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Toward a Post-Mechanistic Philosophy of Nature

Any discourse takes place within a metaphysical framework. In the Western, or Occidental, intellectual tradition, discourse on the human place in nature has been dominated by the ontology and axiology of Modernity. Constructing a new, more robust vocabulary for ecological discourse necessitates that we surmount the limitations and presuppositions of the Modern *weltanschauung*.

Discourse on the human place in nature involves the study of human beings, the study of nonhuman nature, and relationships between the two. Three central questions arise:

- What are human beings?
- What is nature?
- How are humans related to nature?

In terms of environmental philosophy, Modernity is appropriately understood as answering the first question with Cartesian philosophy of self, the second question with the mechanistic view of nature. The Modernist's answers to these first two questions entail a response to the third: humanity and nature are metaphysically discrete.

Correspondingly, a post-Modern environmental philosophy can properly be understood as the explicit repudiation of these answers. To make this argument, I first recount the defining features of Modernity from the perspective of environmental philosophy, namely, the mechanistic view of nature, and second, anthropocentric philosophy of self. Third, I detail the impact of the mechanistic view of nature on the life sciences, and fourth, the breakdown of

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mechanistic philosophy of biology. Fifth, I outline alternate conceptions of self and nature which characterize a post-Mechanistic environmental philosophy. Sixth and finally, I close by bringing the foregoing discussion into focus through the lens of ethics.

The Mechanistic View of Nature

To conceive of nonhuman nature as machine is the hallmark of Modern Western science (namely, the period of the Occidental tradition beginning with the Renaissance and extending to the present).[1]

Scientists, philosophers, and theologians of the Modern period tended to see nature as an elaborate and exquisite machine ticking on inexorably and indefatigably by the deterministic laws of physics—a theme noticeable in the work of Galileo, Hobbes, Descartes, Newton, and many others. Johannes Kepler applied mechanistic metaphysics to astronomy: "My aim is to show that the celestial machine is to be likened not to a divine organism but rather to a clockwork (qtd. in Mumford 86). Corollary to the mechanical view of nature is the optimism manipulatable ('man,' meaning human) insofar as they are understandable and predictable. The social responsibility of science is often framed in terms of prediction and manipulation of nonhuman nature, and acolytes of the mechanical view exude confidence about the control of nature.

The logic of the mechanistic view of nature entails the conclusion that nature has no intrinsic value. This axiology of nature is ubiquitous in Western religion, philosophy, and science. Whereas pre-Modern paganism worshipped the earth as sacred, Christianity increasingly marginalized the earth as profane. For pre-Christian pagans, many economic activities, such as plowing and mining, were forbidden for religious reasons: cutting and gouging Mother Earth was absolutely unacceptable practice (see Merchant 2–3, and Jackson 66–67). These nuanced but radical changes in religious worldview amounted to a tectonic shift in economics, as previously intolerable activities become acceptable, even commendable (vide White). The Roman poet Ovid lamented the rising tide of the exploitation of natural resources (Figure 1) in *The Metamorphoses*:

> In this age . . . every kind of forbidden crime was soon committed. Purity, truth, and trust all fled, and in their place came deceit and fraud, treachery and violence, and a criminal lust for possessions. Men now sailed on the winds, winds no sailor had known till now; and timbers that had long stood high on mountains now

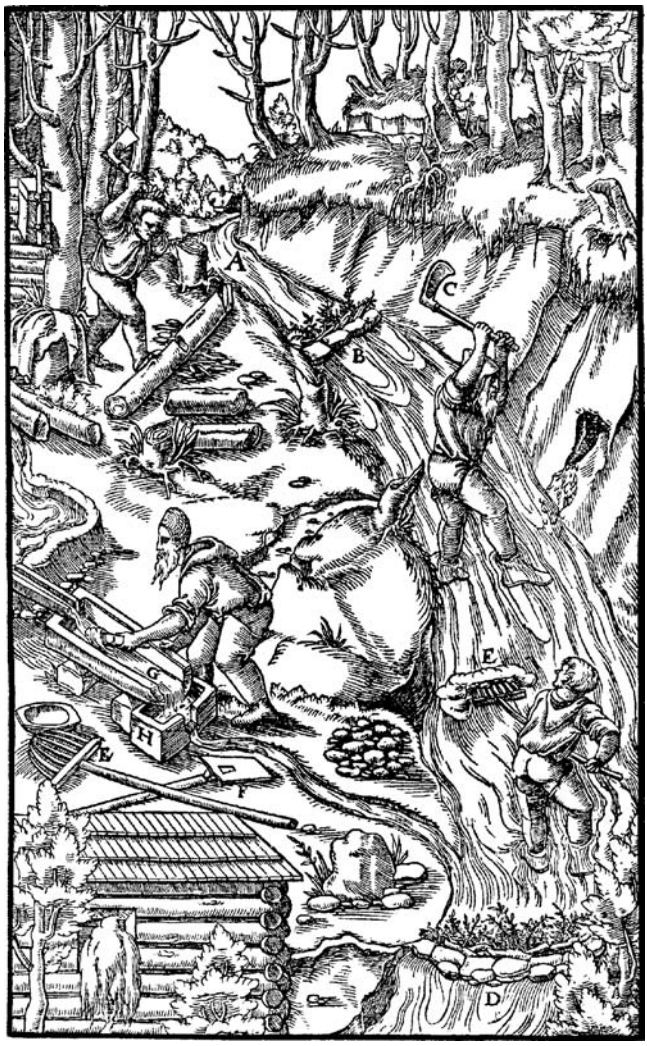

Figure 1. Economic Activity with Enthusiasm: Modernity's New Recognition of the Instrumental Value of Nature (1556 Lithograph, from Agricola 337).

> pitched in foreign sea-swells, while land that once was free as sunshine and fresh air surveyors now carefully marked with boundary lines. Not only was the rich earth dug down into her bowels and brought out the wealth she had hidden there, the source of all evils that she had buried deep in Stygian darkness (op. cit. 12).

With the advent of Modernity, philosophers, physicists, theologians and others began repudiating Aristotelian hylomorphism (the idea that the cause of growth and development of things is embedded in things) in favor of this new metaphysics of "mechanistic materialism" (Merchant 194–205). Using the terminology of Aristotle's four causes (material, efficient, formal, final) (*Metaphysics* 74), the new mechanical view asserted that nature can be exhaustively understood in terms of material and efficient causation. According to the mechanistic view, nature, in itself, has no formal or final causation. The study of material and efficient causation is the proper domain of natural science; the study of formal and final causation—that is, the study of ultimate meaning, purpose, and value—is the proper domain of theology and ethics.

This metaphysical scheme became a defining feature of the Western worldview, reaching its most complete delineation in Isaac Newton's 1687 theory of universal gravitation outlined in *The Mathematical Principles of Natural Philosophy.* On the mechanistic model, only quantifiable (primary) properties—namely, the parameters of shape, size, speed, distance, mass, and time central to classical physics—describe the natural order. Qualitative (secondary) properties such as the sight, tone, taste, smell, and touch—Descartes' piece of wax (*Descartes: Selected Philosophical Writings* 84), Hobbes' "phantasms" (114), and the blue color and sweet scent of Locke's violet (Cahn 491)—radiate from human consciousness. Brute nature itself is utterly devoid of any vestige of quality. The source of quality, of value, of beauty, of sublimity, is human consciousness.

Anthropocentric Philosophy of Self

Connected with the mechanistic view of nature is anthropocentric philosophy of self, systematically outlined by the French philosopher and mathematician René Descartes. Descartes' conception of selfhood is an outcome of his quest for certainty and his goal of laying a solid foundation for the practice of science. In the *First Meditation*, Descartes says most of his beliefs have been acquired through the senses and these are all questionable (*Descartes: Selected Philosophical Writings* 76). Since "there are never any sure signs by means of which being awake can be distinguished from being asleep" (ibid. 77), it is possible that "the sky, the air, the earth, colors, shapes, sounds and all external things are merely the delusions of dreams" (ibid. 79).[2]

Sensory perceptions lack certitude because they are not "clear and distinct." A perception is clear "when it is present and accessible to the attentive mind—just as we say that we see something clearly when it is present to the eye's gaze and stimulates it with a sufficient degree of

strength and accessibility" (*The Philosophical Writings of Descartes* 1: 207). A perception is distinct if "it is so sharply separated from all other perceptions that it contains within itself only what is clear" (ibid. 208). These are intuitive criteria: a thought is clear and distinct if, to the alert subject, it is characterized by strength, vividness, propinquity on the one hand and is unequivocally individuated, defined, and distinguished from other thoughts on the other.

In Part IV of the *Discourse*, the first clear and distinct perception Descartes famously arrives at is *Cogito, ergo sum*—"I am thinking, therefore I exist."[3] Descartes draws the same connection between thinking and existing in the *Second Meditation*: "*I am, I exist*, is necessarily true whenever it is put forward by me or conceived in my mind" (*Descartes: Selected Philosophical Writings* 80). Even if an "evil genius" is deluding Descartes into thinking that he has a body when in reality he does not, and even if mathematical propositions which seem true are in reality false,[4] the very act of doubting secures Descartes' knowledge of himself as a thinking thing.[5] Descartes cannot be deceived, or even wonder whether he is deceived, unless he exists as a mental entity. Thus, Descartes clearly and distinctly exists as a thinking thing (or, to put it another way, his mental existence possesses the property of indubitability).

In contrast, what is significant about his body—and in fact the entire corporeal universe—is that it is *not* characterized by the property of indubitability. This is because, for Descartes, the mind and body each possess a principal, intrinsic property, which makes the mind indubitable and the body dubitable. These principal properties are *thought* and *extension*, respectively. In the *Principles* Descartes says (op. cit. 210): "each substance has one principal property which constitutes its nature and essence, and to which all its other properties are referred. Thus extension in length, breadth, and depth constitutes the nature of corporeal substance; and thought constitutes the nature of thinking substance." The mind is principally a thinking thing (*res cogitans*), and the body is principally an extended thing (*res extensa*).

From these principal properties follow several related properties which distinguish minds from matter (fig. 2). What is important for us to note here is that for Descartes, the fact that mind possesses the attribute of thought makes its existence indubitable, and the fact that material bodies possess the attribute of extension makes them dubitable. While Descartes cannot imagine himself as a nonextant thinking thing, he can imagine himself "as not having hands or eyes, or flesh, or blood or senses."[6]

Hence, while it remains uncertain that he has a body or even that a material world exists, Descartes nevertheless knows he exists as a *res cogitans*. In the *Discourse* IV, Descartes claims:

Properties of Mind	Properties of Matter
thinking (mental)	nonthinking (nonmental)
nonextended	extended
indubitable	dubitable
immaterial	material
active	passive
enduring	nonenduring
unified (indivisible)	composite (divisible)
private	public
autonomous	causally determined

Figure 2. Cartesian Metaphysical Dualism.

> while I could pretend that I had no body and that there was no world and no place for me to be in, I could not for all that pretend that I did not exist. I saw on the contrary that from the mere fact that I thought of doubting the truth of other things, it followed quite evidently and certainly that I existed [. . .] From this I knew I was a substance whose whole essence or nature is solely to think, and *which does not require any place, or depend on any material thing, in order to exist*. Accordingly this 'I'—that is, the soul which I am what I am—is entirely distinct from the body, and indeed is easier to know than the body, and would not fail to be whatever it is, even if the body did not exist. (*Descartes: Selected Philosophical Writings* 36; emphasis mine)

This is the upshot of Descartes' argument: a radical disparity in epistemic certainty entails metaphysical dualism. This is to say that a big difference in certitude makes the mind and body ontologically distinct. The self is the mind, and the essence of the mind is to think. Psychic operations of the mind such as doubting, understanding, affirming, denying, willing, imagining, and perceiving are all manifestations of a singular, unitary entity (ibid. 83).

What is surprising is that these operations have nothing whatsoever to do with the body or the physical world. Responding to Pierre

Gassendi, Descartes says: "I have often also shown distinctly that mind can act independently of the brain; for certainly the brain can be of no use in pure thought" (*The Philosophical Works of Descartes* 2: 212). This disembodied mental entity is the Cartesian self so central to Modernity: "it is certain that I am really distinct from my body, and can exist without it" (*Descartes: Selected Philosophical Writings* 115).

Why does Descartes assert that the mind and body are so radically distinct? We have already touched on the reason: he is operating on an assumption that the essence of a substance is known through the apprehension of some of its properties (see Schiffer, esp. 23). If two substances have differing, even incompatible, properties (or essences), then these are different substances. Thus, Descartes' argument for metaphysical dualism turns on a *principle of discernibility*.

Having identified this implicit premise, we can restate Descartes' argument in valid form:

> (i) For any two objects, *A* and *B*, and property *P*, if *A* has property *P* and *B* does not have property *P*, then *A* and *B* are ontologically distinct substances. (Principle of discernibility.)
>
> (ii) I cannot doubt the existence of my mind (*A*): my mind has the property of indubitability (*P*). (*The cogito*.)
>
> (iii) I can doubt the existence of my body (*B*): my body does not have the property of indubitability (*not P*). (The dream and evil genius conjectures.)
>
> (iv) Therefore, since my mind (*A*) has property *P* and the body does not have property *P*, the mind and body are ontologically distinct substances. (Metaphysical dualism.)

The essence of humans is purely mental. Since the essence of a self is to think, and mental operations are metaphysically independent of the body (or any part of the material world), the human body does not have anything whatsoever to do with human identity.

Mechanistic Philosophy of Biology

How does the mechanical view of nature and anthropocentric philosophy of self play out in the life sciences? Again, Descartes gives perhaps the most clear, concise, and influential formulation of a mechanistic philosophy of biology. Indeed, as the philosopher of biology Ernst Mayr speculates about Descartes, perhaps no one "contributed more to the spread of the mechanistic world picture" (97).

In a 1649 letter to Cambridge Platonist Henry More, composed a year before his death, Descartes writes:

> I see no argument for animals having thought except the fact that since they have eyes, ears, tongues, and other sense-organs like ours, it seems likely that they have sensation like us; and since thought is included in our mode of sensation, similar thought seems to be attributable to them. This argument, which is very obvious, has taken possession of the minds of all men from their earliest age. But there are other arguments, stronger and more numerous, but not so obvious to everyone, which strongly urge the opposite. One is that it is more probable that worms, flies, caterpillars and other animals *move like machines* than that they all have *immortal souls*. (*The Philosophical Writings of Descartes* 3: 365–66)

We can distill Descartes' argument to two premises and a conclusion:

1. Either nonhuman animals are utterly devoid of sentience or they have human-like sentience;
2. Nonhuman animals do not have human-like sentience;
3. Therefore nonhuman animals are utterly devoid of sentience.

We may properly call this argument Descartes' *biomachine ontology*. The big difference between minds and bodies is that bodies are subject to the deterministic laws of physics, to which minds are immune. As material bodies, organisms also operate according to the deterministic laws of physics. To be sure, organic bodies are superlatively intricate and complex: the difference between machines like clocks and animals is that clocks spring from Man's hand and animals spring from God's hand (see *Treatise on Man*, in *The Philosophical Writings of Descartes* 1: 99).

Organisms are mechanical in the sense they operate according to perfect deterministic laws—that is, they operate *automatically*. When a dog chases a partridge, the action is determined by the dog's physiological makeup, and does not have its source in any sort of mental awareness. In a February 5, 1649 letter to Henry More, Descartes says "the movements of animals [. . .] all originate from the corporeal and mechanical principle" (*The Philosophical Writings of Descartes* 3: 365). Indeed, even the human body is "a kind of machine equipped with and made up of bones, nerves, muscles, veins, blood and skin in such a way that, *even if there were no mind in it*, it would still perform all the same movements as it now does" (*Descartes: Selected Philosophical Writings* 119; emphasis mine).

Here, we see that the biomachine ontology is not just a theory of nonhuman animals and human bodies, but an entire philosophy of biology. Descartes addresses only fauna, but his argument applies equally to flora—hence all biota. The biomachine ontology is an integral part of Descartes' overall picture of the world: Nature is a colossal clockwork, ticking on predictably, precisely, perfunctorily.

The assertion that nonhuman animals are utterly devoid of sentience, Descartes admits, is a matter of probability; it is *possible* that nonhumans have some sort of subjectivity analogous to our own (*The Philosophical Writings of Descartes* 3: 365). Nevertheless, other considerations, "stronger and more numerous," trump this eventuality. What are these considerations? One could point to the theological ramifications of granting nonhumans immortal souls, ramifications that Descartes was eager to avoid. Whatever other reasons Descartes had, an important one was that nonhumans do not use discursive language. Animals are not incapable of speech because they lack the necessary physiological apparatus, for "magpies and parrots can utter words as we do, and yet they cannot speak as we do" (*Descartes: Selected Philosophical Writings* 45). No, Descartes writes in a November 23, 1646 letter to the Marquess of Newcastle, "the reason why animals do not speak as we do is not that they lack the organs but that *they have no thoughts*" (*The Philosophical Writings of Descartes* 3: 303; emphasis mine).

Thus, according to Descartes, *a possum is no more sentient than a printing press!* Believing nonhuman fauna are sensate is a prejudice we acquire through experience. In a July 30, 1640 letter to Marin Mersenne,

> As for brute animals, we are so used to believing that they have feelings like us that it is hard to rid ourselves of this opinion. Yet suppose that we were equally used to seeing automatons which perfectly imitated every one of our actions that it is possible for automatons to imitate; [. . .] in this case we should be in no doubt that all the animals which lack reason were automatons too. (ibid. 149)

This is a point not so obvious to everyone. Unsophisticates who go on mundane experience and assume their pets have some sort of subjectivity do not realize Fido and Fifi are insensate automata. "Look how this cat recoils from my scalpel, as though it were in pain!" an informed Cartesian vivisectionist might exclaim. "I know *a priori* this organism has no mind, no mentality. All its movements are causally determined. It cannot *experience* pain. This must an automatic, predictable physiological reaction of *Felis domesticus*."

Although Cartesian philosophy of self has been widely discredited by philosophers, and most pet owners probably think their pet is something more than a biological machine, the biomachine ontology has had a profound effect on our conception of nonhuman organisms, exemplified, for instance, in the practice of factory farming.

The Breakdown of Mechanistic Philosophy of Biology

The radical anthropocentrism of Descartes is built on the coupled pillars of the mechanistic philosophy of biology and the supernatural ontology of humanness. When the radical anthropocentrism of Modernity is viewed through the lens of evolution, however, the edifice crumbles.

Paleontological evidence suggests that there has been an increase in both the complexity and diversity of organisms from the time the first prokaryotes emerged 3.8 billion years ago. Since then, as Edward O. Wilson says:

> Many reversals have occurred along the way, but the overall average across the history of life has moved from the simple and few to the more complex and numerous. During the past billion years, animals as a whole evolved upward in body size, feeding and defensive techniques, brain and behavioral complexity, social organization, and precision of environmental control —in each case farther from the nonliving state than their simpler antecedents did. (187. cf. graph on 191)

Somehow, life has evolved on Earth, and this has been one of the most remarkable events in Earth's history.

Organisms are homeostatic entities, that is, they achieve an internal stability despite the flux of the environment, for a time subverting submission to entropy, for a time stalling the dissolution and disorganization mandated by the second law of thermodynamics.

Homeostasis is an anomaly, as far as the laws of physics go. This means that not only is homeostasis inexplicable in terms of physical laws, homeostasis seems to be contradictory to at least some of these laws. As Charles Hartshorne nicely puts it: "if the physical world in general is running down, life on this planet is a partial exception, there being no evidence that the ascent of life is a mere example of the laws of quantum mechanics, but every reason to think it is partly contrary to those laws" (82–83). Since, according to mechanistic

materialism, there is no purpose, value, or direction in nature, there is no way to account for life or evolution in terms of nature itself.

As the mechanistic view of nature is the Modernist model *par excellence*, it dominated the Victorian worldview. A fascinating study is Charles Darwin's struggle to reconcile the problem of the ascent of life in a purposeless universe. At the end of *The Origin of the Species*, Darwin writes:

> It is interesting to contemplate a tangled bank, clothed with many plants of many kinds, with birds singing on the bushes, with various insects flitting about, and with worms crawling through the damp earth, and to reflect that these elaborately constructed forms, so different from each other, and dependent upon each other in so complex a manner, have all been produced by laws acting around us. (489)

These laws are the laws of evolution and dictate how different life forms emerge. But *why* does this happen? At Cambridge, Darwin was most impressed by English theologian William Paley's work (see letter to Cambridge botany professor J. S. Henslow, July 2, 1848 in *The Correspondence of Charles Darwin* 4, 155, and letter to John Lubbock, November 22, 1859, ibid., 7: 388), and so his early answer to the question of life was the response of Natural Theology: God gives purpose to nature.[7] Nature is a corporeal clockwork designed by God, its every operation precisely determined by God's will. Nature does not intrinsically have the impetus to run; any purposive phenomenon such as life comes from outside nature, from God.

As Darwin's investigations progressed, he began to suspect that nature is not the flawlessly designed super-mechanism he previously believed; the degree of struggle and strife inherent in nature contradicted perfection of design. The various parts of nature often impede and destroy other parts. Darwin, like Voltaire and David Hume before him, could not accept the idea that an omnipotent and omnibenevolent God could design a world with so much apparent maladjustment. In the words of Philo, Hume writes:

> The parts hang all together; nor can one be touched without affecting the rest, in a greater or less degree. But at the same time, it must be observed, that none of these parts or principles, however useful, are so accurately adjusted, as to keep precisely within those bounds, in which their utility consists; but they are, all of them, apt, on every occasion, to run into the one

> extreme or the other [. . .] Rains are necessary to nourish all the plants and animals of the earth: But how often are they defective? how often excessive? (*Dialogues Concerning Natural Religion* 120)

How can one account for disease, famine, and other cataclysms and embrace theism?

As a biologist, Darwin could no longer accept the argument from design in nature. This is explicit in his autobiography:

> The old argument of design in nature, as given by Paley, which formerly seemed to me so conclusive, fails, now that the law of natural selection has been discovered. We can no longer argue that, for instance, the beautiful hinge of a bivalve shell must have been made by an intelligent being, like the hinge of a door by man. There seems to be no more design in the variability of organic beings and in the action of natural selection, than in the course which the wind blows. (*The Autobiography of Charles Darwin* 87)

Within the framework of the Modern mechanism, rejecting perfection of design in nature amounts to denying God's existence. In a letter to Harvard botanist Asa Gray, Darwin says on May 22, 1860:

> I had no intention to write atheistically. But I own that I cannot see, as plainly as others do, & as I [should] wish to do, evidence of design & beneficence on all sides of us. There seems to me too much misery in the world. I cannot persuade myself that a beneficent & omnipotent God would have designedly created the Ichneumonidae with the express intention of their feeding within the living bodies of caterpillars, or that a cat should play with mice. Not believing this, I see no necessity in the belief that the eye was expressly designed. On the other hand, I cannot anyhow be contented to view this wonderful universe, & especially the nature of man, & to conclude that everything is the result of brute force. (*The Correspondence of Charles Darwin* 8: 224)

Six months later he writes to Gray, "I am in an utterly hopeless muddle. I cannot think that the world, as we see it, is the result of chance; & yet I cannot look at each separate thing as the result of Design" (ibid. 496).

Darwin is understandably in a quandary. Without a purposive force like God, why should life and the will to live spring from the vulgar operations of nature at all? A gnat eaten by a swallow and a man killed by lightning are, in Darwin's estimation, "in the same predicament": neither death was designed (predetermined) by God (letter to Gray, July 3, 1860, ibid. 275). To Gray he writes: "If the death of neither man or gnat are designed, I see no good reason to believe that their *first* birth or production [should] be necessarily designed. Yet, as I said before, I cannot persuade myself that electricity acts, that the tree grows, that man aspires to loftiest conceptions all from blind, brute force" (ibid.). He signs the letter, "Your *muddled* & affectionate friend, Ch. Darwin" (ibid.).

The source of Darwin's aporia was that he had been working within the mechanistic paradigm. In fact, on mechanistic grounds alone, there is no reason for the evolution of life to have taken place. As English philosopher Alfred North Whitehead says:

> [A] thoroughgoing evolutionary philosophy is inconsistent with [mechanistic] materialism. The aboriginal stuff, or material, from which a materialistic philosophy starts is incapable of evolution. This material is in itself the ultimate substance. Evolution [. . .] is reduced to the role of being another word for the description of the changes of the external relations between portions of matter. There is nothing to evolve, because one set of external relations is as good as any other set of external relations. There can merely be change, purposeless and unprogressive. But the whole point of the modern doctrine is the evolution of the complex organisms from antecedent states of less complex organisms. (107)

On the mechanical model in which the basic ontological units move predictably and deterministically according to physical laws, there is no reason for the evolution of life to have taken place. Simply put, the evolution of life is inconsistent with the conception of nature as machine; the mechanical view is bad metaphysics for the philosopher of biology and ecology.

Environmental Philosophy: Farewell to Modernity

The Modernist answers the three questions posed at the outset by granting selfhood—and hence intrinsic value—exclusively to human beings, consequently erecting a rigid ontological barrier between

humanity and nonhuman nature. Nonhuman nature, the Modernist asserts, has only instrumental value for human ends.

Conversely, the post-Modernist squarely rebukes the Modernist on each answer.

What are human beings? In the eighteenth century, Hume rejected the immutable, supernatural Cartesian "thinking thing" by suggesting the mind is nothing but a fragmented "bundle or collection of different perceptions, which succeed each other with an inconceivable rapidity, and are in a perpetual flux and movement" (*A Treatise of Human Nature* 252). However, it was Darwin who a century later obliterated the ontological divide between the human and nonhuman by suggesting that all organisms are the result of the same evolutionary processes. A post-Modern environmental philosophy articulates a naturalistic, Darwinian answer to the first question in direct opposition to Descartes: Human beings are the result of evolution by natural selection. Moreover, individual identity is in large part a function of the environment. Selves are not ahistorical, incorporeal souls disattached from the lifeworld. A Hopi Indian in northern Arizona, a Caucasian stock broker in Lower Manhattan, and a Hindu fisherman on the Ganges River all have different identities, because each inhabits a different temporality.

What is nature? Newton made obvious in *The Mathematical Principles of Natural Philosophy* that natural systems operate, at least to a large extent, mechanistically. If they did not, medical science would not have had so much success in analyzing and manipulating biotic function. Animals exhibit fixed behavior patterns, and observing the ratcheting motion of a gecko's tail or the robotic strut of a dove invariably conjures mechanistic metaphors. Even so, the premise that biological systems exhibit mechanistic properties does not entail the conclusion that such systems can be understood solely in mechanistic terms. Given the stochasticity of natural systems and the inability to explain evolution solely in mechanistic terms, nature must have *extra*-mechanistic properties. While detailing an alternative to mechanistic metaphysics is far beyond the scope of the present discussion, there is good reason to assert that the process of the generation of beauty—as manifested in the phenomenon of life—is intrinsic to nature. Nature is, to use the neologism of writer Frederick Turner, *kalogenetic*, from the Greek word 'kalós,' meaning beauty, and the common stem 'genesis,' to generate (99; see also Ferré 340). In terms of nonhuman biota, one of these extra-mechanistic properties is the predilection of living things to express preference. If human selves have intrinsic value by virtue of showing preference, then other biota must also. Human consciousness is *not* the sole locus of valuation. Nonhumans, like humans, have intrinsic value.

How are humans related to nature? Intimately, inextricably. The radical anthropocentrist is guilty of fabricating a false metaphysical divide between the human and nonhuman. A post-Modern environmental philosophy sees the human as entwined with natural processes.

In summary, a post-Modern environmental philosophy asserts that (1) the essence of *Homo sapiens* is contingent on evolution by natural selection; (2) nature has extra-mechanistic properties, including but not limited to kalogenesis; (3) nonhuman biota, in showing preferences and exhibiting beauty, have intrinsic value; and (4) humans are ontologically interconnected in the most fundamental sense with nonhuman nature.

Conclusion: Toward a New Ontology for Ecological Discourse

Our three questions suggest a fourth: How *should* humans be related to nature? In posing this question, we enter the domain of ethics.

If identity, as the Modernist proposes, has nothing to do with the lifeworld, then what is unjustified about pollution or reducing biodiversity? If we tend to believe that the essence of the self is the cogitating soul and nothing to do with the body or the natural world, then what is the moral significance of the natural world? For the Modernist, environmental degradation has no substantive effect on human identity, since the soul exists independently of the physical realm.

However, from an ecological perspective, the arrogance of anthropocentrism is dangerously misguided. As American philosopher David Ray Griffin puts it, "the continuation of modernity threatens the very survival of life on our planet" (xi). Industrialization and the instrumentalization of nature, justified by the fallacy of a human/nonhuman divide, flirts precariously with ecocide. In the grim but prescient words of desert curmudgeon Edward Abbey, "Growth for the sake of growth is the ideology of the cancer cell" (21).

Luckily, with the rejection of radical anthropocentrism, the rationale for asserting that the natural world has little bearing on human well-being becomes ludicrous. If nature is not only not irrelevant, but *necessary* for human flourishing, then natural systems ought to be valued by humans above all else. Thus, navigating safely between the Scylla of immaterialism and the Charybdis of mechanism, a post-Modern environmental ontology reaffirms our intimate organic relationship with the webwork we call nature.

Notes

1. For a characterization of the mechanical view of nature in the context of agricultural ethics, see David Keller and E. Charles Brummer, "Putting Food Production in Context."

2. Ibid., p. 79; cf. *Discourse* IV, ibid., p. 36. This is the "dream conjecture."

3. *Descartes: Selected Philosophical Writings*, p. 36. Bernard Williams refers to this argument as *the cogito*; see *Descartes: The Project of Pure Enquiry.*

4. *Meditations on First Philosophy.* Ibid., p. 79. The "evil genius" or "malicious demon" conjecture has been a rich resource for twentieth-century philosophy of mind: it is the source of contemporary mad scientist/brain-in-a-vat epistemological nightmares, recently, the movie *The Matrix*.

5. "Thinking thing," "res cogitans," "mind," and "soul" are synonymous.

6. *Meditations on First Philosophy.* In *Descartes: Selected Philosophical Writings*, p. 79. Descartes, of course, does eventually claim to know that he has a body and that a physical world exists, but he arrives at this conclusion *a priori*; he demonstrates the existence of God that God is not an evil genius, and since God is no deceiver Descartes can suspend hyperbolic doubt. Since we have a natural (i.e. innate) inclination to believe that sensa come from material objects, material objects clearly and distinctly exist.

7. On the topic of Darwin's early admiration of Paley, see Charles Birch's remarks in "Chance, Purpose, and Darwinism." In Lewis Edwin Hahn (ed.), *The Philosophy of Charles Hartshorne*, p. 51.

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