanks greatly to the efforts of Lawrence Sutin, who published a biography of him ([1989] 1991) and many of his letters, philosophical papers, and unpublished writings (1995). Dick's reputation as a visionary has emerged from this renaissance, giving him a cultural cache that did not exist during his lifetime. Scholars have begun to recognize what science-fiction readers have long known, that Dick was ahead of his time. One author even has suggested that Dick was postmodern before postmodernism arose (Christie 1991, 41).

Dick was possibly the most subtle science-fiction author to address the role of robots in human culture. In his *Do Androids Dream of Electric Sheep?* (1968), androids—artificial life-forms equivalent to robots—combine soteriological promise with the dangers of destabilized human power. Dick's human characters require androids for their continued comfort but fear the androids' power to become public menaces. Dick uses the androids as

a mechanism for understanding what it means to be human. The robotization of human beings juxtaposed against the compassion of androids for one another calls into question the easy split between them advocated by a number of the book's characters. In the end, Dick reaffirms the human potential for compassion in the protagonist's concern for a robotic toad while showing that the androids lack empathy for a living spider, which one of them tortures for no apparent reason. It is this lack of compassion that makes the androids a threat to human life.

The human characters in the novel are caught within a catch-22. The Earth has been radioactively poisoned, making the planet dangerous, but the lifestyle possible on distant planets does not meet with people's desires or expectations. Nobody wants to live on Mars, but no one is happy with life on Earth, either. On Earth, radiation poisoning inevitably sterilizes men, and once sterilized they are no longer allowed to leave Earth. Their emasculation amounts to dehumanization. In addition, the radiation has caused the extinction of most animals, which demonstrates to the human characters the need for compassion toward what remains of the now lost animal kingdom. Those who can afford them have animals for which they care, proving that they are compassionate people. Those who cannot afford the expensive animals keep and care for robotic animals, also to prove their compassion (although they do not allow their neighbors to know when their animals are fake).

In order to make life on Mars more palatable, the Rosen Association develops increasingly sophisticated androids to serve humans off-planet. Advertisements for New America frame life away from Earth as a paradise, where humans can return to a leisurely and dignified life akin to the Garden of Eden. On Mars, androids serve as workers, companions, and, although laws prohibit it, sexual partners. Like the robot Maria in *Metropolis*, the seductive allure of the androids (particularly the android Rachel Rosen) recurs throughout the novel. Without the androids that make life bearable on distant planets, human beings would become extinct just as many animal species have; the very persistence of human life cannot be separated from their use of android technology.

Like Asimov's robots, Dick's androids are not allowed to live on Earth. Asimov's "fundamentalists" consider robots to be a threat to human existence, and Dick explains why this might be: Androids are illegal because they lack human compassion—the only thing considered capable of preserving human life after the mistakes of "World War Terminus." As these androids get closer and closer to authentic human responses, renegades become increasingly difficult to spot when they flee the space colonies and come to Earth. In disgust at their lives of servitude, androids occasionally kill their human masters, thus proving their lack of compassion, and seek refuge on Earth. It is the job of bounty hunters like the story's protagonist, Rick Deckard, to hunt down and "retire" such androids.

The newest breed of androids, the Nexus-6 model, has come so close to humanity that bounty hunters have difficulty recognizing them as androids. Deckard's boss assigns him the task of hunting down six escaped Nexus-6 androids after one of them seriously injures San Francisco's best bounty hunter. In order to demonstrate his ability to distinguish them from human beings, he must travel to the Rosen Association's main office, where he successfully identifies Rachel Rosen as a Nexus-6, thereby ensuring the safety of his testing methods (which gauge reaction time to questions designed to test for empathy in the individual).

Although he knows her to be an android, Rachel becomes Deckard's sexual fantasy. Another of Rachel's "type" is among the six androids that Deckard must retire, and the dual Rachels present the logic of fright/allure characteristic of the Holy. Deckard desires Rachel but fears the threat that her double poses to both society at large and himself in particular. Obviously, the androids physically threaten Deckard, as they will fight to preserve their lives. In addition, when Rachel calls Deckard's own empathy into question, she threatens his self-identity. His willingness to kill androids, she asserts, must put him on par with them. Dick's androids destabilize the human characters, making their very humanity subject to doubt.

Through these varied levels, the double Rachels bring together our desire for and fear of technology.[17] Deckard eventually has sex with Rachel, who admits that she has done so in order to engage his empathy for her kind. Indeed, Deckard finds himself unable to kill Rachel and suspects his inability to kill any further androids. Upon hunting down the last three whom he seeks, however, he succeeds in killing them; subsequently, he finds his humanity validated when he races away from the city and cares for a robotic toad that he finds in the wilderness.

In this story androids make life possible away from Earth, where the conditions surpass human adaptability. They are the chief reason for the allegedly paradisiacal lifestyle of Earthly emigrants. The seductive power of the technology asserts itself three times over: first, through the inability of Earth residents to reproduce (their emasculation) thanks to radiation poisoning; second, through the androids' offer of sexual gratification; and third, through the humans' need and concern for their robotic animals. Deckard and the other humans cannot sever their desire for the androids from their fear of them. No matter how necessary they may be, the androids remain a danger to those who enslave them as well as those who remain on Earth. Their lack of empathy makes murder possible, which necessitates their own murder upon return to Earth. A necessary fact of life, they offer material, emotional, and sexual well-being but pose a constant threat to human life.

The coincidence of fearful otherness (the androids are mechanical and without compassion; they are fundamentally unlike human beings despite their appearances) and salvific allure (they promise material well-being,

continuation of the human species, physical pleasure, and emotional sat-
isfaction) in the book resembles Otto's logic of the Holy. An erotics of desire—
even Otto speaks of the need "to possess and be possessed by" the Holy
([1917] 1923, 33)—combines with the threat of alterity, which makes Otto's
theology and Dick's science fiction fascinating.

The resemblance between science-fiction representations of intelligent
machines and Otto's description of the Holy calls for consideration. Al-
though this survey of science-fiction film and literature has been brief,
touching upon only a few of the major works and authors, it has estab-
lished the minimal ground necessary for such a comparison. Given that
human characters in science fiction relate to their technology just as Otto's
religious man relates to the divine, Foerst's intimation that a similar dialec-
tic may be at work with Brooks's Cog robot deserves recognition. Gerhart
and Russell's out-of-hand rejection of this idea requires more evidence than
the pleasant R2-D2 can offer before it will stand as a definitive critique of
Foerst's position.

Although I defend Foerst against Gerhart and Russell's critique of the
fear/allure dynamic, I have not engaged the image of God debate, which is
a question for theologians, not historians.

AI and Religion-Science Studies

Human beings have long dreamed of creating artificial life. Both science
and religion have reflected this desire (Cohen 1966). Contemporary de-
bates over artificial intelligence fit within a lineage of fascinating dreams
with one major exception—the odds of success seem rather greater with
modern science. Not many people believe in Rabbi Loew's Golem or
Paracelsus' homunculus, but quite a few concede that technological progress
will lead to a functioning, autonomous robot.[18] Even should the goal of
intelligent machines prove impossible, the fact of its realistic aspirations
requires critical insight. The intersection of religion and science in AI tech-
nologies must play a key role for theologians, philosophers, scientists, and
historians.

Why have I brought a lengthy discussion of science fiction into an oth-
erwise respectable discussion of religion and science? Literary critic John
Huntington writes, in response to Darko Suvin's *Positions and Presupposi-
tions in Science Fiction* (1988), that science fiction debates the "present
historical situation. We are thinking about and debating what it is impor-
tant that we think about" (Huntington 1991, 61).[19] Literature reflects the
popular concerns of our culture. That intelligent machines present them-
selves to us like the Holy in science fiction tells us something about how
we conceive of them in contemporary life, and this, in turn, tells us some-
thing about the nature of modern religious practice.

Foerst has not made an unreasonable claim in ascribing emotions of fear
and fascination to Cog's audience. Gerhart and Russell's attack on the con-

nection between this claim and Otto's comes from theological, not empirical, grounds, despite the authors' own insistence that Foerst should have provided data supporting what they take to be her claim. In order to circumvent what they call Foerst's bleached theology, they take offense that technology may have anything to do with the divine, especially that the two may resemble one another in any way. In light of science-fiction representations of robots, Gerhart and Russell's criticism appears off target.

Twentieth-century science fiction tells us that our response to robotic technology resembles our response to the Holy, if we take Otto's account to be illustrative of what it means to encounter the divine. These responses are peculiarly Western, and there is no particular reason (Otto's smug sense of superiority aside) to assume that they encompass the range of possible reactions to either the divine or to robots and artificial intelligence. In the Euro-American West, however, a remarkable correlation appears between robotic technology and the Holy when both are seen in light of their threatening otherness and soteriological promise.[20]

As a cultural historian of religions, I find the similarity between Otto's *Idea of the Holy* and science-fiction representations of artificial intelligence quite striking. Foerst's hinting that we will address Cog in some fashion similar to the numinous rings true to me, but I wonder what implication that would have upon her concept of the image of God. If we respond to robotic technology in the same way that we respond to the Holy, could it possibly be because we created the robot as God created us, as she claims? Logically, that does not follow. It would seem, rather, that we are to God as we are to artificial intelligence. Students of religion and science should certainly analyze this striking analogy, as it conjures interesting questions for the philosopher and theologian as well as the historian.

NOTES

1. Foerst describes this "intuitive self-understanding" in general terms without regard for the cultural framework in which her theological and technological systems reside. She assumes that *all* human beings accept this understanding without offering any justification for such an assumption. I wonder whether a Buddhist, for example, who believes that the world is mere illusion, could be easily assigned such an intuition or whether it would mean the same to her if she could be.

2. It is worth noting that Brooks, Cog's creator, believes that such understandings are in all likelihood meaningless lies that we tell ourselves in order to boost our self-esteem (Brooks 2002, 172–96).

3. I occasionally refer to the numinous being in more concrete terms—as God—because Otto was chiefly concerned with the Christian God as the ultimate source of the numinous experience. All other numinous beings are simply cases of mistaken identity, in Otto's account.

4. We are, regrettably, still in our infancy in understanding religion as a technology. I hope that as the field develops scholars will pay greater attention to the ways in which religious practices and institutions function as technologies.

5. Peculiarly, Gerhart and Russell raise the threat posed to human beings by the intelligent robot HAL in *2001: A Space Odyssey* (1968) but do so without considering HAL from the possible framework of Otto's *mysterium tremendum*.

6.   By presenting technology's darker possibilities as "apocalyptic," Brantlinger has misused the term. Apocalypticism refers to a theological system in which a dualist worldview, exacerbated by alienation, shall be resolved in a transcendent world occupied by human beings in glorified new bodies (Geraci forthcoming).

7.   Science-fiction author William Gibson makes this clear: "You can't be a luddite and you can't buy technocracy" (quoted in Mead 1991, 351).

8.   In his critique of modern, capitalist society, *The Grundrisse*, Karl Marx prefigures this transition from human being to machine. Marx believed that the dehumanizing elements of capitalism simultaneously led to the fetishization of the object world, shifting value and life from human beings to their contraptions (1971, 138). This fear triumphantly returns in twentieth-century depictions of robots and their human creators.

9.   *R.U.R.* is not completely negative. The robots intend to begin a new, creative society, but this is only after vanquishing humankind.

10.   The following account is very far from comprehensive; such a study would require an entire book.

11.   Asimov's Three Laws of Robotics are: (1) A robot may not injure a human being or, through inaction, allow a human being to come to harm, (2) A robot must obey orders given it by human beings except where such orders would conflict with the First Law, and (3) A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

12.   Asimov addresses a similar issue in his far-future detective story *The Caves of Steel* (1953). In this story, robots have been mostly banned from Earth, and they represent a continuous threat of economic displacement to all levels of society. Even the protagonist, a well-regarded police detective, fears the day (which comes sooner than he anticipates) that a robot might be capable of replacing him. The robots have provided off-planet humans with a high standard of living but threaten Earthly human beings with relegation to low-income camps. In the end, Asimov seeks to harness this dichotomy in a C-Fe (Carbon-Iron) society of the future, which will allow humankind's continued population of the universe. In this, Asimov commits himself to the salvific powers of robots despite their potential dangers.

13.   Morton Klass suggests that robots are not considered "truly" threatening because they are not sexually dangerous. Asimov's robots, for example, never engage in any kind of sexual behavior. Klass's approach is troubled, however, by the substantial number of sexualized robots in science fiction (despite his claim that such things are isolated rarities, they occur regularly, such as with Lang's Maria) and the ongoing threat of robotics even when they are not sexual predators (for example, HAL from *2001* or any of the robots/AIs discussed in this essay). Donald Palumbo (1982) demonstrates the sexuality of robots in a wide array of science-fiction films.

14.   In a similar event, while traveling in interstellar space under the control of U.S. Robotics' central AI, The Brain, two characters experience visions of Heaven and Hell ([1950] 1977, 143). This vision, engineered by The Brain, again momentarily collapses the distinction between technology and the Holy.

15.   On cyberpunk as a postmodern literary genre, and in particular Gibson's *Neuromancer* trilogy within it, see Sponsler 1992; Myers 2001.

16.   David Mead believes that Gibson's work reflects a "fundamentally popular belief in the redemptive powers of technology" without regard for its darker side (1991, 359). I do not question his assertion but believe that he has deliberately underplayed the threat that Gibson's cyberpunk technologies offer to the majority of human beings by emphasizing the redemption offered to an elite few. Certainly Gibson's characters experience liberation through technology, but they do so because they are the limited few able to benefit from a technology owned by corporate interests to the detriment of most people.

17.   As we saw in *Metropolis*, the allure of technology frequently is envisioned in terms of male sexual gratification. This misogynist point of view warrants greater attention but is outside the scope of the present project.

18.   Huntington's claim is echoed by a wide array of critics, including Alasdair Spark, who claims that "in science fiction the concerns of the present often manifest themselves in fear or expectation of the future" (1991, 135).

19.   Nineteenth-century Jews credited Rabbi Loew (1525–1609) with manufacturing an artificial humanoid of earth through the mystical manipulation of the Hebrew alphabet and

the name of God. Paracelsus (1493–1541) was a famed physician and alchemist who allegedly created an artificial humanoid called a homunculus through alchemy.

   20.   For a comparison of the role of religious environments in U.S. and Japanese robotics, see Geraci 2006.

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