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As salvation and fall narratives predominate the arenas of both theology and biotechnology, the author presents here an exploration of the ethical and ecological implications of such narratives as they aim to moderate the relationship of human beings to God, Earth, and each other. There is real evidence for concern over the ecological threats created by the genetic engineering of plants. The “feed the world” biotech salvation narrative might not save humankind from starvation, as it glosses over its own form of idolatry, namely, the worship of the market God. What sort of goodness can be found in or made of “creation,” one might ask, while pondering the problems and potentials arising out of two competing models for ethics, that of Prometheus and that of Gaia.

Lastly I would address one general admonition to all, that they consider what are the true ends of knowledge, and that they seek it neither for pleasure of mind, or for contention, or for superiority to others, or for profit, or fame, or power, or any of these inferior things; but for the benefit and use of life, and that they perfect and govern it in charity. For it was from lust of power that the angels fell, for lust of knowledge that men fell, but of charity there can be no excess, neither did angel or man ever come in danger by it.

—Francis Bacon

The Earth is at the same time mother...
She is the mother of all
For contained in her
are the seeds of all

— Hildegard of Bingen

If one believes a divine power has authorized the radical and spontaneous freedom involved in evolution, through billions of years of slow self-organizing development of plant and animal generations, human beings have recently been countering this creative diversification. Through a habit of dis-creation, our species has presided over the rapid decimation of wilderness, and the erosion of genetic and biodiversity. Unlike the God of Genesis, idolatrous gods of biotech, many fear, are being worshiped through human greed alone. In this paper, I will examine how biotechnology is driven by the unyielding power of a market that exploits and threatens the interconnected generations of creation.

My use of the term “generations” comes from “the generations of heaven and earth” in Genesis 2:4. I propose this term, “generations,” as a metaphor to represent the Earth’s multiple forms of plant and animal life; it is a term that includes birds and ferns, insects and people, in their evolution through time. In a dialogue with science theorist Donna Haraway, theologian of science Ted Peters, Christian ethicist Max Stackhouse, and eco-theologian Sallie McFague, I will examine different strategies for theorizing about biotech “fall and salvation” narratives. The book of Genesis provides a symbolic backdrop for this examination that I will argue, discloses the magnitude of earth-threatening forms of genetically modified plants and the importance of theological ethics in challenging corrupt aspects of biotech industry and its science.

The market as God

In Modest Witness @ Second Millennium, the feminist historian of science, Donna Haraway, emphasizes how technoscience is...
hinged on a “narrative set up of threats and promises”—“fears and certainties of disasters” as well as “dreams of progress” that “promise the fulfillment and restoration of human nature.” This narrative of threats and promises can be found on Monsanto’s webpage that quotes Ismail Serageldin of the World Bank:

Biotechnology could be a tremendous help in meeting the challenge of feeding an additional three billion human beings, 95% of them in poor developing countries.

Monsanto’s “feed the world” propaganda portrays the promise of a Western technological fix for the resource threat of overpopulation.

Using the Marxian troupe of commodity fetishism as a model, Haraway proposes that genetic technology is “…endemic to capitalist market relations…[as] genes displace not only organisms but people and nonhumans of many kinds as generators of liveliness.” As an example of the displacement process, Haraway highlights sociobiologist Richard Dawkins’ construct of the body as a vehicle through which the gene replicates and transports itself. Haraway explains:

Mere living flesh is derivative; the gene is the alpha and omega of the secular salvation drama of life itself. She claims that “fetishes literalize and so induce an elementary material cognitive error. Fetishes make things clear and under control.”

I have found this sense of control to be evident in the agricultural Biotech mantra, “We will feed the world.” The material cognitive errors in this logic, however, become revealed by the evidence. Released in July 1999, a USDA Economic Research Service Study of major transgenetic crops found that these crops, contrary to manufacturers’ claims, did not show any improvement in yield or a reduction in pesticide costs compared to conventional crops.

The genetic map, when fetishized, becomes what Haraway calls a “god trick,” by which it gives the scientist or capitalist a “kind of clarity” or “uncontaminated referentiality.” Haraway reminds us that a gene is not a thing in itself. One too often forgets that bodies emerge along “webs of integration.” This fetishism rings of the old and persistent problem of a Newtonian lens that objectifies matter as composed of passive and isolated entities. In gene fetishism, genes are mistaken for things to which actions might be applied, while their wider ecosystemic interactions are ignored.

In biotech agriculture, the genes might well be considered agents, but they are defined only narrowly in regards to the one engineered effect. One gene is described by Monsanto as being “modified to control the lepidopteran family of insects,” or another as having “tolerance to Roundup® herbicide.”

The broader ecosystemic effects of such genetic modifications, unacknowledged by Monsanto’s gene fetishism, will be discussed below.

The gene fetish must also be understood in terms of market reductionism. Theologian Harvey Cox, in his article, “The Market as God,” finds the following:

...a willed-but-not-yet achieved omnipotence of the Market [where] there is no conceivable limit to its inexorable ability to convert creation into commodities.

Cox describes this as the reversal of eucharistic Transubstantiation, when bread and wine become holy. The “Mass of the market” takes the land once held sacred as “Mother Earth, ancestral resting place, holy mountain, enchanted forest, tribal homeland, aesthetic inspiration…,” and transforms all these complex meanings into one: real estate.

As the commodity, the gene alone becomes the source of value, creating complex “mistakes, denials, and disavowals.” Cox includes the sacred as one of the many denials. Haraway analyzes the denials in terms of Whitehead’s fallacy of misplaced concreteness:

[Gene fetishists mistake the abstraction of the gene for the concrete entities and nexuses.]

This misplaced value is seen operating in the feed-the-world rhetoric. This is another fal-
lacy of misplaced concreteness that does not thoroughly represent the complexities involved in the issues of hunger and overpopulation. A United Nations study done by the Food and Agriculture Organization (FAO), released in April 2000, intentionally excluded any so-called agricultural benefits of genetic engineering from its study because of "ambiguities over the long-term promise, safety and consumer acceptance of this technology." Without studying the potentials of genetically engineered food, the FAO nonetheless found that "growth in global agriculture should be more than sufficient to meet world demand" of a population that will reach eight billion by the year 2030. This statistic stands in firm opposition to Monsanto's alarming claims of a future food crisis.

Mistakes and denials arise in any technology, but the oversights made by corporate claims on the genetic engineering of plants are not the kind of mistakes that arise out of in-depth studies that include the social, technical, organic, and non-human implications. Too few unbiased (non-industry) scientific studies have been done of the risks of biotech transgenetics, for instance. Blindly plowing forward, as the industry has been, into reconfiguring genes across species boundaries is a radical move, considering the history of evolution. Plant physiologist, Celia Dean-Drummond, explains the tremendous difference between genetic engineering and normal evolution:

The ability to move sections of genetic material from one highly evolved species to another is an impossibility in the course of normal evolution.... Most species emerge over a period of a million years, with only a handful taking less than 5000 years. Through genetic engineering, the process has been sped up, now taking a matter of years, or even months.19

Are agro-biotech industry scientists being loyal only to the "market god" and their paychecks? Is this what creates acts of ethical irresponsibility in the biotech corporate arena? In the case of Bt corn, with, for instance, its threat to the Monarch caterpillar, Monsanto scientists remain trapped in a position to convince the public of biotech salvation. They stand upon a vast array of denials. Despite numerous studies confirming Monarch toxicity, Monsanto still denies any real threat to the Monarch. They also fail publically to report or even to consider the evidence of depleting effects that Bt has on groundsoil and its harm to other beneficial insects.

The social context of the scientist produces the type of study and the ethical focus. For instance, Novartis scientists are critiqued for doing only inside-lab experiments and turning a blind eye to the vast environmental impacts of Bt. Angela Hilbeck, from the Swiss Federal Research Station for Agroecology, on the other hand, felt it of import to do a study on the effects of Bt on beneficial insects. She found that "lacewings died after eating cornborer caterpillars" who had eaten the Bt toxin. Hilbeck's study indicates the likelihood of the detrimental effects extending up the food web to insect-eating birds. Seemingly anthropocentric in its ethics and prey to the pressures of market reductionism and gene fetishism, Novartis has been charged with denying other realities: unintended effects on insects, birds, and other animal species; dosage and form of toxin; and effects of season and plant growth cycle on the time of toxin's release.

Most industry scientists cite their good intentions to justify their work: they believe Bt will decrease the harmful effects of chemical pesticide use, or they honestly aim to benefit humanity with increased agricultural

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yields. However, as has been seen, non-industry studies have strongly challenged these positions. Though industry scientists perhaps intend their work for the betterment of life, the market is not a patient entity; and patience is what is needed to limit potentially devastating effects, those unintended consequences that such engineering threatens to release. Ecosystems might benefit if industry science respected the Precautionary Principle:

When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effects relationships are not fully established.

The Precautionary Principle has not been heeded in the production of Bt crops, Roundup-Ready plants, and especially in the application of “terminator” technology—the latter clearly being a technology of market idolatry. Monsanto reverses the message of Genesis 1: “plants and fruit with seed in it.” Through its “terminator” technology, plants without the seed have been created, not to satisfy consumer pressure, nor to feed the world, but to create a sort of double monopolization of production by usurping the productive capacity of both the plant and the farmer.

The market-god drives the agricultural biotech engine in other ways. For instance, as Celia Dean-Drummond has found

...more money has been spent on the development of strawberries that can withstand frost conditions for the spring USA market than on improving the yield of basic sustenance crops, such as cassava, maize or bean plants in the Third World.

Agribusiness biotech’s construction of itself as salvific for humanity falls apart as more and more of its clever inventions serve only the commodity fetish. Harvard professor Richard Lewontin, one of America’s leading geneticists, puts its bluntly:

[T]he feed the world propaganda misleads the public by calling attention to world hunger then using transgenetics not to solve the problem of world hunger but to solve the problem of profit hunger.

Sin, fallen nature, and biotech salvation

In his book, Playing God: Genetic Determinism and Human Freedom, Ted Peters introduces a theological ethic that aims to avert the dangers of biotech. For Peters, sin is an estrangement from God, involving an alienation from other people, the self, faith and love. Peters looks to Marjorie Suchocki’s use of Whiteheadian “relational metaphysics” for a conceptualization of sin. It affirms that we are internally related to both our DNA and our environment.

Sin takes the form of violence that contributes to the ill-being of any aspect of creation, to other people or other creatures or even to planet Earth itself. Sin is rebellion against creation, and thereby, indirectly, rebellion against God.

In this model, sin is mediated through relational structures such as social inheritance. Peters also considers how sin might be genetically determined in the form of selfish genes or violent genetic predispositions and likens this to the Pauline notion of sin transmitted through the flesh. So, he suggests a two-factor determinism, biologically and socially transmitted sin. Despite being determined by DNA and social relationships, human beings nonetheless have the freedom,
Peters argues, to resist the determining agents, being "response-able" creatures.29

I find Peters' application of Suchocki's construction of sin to biotech ethics helpful for examining the problem of biological pollution and market idolatry. For instance, in cases such as the production of Bt plants, where biotech science contributes to the "ill-being" of insects such as lacewings and ladybugs, on up the food chain to their predators, might the genetic engineering of these particular plants be considered a rebellion against God in its danger to creation? As Bt is passed on into the ecosystem through pollen and animal ingestion, the sin becomes embodied in the organic ecosystem and reproduced. As far as Monsanto and its scientists fall prey to the greed and profit motive of the market system, they participate in an idolatry of the market that overlooks the integrity and health of God's creation. The economic system in this sense harbors the corporation's socially transmitted sin of greed that disseminates a biological sin (Bt) into the fabric of Earth's ecosystems.

Christian ethicist Max Stackhouse also conceives of sin as both moral and natural. In his paper, "Ethical, Religious, and Cultural Reflections on the Engineering of Nature," Stackhouse defines ethics as the move to make things work "better." However, this definition depends upon a view of nature that is "less than perfect, not fully living up to potential, and constantly subject to breakdown, is called ‘sin,’ which is not so much an action as a condition."30 Stackhouse recalls the sociological analysis developed by Max Weber, and used by R. K. Merton in his analysis of Protestant attitudes that have driven science in its "study of Nature" for "the greater glory of God and Good of Man."31 While nature beholds the Creator's "order of things," nature has also been considered disorderly and in need of "reordering that could conduce it to ‘good in the light of the Doctrine of Salvation’."32

This view about science and technology supports the construction of a technological salvation rooted in the notion of the doctrine of the Fall. Stackhouse refers to the work of David Noble in The Religion of Technology.

Noble argues:

[T]he…project of Western technology…is actually medieval in origin and spirit. […] [It] was rooted in an ideological innovation which invested the useful arts with a significance beyond mere utility. Technology [was],…identified with transcendence, implicated as never before in the Christian idea of redemption. […] The other-worldly roots of the religion of technology were distinctly Christian.33

Stackhouse agrees with the view that technology can be used by the just for the world's salvation. In other words, the "wisdom and virtue God implanted in humans with the gift of the image of God" can only be possible "after the Fall."34

Following the tradition of the Epistle to the Romans, Stackhouse believes that nature was created good, but fell. He writes:

Disease and plagues wreak terrible havoc on life, and humans by nature are inclined to rearrange their environments to suit themselves even if it threatens whole species.

Stackhouse believes that nature has then departed from "the intent of 'creation,'" from an "intended order that is not perfectly manifest in the way things are." He continues:

The fact of goodness means that residual capacities to improve life are present; the fact of fulleness means that improvement is required, two facts that seem to survive in critical, post-literalist readings of the creation myth. The disciplined use of technology, under God’s watchful eye, in this view, is a grace-filled means whereby residual if ambiguous goodness can make things that are distorted better. In this view, engineers are the physicians of fallen nature and the artisans of a better world, if they view their work under God’s guidance.36

Although every theologian and theorist considered here participates in the journey for a "better world," the good path remains disputed. In this world where what might be called the "sin of anthropocentrism" predominates, why does Stackhouse then need to deem nature "fallen"? Apparently influenced by an aspect of the tradition that Rosemary Radford
Ruether defines as a "quasi-gnostic" deprecation of nature, Stackhouse applies modernist science to "fallen" nature, giving him some sense of salvific hope in human technology. I do not deny that technology can be healing. But, to predispose technology on the view of a "fallen" earth places the source of salvation as human technology. It forgets that the greatest danger to the good and healing powers of creation, to both humanity and the other generations of earth, is not nature itself, but human violence against nature through technological innovations.

"The fact of goodness" can also mean that creation, as it has evolved over billions of years without human technology, harbors a deeper-than-human wisdom of healing, considered by some to be the logos of God, and this must not be overlooked in the path toward a better world. For undomesticated animals, a better world might be one without human technology; for some human beings, a better world means human technology. For God, who created both, a better world might very well involve the best for both, a compromise that I am not sure Stackhouse takes seriously. Human judgement of nature as fallen has created technological travesties and the scientific neglect and abuse of nature. The view of nature as something fallen that needs to be fixed (as if non-human creation wasn’t good enough), I believe, participates in what Ruether calls "an earth-fleeing ethic, which has undoubtably contributed very centrally to the neglect of the earth, to the denial of our commonality with plants and animals...."38

If God guides biotech scientists, as Stackhouse claims, then which God? If not the Market God, then which God? If Stackhouse means the God who seeks well-being for all of creation, and I suspect he does, then how can the technologies of agribusiness biotech examined above be found under God’s guidance?

Prometheus and Gaia

A comparison of Stackhouse’s position with the similar but significantly different argument of Ted Peters will be critical. The scientific attempt at mastery of nature is theorized by what Ted Peters calls “Promethean determinism.” For Peters, human creativity, such as that of biotech, is a power of co-creation; but he makes it clear that this creativity does not make human beings into gods. Peters reconstructs “playing God” through what he calls “Promethean determinism,” based on the image of a “controlling God.” Similar to the kind of clarity produced by Haraway’s god-trick, in Peter’s words, “promethianism tries to play God by taking God’s place, by taking control.”40 However, for Peters, this is a false sense of domination, in the case of biotech science.41

To the contrary, Peters also constructs Prometheanism as potentially salvific:

"Prometheans could determine a future that would bring better health and increased well-being to the whole of the human race."42

However, he also issues a warning:

[Notice] the gene myth’s implicit prometheanism: As Prometheus stole the secret of fire from the gods, we will steal the secrets of life from DNA.... Once we can have the knowledge, we will have the power. And with this power we can do what? Yes, we can do damage beyond measure....43

As shown above, Peters’ discussion of sin proves helpful in the biotech ethical dilemma. His support of genetic engineering, however, is oddly based on a desacralization of nature.

Peters constructs his position in conflict with Jeremy Rifkin, claiming Rifkin’s resistance to genetic engineering as based in “vague naturalism, where nature itself claims sacred status.”44 For Peters, nature is not sacred; God is. A sacralization of nature, for him, reduces God to the level of enzymes, viruses, and sexual reproduction. Peters mounts a stout defense against the idolatries of genetic determinism and material reductionism. Biotech dangers to ecology adhere to additional idolatries, examined above—gene fetishism and market reductionism.

Worship of the power of one gene, for profiteering, creates the denials of moral conscience observed in some practices of
biotech science. However, the reductionist problems of genetic determinism do not necessarily evoke a sacralization of nature as a whole, as Peters assumes. I also do not share Peters' fear that the wider view—that Earth as a whole is sacred—can only warrant a ban on genetically based medicines.

It is interesting that Peters critiques human attempts of control over nature while simultaneously putting on the mask of Prometheanism himself, in the case of biomedical research. The biotech salvation narrative compliments his image of a transcendent God that promises to bring about the new world, where there shall be "neither sorrow, nor crying, neither shall there be any more pain" (Rev 21:4). The model of an otherworldly divinity has been widely criticized for the dilemma of Christian alienation from and devaluation of the body. As Jürgen Moltmann puts it, to distinguish between God and the world "surrenders the world, as godless, to its scientific 'disenchantment' and its technical exploitation." Instead, Moltmann discovers "God in all the beings he has created," and finds God's "life-giving Spirit in the community of creation that they share." Peters does advocate caring for other animals, but he does not consider that the human benefit of biotech pharmaceutical innovations entails a cost to animal habitats. Plants are to be used as pharmaceutical factories in the production of drugs.

Foraging animals, seed-eating birds, and soil insects will be exposed to a range of genetically engineered drugs, vaccines...and hundreds of other foreign substances for the first time, with untold consequences.

Stackhouse elaborates on Peters' model of Prometheanism. Like Peters, he rejects the sacred-Earth model, Gaia. These two topics are introduced as one. Stackhouse claims the two competing salvation narratives in the West are Gaia and Prometheus. Prometheus is described as stealing the power of technology from the gods, making the gods dispensable. Human beings claim divine power by surpassing the mythical deities. Gaia is described as the myth where the Earth is sacred Mother, who can heal herself if left alone, despite "wayward offspring" whose technology resists her "natural wisdom." Stackhouse uses these Greek models to expose "those forms of technology that have lost sight of the actual roots of what drives contemporary theology." He sums up the issue as a conflict between the Gaians, who aim to limit technology by paying more attention to ecology, and the Prometheans, who seek to "seize control of our own evolution" and expand technology so nature bends to human will. Stackhouse maintains that "in either case we have no trans-natural or metaphysical guidance as to what kind of morality might guide us." Stackhouse constructs his position from his historical narrative. Though the foundations of modernity involved a belief in "a divine wisdom, a deep, ethically ordered logos" framing the empirical world, the logos lost "any kind of religious or ethical a priori." Stackhouse calls this "the enthronement of Nature in modernity." Emptied of a righteous God, the natural theology described by Stackhouse ascends as "Mother Earth" or as a morally neutral source, reverting to what he calls "a pagan world where barbarism was quite conceivable, now with technology as our flint." Stackhouse believes that the two movements, "sovereignty of Nature" and

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the “sovereignty of History,” have given standards extrinsic to natural, and cultural norms for moral choice of good or evil; and they propel moral atrocities such as the eugenics of Nazism and Stalin’s ecological disasters.  

Though modernity did lose a “religious or ethical a priori” and created morally atrocious technologies perpetuated by the Nazis and Stalin (and the United States, in the developments of nuclear technology), I strongly disagree with Stackhouse’s assumption that honor for “Mother Earth” is to be blamed for these atrocities, including his labeling of modern industrial evils as “pagan barbarism.” In this section of his paper, Stackhouse’s agenda against “evil” becomes conflated with a rather disturbing need to attack what is “pagan,” interpreted by many to mean “earth-revering,” and it recalls a form of “Christian barbarism,” the persecution and hatred of “other” religions. Though the history of the word “pagan” is too complex to address here, Stackhouse’s use of it is reductionist and dangerous. In the words of Ed McGaa, Eagle

**I believe that Stackhouse, in equating the destructive tendencies of modern science with “pagan” or earth-revering perceptions, has mixed up Prometheus with Gaia, as if Promethean behavior has revered Gaia. The evidence is quite the contrary.**

Man, reverence for Mother Earth means “healing the harms done to Mother Earth.” In McGaa’s assessment, modern industrial technology has been ravaging Mother Earth, not worshiping her. I believe that Stackhouse, in equating the destructive tendencies of modern science with “pagan” or earth-revering perceptions, has mixed up Prometheus with Gaia, as if Promethean behavior has revered Gaia. The evidence is quite the contrary.

Numerous works examining the process of modern scientific disenchantment explain a Christian conceptual influence. Confirming Stackhouse’s position, Francis Bacon ties the scientific revolution to ideas about the fall and redemption. With Eve’s sin, “nature fell out of man’s control,” but for Bacon the fall can be reversed through science, restoring nature to humankind’s dominion. Under scrutiny in the scientific laboratory, nature is put to the test and “forced to yield her secrets.”

Bacon likens the Inquisition to the scientist’s technique of investigation: “disclosing the secrets of nature” by “entering and penetrating into these holes and crevices.” Without any apparent intention, Ted Peters seems to be paraphrasing Bacon as he ends his book, *Playing God*, with this comment on biotech research science:

> Probing the mysteries of the natural realm and becoming privy to her magnificent secret is in itself a worthwhile vocation, needing no additional moral confirmation.

Does “her secret” not also deserve the potential for freedom from penetration? Does any creature have a right not to be probed? Might the generations of life have some integrity that would appreciate protection from biotech invasion? Once genetically manipulated, the change can be passed on in the web of life, hardly the “amoral” action that Peters suggests.

Another orthodox Christian scientist, René Descartes, constructed the model of nature as machine, empty of sanctity and empty of life itself. It has been argued that this mechanistic view is still one problematic in genetic engineering, a science that, when market-driven, “glorifies efficiency,” the optimal trait of machines. Genetic engineers aim to make living beings “more efficient.” This is based on capitalist ideals that exclude feelings of empathy and love from the picture. In other words, it is harder to empathize with a machine.
Hence, Peters’ desacralization of nature seems familiar. Both he and Stackhouse adhere to the age-old Christian anxiety and denunciation of earth-inspired belief systems. They assume that a sacralization of nature means that Earth, if viewed as holy, cannot be altered by human technology, as if a “sacred Earth” would somehow mandate a ban on biotech. However, it has been argued by Carolyn Merchant that historically, the model of nature as a living organism, or as the dwelling place of spirit(s), has indeed promoted more accountability and restriction to technologies. For instance, miners of the 15th and 16th century believed the mines to be the womb of Mother Earth. This did not stop them from mining, but it made them ethically accountable for limiting the destruction of their mining practices.60 Another reference to the notion that a sacred Earth is a protected Earth can be found in Isaiah 11:9:

They shall not hurt or destroy in all my holy mountain, for the Earth shall be full of the knowledge of the Lord.

Gaian ethics

The notion of Spirit in nature, familiar to indigenous peoples, is not foreign to the Judaic and Christian tradition. The Earth viewed as both a living organism and as embodying Spirit can be found in Genesis. Ruach (Spirit) is the Hebrew term for breath and wind (Genesis 1:1). The earth is also depicted as alive and having the power to birth forth the plants and the animals (Genesis 1:11-12). Making scientific technologies accountable to the perception of a sacred Earth does not necessarily mandate an outright ban on biotechnology, as both Peters and Stackhouse fear. It does, however, make the science answerable to the sacred when “probing” its mysterious body. Perhaps it would justly mandate a ban on those genetic engineering practices that obviously threaten the livelihood of ecosystems and their plant and animal species, such as in the cases of Bt and “terminator” technology.

To come to more clarity about an appropriate theological ethics that might guide biotech morals, the model of Gaia should be considered. Gaia, the term for the Greek Earth Goddess, has been revived by contemporary scientist James Lovelock to describe Earth as a living system, as a single, living organism.61 Ruether, in her book, Gaia and God, claims that God need not be simply replaced with Gaia as a focus of worship.62 As I examined above, the notion of a living and sacred Earth is familiar to the Judaic and Christian traditions. “The biblical God and Gaia are not at odds,” but co-mingle with each other.63 Immanent theologies have been developed in the panentheisms and ecofeminist theologies that explore the world as indeed God’s body.64 Belief in “the divine” as rooted in the universe can guide an ethics of deep love and care for Earth.65 In light of the model of Gaia and in contrast to Peters and Stackhouse, Ruether claims that nature may be reshaped, guided by human ideals.

But this reshaping is finally governed by the finite limits of the interdependence of all life in the living system that is Gaia. Ecological ethics is an uneasy synthesis of both these “laws”: the law of consciousness and kindness, which causes us to strain beyond what “is,” and the laws of Gaia, which regulate what kinds of changes in “nature” are sustainable in the life system of which we are an inextricable part.66

The perception of a sacred Earth calls us to understand human participation in divine immanence.

“Playing God” becomes a problematic phrase in this discussion. Again, which God? In the case of the Promethean attempt at the domination of nature, “playing God” becomes a destructive form of anthropocentrism, as it does not recognize or respect the intricate webs of life with their multiple species of beings. Prometheus is modeled on a God that objectifies the Earth; it is an overly transcendent God that cannot speak to questions of cosmic incarnational immanence. However, there is a tradition in Christianity that allows human beings to attempt to be Godlike in another way.
Playing with the sacred

Peters emphasizes that "science should serve technology" in responding to the "needs of the neighbor" to provide greater well-being and "make life qualitatively better for God's creatures." Stackhouse, too, asks whether genetic engineering can live up to "righteous or holy living, and thereby contribute to the common good?" Stackhouse believes righteous technology must work to make things "better." How might this happen in biotech?

Instead of playing God, biotech scientists might benefit the common good by the realization that they are playing with the sacred, the world as God's body, an incarnation of God. Under this model, "to play with" the sacred reality is not "bad" in itself; but when human sin becomes involved, as modeled above by Suchocki, an alienation from God that involves an alienation from love for the neighbor takes over. I believe this is what happens in the market-God model, when biotech is corrupted and narrowed in its study by capitalist systems of money-making. The "institutions, laws, and bodies of market capitalism" have become collective forms of sin, creating unnecessary forms of Earth-exploitative biotechnologies.

Sallie McFague offers an alternative theological ethic that challenges the dangers of "playing God" in the Promethean way. She offers Jesus' life as a prototype for an ethics that emerges from deeply loving God and, hence, loving "all living things." Acting with this creation-loving ethic is what McFague calls "deification" or theosis:

As long as humanity is the only neighbor that is considered worthy of love and prosperity, the generations of heaven and earth will continue to fall—not into sin, but into extinction wrought by human technologies of sin.

[Deification is] a reflection of God's life and an attempt to become like God through loving the neighbor in all creatures. Similarly, Peters calls for "proleptic ethics" as the "most practical to love the neighbor in light of a better future."

For McFague, sin involves selfish accumulation of money, fame, power, and consumer goods. Salvation through deification evokes a sense of consciously caring for the community of creation, loving one's neighbors, loving God by emptying the self and detaching "from distorted goods (money, power, fame) allowing for attachment to genuine goods (God, other people, the natural world)."

As seen in the genetic engineering of plants, the capitalist sin of greed too often moves biotech science to anthropocentrist and corporate interests that harm Earth's habitats and creatures. Consider another example. Transgenic trees and forests are being created in labs at the University of Washington's Poplar Molecular Genetics Cooperative, the Oregon State University's Tree Genetic Engineering Research Cooperative, and the Institute for Forest Genetics in Placerville, California. Who is supporting this research? Those cutting down western forests: Alberta Pacific Forest Industries, Champion International Corporation, Georgia-Pacific West, Inc., Inland Empire Paper Company, Scott Paper Ltd., Shell, and National Forest Service are a few of the institutions generating this research.

What is the goal for these institutions? More efficient forests, such as new cottonwood trees that grow 10 feet a year. Ecologist Jack Turner observes:

Our ideas of "health," "disease," "improvement," and "diversity" are being modified by the concept of efficiency for the sake of greater profits. Transgenetic forests are not about health; they are about money.
Research has focused on herbicide resistance, and resistance to insects and disease. The herbicide glyphosate (Monsanto's Roundup), when sprayed on a forest, will kill everything but the genetically engineered trees.

Roundup is the third most commonly reported cause of illness among agricultural workers in California. [...] It blocks nitrogen fixation in plants, harms fungi, reduces winter hardiness in trees, and retards the development of earthworms. Do we want this stuff sprayed on Western Ecosystems?

Also, Bt is the first choice for a biological pesticide to apply to these trees. Recall that Bt is famous for killing both monarch larvae and other beneficial insects. It is carried by the wind through pollen. Turner asks two key questions:

Aren’t those beetles, butterflies, caterpillars, fungi, rusts, borers, and worms somebody’s lunch? Weren’t genetic engineers required to study ecology at some point in their education?

The alternative type of transgenic forest being explored is the “sterile forest,” composed of “terminator trees,” which are not able to reproduce. Ironically, these forests are described by biotech as “healthier, improved, more efficient.” For whom?

There is a deep-seated dissociation from the earth involved in this story. According to environmental historian Wes Jackson:

At one point in our evolutionary history...our ancestors considered themselves to be part of the natural world, and they were able to experience their surroundings directly and immediately. Humanity’s fall from grace came about when nature began to be regarded instead as an object, foreign and manipulable. Such is our present state of affairs in which “the environment” or “wilderness” is regarded as something out there to be “saved” or “preserved” by one clever invention or another.

For Jackson, evil is “the wanton manipulation of this “other” in order to serve one’s self-aggrandizing ambitions—and in the current economic system in the U.S., this means “exploitation for profit.” He suggests that this is a variation of the old Augustinian idea of concupiscence, or “wanting to have it all.”

Ian Barbour, in Ethics in an Age of Technology, takes a similar position to that of Jackson. He does not advocate a mandate against biotech per se, but a strong ethical direction for it.

[Human beings] can be coworkers with God in the fulfillment of God’s purposes.... At the same time, the biblical tradition speaks of human sinfulness and our tendency to use power to advance self-interest at the expense of others. This tradition is the unbridled drive for mastery and control, and it rejects all attempts to seek technical fixes as a substitute for changes in human relationships and institutions.

Science might benefit from an ethic of love for all creaturely neighbors. As Barbour puts it:

I do hold that we must not treat creatures as mere commodities to alter and use for our own benefit.... [In] place of the anthropocentric and technocratic assumptions expressed in our domination of nature, we should encourage a greater respect for all living beings.

John Cobb and Charles Birch use an organismic model of ethics, similar to the Gaia model, where every being is constituted by interaction with the world. All beings are subjects participating in continuity and novelty. The organismic view is given by the sciences of ecology and biology. Similar to the Gaia model, this model houses an ethics that avoids anthropocentrism. Concern for the nonhuman brings a richness of experience. God is the source of this creative-responsive love.

As most of the genetic engineering of plants has been driven by the greed of the profit motive constructed by global capitalism, several questions remain: How can the genetic engineering of plants work toward worldly salvation, if it is being driven by gene fetishism and market idolatry? Who is “fallen” in this picture? Nature, or human nature? I have examined how the construction of a “fallen nature” can too easily serve Promethean technologies of destruction. Con-
ceiving “fallen human nature” however, re-

mains crucial for theological ethics. It calls

for responsible resistance to human created
evils that compromise the health of earth’s
ecosystems. As long as humanity is the only
neighbor that is considered worthy of love and
prosperity, the generations of heaven and earth
will continue to fall—not into sin, but into
extinction wrought by human technologies of
sin.

Conclusion

Concerning theology, Haraway suggests

we can learn to live without salvation narra-
tives.**- I opt instead for a salvation narrative
that highlights the diverse generations of cre-
ation. In the words of Wes Jackson, “Nature’s
wisdom must have priority over human clev-
erness,” that earth may be a place of hope and
not exploited.** Human beings were created
after the plants and the other animals in both
Genesis and in the book of Evolution. How-
ever, we still have not learned our lessons from
our earth ancestry and its indwelling creative
logos. In this sense, we are far from the neigh-
borly love in theosis. We do not honestly seek
to love, understand, or protect the needs of
nonhuman creatures, with a few exceptions.

For McFague, the problem with the capi-
talist economy (and I believe, the science pro-
duced by it) is that it aims to eradicate what it
sees as the natural enemy, that is, anything
threatening its profit motive. The industry sci-
entists genetically manipulate plants to over-
come whatever gets in the way of highly effi-
cient production of the plants for human
commodification. For instance, insects and
other non-commercialized plants (so-called
“weeds”) are natural enemies. The industry
also promotes its salvific position against
other social evils, starvation and chemical pes-
ticides and herbicides. Again, as I have ex-
plored, evidence abounds to refute the mis-
placed concreteness in the “feed the world”
and “freedom from chemical pesticides” pro-
paganda advertizing the “goodness” of the
industry.** This is a perception of fallen na-
ture constructed by commercial capitalism.

If salvation is about making “goodness”
on earth, then whose idea of goodness? For

Stackhouse, goodness seems primarily to in-
volve human release from suffering. But,

human well-being completely depends on the
well-being of Earth. It should be addition-
ally recognized that the way the generations
were created mandates some suffering.

What is good for the mosquito is not for
the naked arm. The heart transplant
that saves my life comes at the cost of
another’s life.... [T]his is just the way
things are. If we want a world in which
nothing bad happens to any person,
tree, or elephant, then nothing could
happen at all.**

If Stackhouse and Peters believe that biotech
can save by changing the so-called “falleness”
of nature into a world with no more crying,
McFague affirms the suffering aspect of na-
ture. Humanity needs to accept its limits.

God is the belief that hope and not
despair, life not death, laughter not tears
are deep in the nature of things and that
while despair, death, and tears are a
necessary part of reality...they are not
the dominant part.**

For McFague, to bring goodness into reality
is to respond to the call of the oppressed,
which now includes all the generations of cre-
ation being exploited by the moral gaps in the
current economic system.**

Since every technology* involves a cost,
Cobb and Birch suggest that the development
of new technologies must honestly “estimate
as far as possible the cost” and then “decide
what price we are willing to pay.”** Ethics
mandates that the probable benefits outweigh
the costs of the technology. The risks involved
in agricultural biotech are clearly evident for
animals and ecosystems and this will also di-
rectly diminish human quality of life. The
anthropocentric and profit-driven priorities of
industries that pay homage to the market-god
promote benefits that ride upon denials of eco-
logical harm. Again, this could change if the
precautionary principle is enforced in com-
mercial decision-making.

Theologian Catherine Keller, in her ar-
ticle, “Playing God,” agrees that biotech sci-
ence must face up to the ethical challenges
involved in the commodification of life. In-
 deed, we as creatures are going to alter the
shape of creation, but we have a "godlike" responsibility to make "good" for all creatures. As did Stackhouse, Keller believes we can take delight in the goodness involved in the "intensive sense of the common."[59]

We may look to Genesis, as it encourages the earth’s capacity for creation, and the diverse forms of plants with their ability to pass on their own seed, DNA and all, to countless generations. The subjective ability of plants to reproduce and cross-pollinate, is something that cannot be monopolized. Vandana Shiva reminds us:

Living organisms, unlike machines, organize themselves. Because of this capacity, they cannot be treated as simply "biotechnological inventions" or "products of the mind" that need to be protected as "intellectual property."[60]

Patenting control over the gene, or the crop, has its limits. Once the gene is spliced, the change can be passed on into the web of life, unmonitored, invading organic neighboring crops as well as wild ecosystems. Technoscience threatens to create super invasive weeds, resistant to herbicides, pests, and viruses, further decimating the already dwindling biodiversity of Earth.

Earth brings forth plants of every kind. They all are good, but now disappearing. A vast multiplicity of plant species are becoming extinct due to industrial agriculture’s green revolution and the biotech perpetuation of its monocrop agriculture.

For over three and a half billion years, life has been blossoming, diversifying, and expanding into incredible forms . . . In the space of a human generation we have truncated this flowering.[91]

The salvation and fall narratives of biotech agriculture offers more corporate propaganda than life potential. As long as capitalist concupiscence drives the genetic engineering of plants, it is genetic erosion and pollution, the desecration and extinction of soil organisms, poisoning of water, fish, and birds, that will become fruitful and multiply. As a creation-affirming story, par excellence, Genesis evokes an Earth-centered wisdom that might reroute the ethics of biotechnology, one that magnifies the goodness of ecosystem integrity instead of economic growth.

Certainly the generations of all life, once upon a time, evolved with the earth in common. The God of Genesis enabled the good earth to bring forth plants and fruit with good seed in it. As biotech seeds and pollen now pass into neighboring and future generations, we are compelled to question the goodness of creation.

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Endnotes:

1. Ravetz, p. 436.
2. Roberts, p. 46.
4. Serageldin.
6. Ibid., p. 133.
7. Ibid., p. 136.
10. Ibid., p. 142.
11. Ibid., p. 143.
12. Monsanto.
13. Cox, p. 4.
14. Ibid.
15. Haraway, p. 144.
16. Ibid., p. 147.
18. Dean-Drunmond, p. x.
19. Ibid.
20. See <www.monsanto.com>
22. Desser, p. 22.
23. Ibid., p. 23.
25. Desser, p. 25.
26. Dean-Drummond, p. 82.
27. Lewontin, in Jackson, p. 3.
29. Ibid., p. 93.
30. Stackhouse, p. 3.
31. Ibid., p. 6.
32. Ibid.
33. Ibid., p. 8. Also see Noble, p. 9.
34. Stackhouse, loc. cit.; Noble, loc. cit.
36. Stackhouse.
37. Ruether, p. 129.
38. Ibid., p. 139.
41. Ibid.
42. Ibid., p. 93.
43. Ibid., p. 177.
44. Ibid., p. 14.
45. Despite Monsanto's claims that their genetically engineered crops will alleviate agricultural impacts on the land, the Union of Concerned Scientists explain that risks remain detrimental to ecosystems. “The environmental benefit Monsanto claims for Roundup Ready soybeans is associated with the move away from popular herbicides like atrazine, whose active ingredients persist in the environment. Even granting that glyphosate is less toxic than atrazine and generally to be preferred to it, a switch from one herbicide to another does not result in an environmentally sound agriculture. Glyphosate is highly toxic to plants and fish [and] are dissolved in so-called inert ingredients that can also be toxic. More fundamentally, it is highly unlikely that chemical companies that produce herbicide-tolerant plants will ever develop products that cut into their substantial herbicide revenues.... The bottom line: US agriculture remains shackled to intensive chemical use” (Union of Concerned Scientists, “Case Study: Roundup Ready Soybeans”).
46. Moltmann, p. xi.
47. Rifkin.
48. Stackhouse, p. 11.
49. Ibid.
50. Ibid.
51. Ibid., p. 13.
52. Ibid., p. 14.
53. Ibid., p. 15.
54. Ruether, p. 96.
55. Ibid., p. 195.
57. Merchant, p. 168.
58. Peters, p. 178. Peters subsequently qualifies this statement by claiming biotech must aim to make life better for all creatures, a healthy mandate.

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59. Kimbrell, p 65.
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63. Ibid., p. 240.
64. For example, Sallie McFague’s *The Body of God: An Ecological Theology* (Minneapolis: Fortress, 1993).
65. Ibid., p. 5.
68. Stackhouse, p. 12.
69. McFague, p. 175.
70. Ibid., p. 176.
71. Ibid., p. 175.
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74. Ibid.
75. Ibid.
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78. Jackson, quoted in Deffenbaugh.
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