

Book Review

Ruse, Michael, *The Gaia Hypothesis: Science on a Pagan Planet*, The University of Chicago Press, 2013, 251 pp, \$26.00, ISBN 978-0-226-73170-4

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Not a Fossil Earth

Decades ago, in an adolescent fit of rebelliousness, I stumbled upon the writings of Henry David Thoreau, particularly *Civil Disobedience* (1849) and *Walden* (1854). Respectively, Thoreau's well-reasoned politics and his keen observations of the natural world appealed to my hormone-driven defiance and pacified my unruliness. I thought I knew my Thoreau.

So imagine my gleeful surprise to read this excerpt from Henry David Thoreau's *Walden* recounted in Michael Ruse's *The Gaia Hypothesis*: "The earth is not a mere fragment of dead history, stratum upon stratum like the leaves of a book, to be studied by geologists and antiquaries chiefly, but living poetry like the leaves of a tree, which precede flowers and fruit – not a fossil earth, but a living earth" As it turned out, I knew my Thoreau not at all.

In terms of what we would call today his ecological philosophy, Thoreau anticipated the great scientific synthesis called Gaia theory by more than a century. This was the first of many delightful discoveries I made in my spring-time reading of Michael Ruse's pensive 2013 volume, *The Gaia Hypothesis: Science on a Pagan Planet*.

Michael Ruse's beguiling tale begins with a subtle, but provocative title: the Gaia hypothesis rather than the Gaia theory. Let me explain my deliberate use of the word, provocative, with a bit of history.

Lynn Margulis, late professor of biology in the De-

partment of Geosciences at the University of Massachusetts Amherst and co-progenitor with James Lovelock of contemporary Gaian thinking, was an adjunct instructor during my first year of doctoral studies (1999) at Antioch University New England (AUNE, Keene, NH). Later, as the director of research and conservation at the Marie Selby Botanical Gardens (Sarasota, FL), I invited her to speak to our scientists and the general public about her distinguished career in the field of endosymbiosis: two separate, standing-room-only venues in 2003 to hear this accomplished scholar wax poetic, philosophic, and scientific. She contributed chapters to my two books, *Forest Canopies* (2004, Elsevier Academic Press) and *Gaia in Turmoil* (2010, MIT Press). Further, in March 2004, she graciously hosted a celebratory dinner party in Amherst, MA after my successful doctoral defense and escorted me afterward around the home next-door of American poetess Emily Dickinson, reciting her poetry under a bright moon in crunchy-cold New England snow. "The Silence condescended – Creation stopped – for Me – But awed beyond my errand – I worshipped – did not pray." It was Lynn Margulis who moved me inexorably through it all toward systems thinking.

When I met Lynn Margulis (first at the Carey Institute of Ecosystem Studies in Millbrook, NY in 1993 and later at AUNE in 1999), I was ensconced in the newly emerging field of forest canopy ecology. Scientific American, the National Geographic Society, and others seemed enamored by the so-called "High Frontier," particularly the theretofore undiscovered species and ecological processes aloft among the lol-

lipop-like emergent trees in the world's tropical rainforests. Our tools of access included the French-sponsored "Radeau des Cimes" as well as canopy cranes and walkways: all dramatically photogenic.

It didn't take long, however, for most of us researchers in the world's treetops to realize that the canopy was not a distinctive upper layer at all, but part of an interwoven tapestry of living and nonliving stuff from atmosphere to bedrock. In other words, the entire forest system was engaged in multiple-scale feedback loops from top to bottom and back again. Voilà! No such thing *per se* as a forest canopy, those clever illustrations in high school biology texts notwithstanding. To insist otherwise was to engage in furtive but popular staging that has less to do with science and more to do with grant procurements.

Thus, in the time between my two books, *Forest Canopies* in 2004 and *Gaia in Turmoil* in 2010, my view of forest ecology morphed from a constricted, almost quixotic notion of the treetops to an expansive one under the influences of Lynn Margulis and James Lovelock. I even devoted a final chapter in my dissertation to the implications of my conservation work, linking canopy herbivory to soil decomposition, for Gaia theory.

As it turned out, old-time biologists – Eugene Odum, E.O. Wilson, and others – had counseled us ages ago about the need for consilient approaches to understanding the planet's multi-scale intricacies of life and nonlife. They had been right all along. Ultimately, reductionist thought has proved the wrong direction of understanding for a full portrait of our ancient, biodiverse planet.

Now back to my use of the word, provocative, when referring to Michael Ruse's new book on Gaian thinking.

Lynn Margulis and James Lovelock, along with a burgeoning army of scientific and popular converts, helped to revolutionize the Gaia *hypothesis* of the 1960s and 1970s into a robust, widely recognized Gaia *theory* in the early years of the 21st century.

Unfortunately, despite 251 pages of otherwise discerning text, Michael Ruse leaves off a large number of supportive researchers and educators plainly active

in the "camp" of Gaia theory: thinkers such as David Abram, Bruce Clarke, Eileen Crist, Stephen Schneider, and Mitch Thomashow. Others, such as Stephen Harding and Tyler Volk, appear as mere glosses.

Further, he does not acknowledge the pivotal gathering in October 2006 outside Washington, DC of natural scientists, social scientists, philosophers, theorists, technologists, educators, and even musicians (including Paul Winter of *Missa Gaia* fame) entitled "Gaia Theory: Model and Metaphor for the 21st Century." Hosted by the Northern Virginia Regional Park Authority and George Mason University, the conference brought together professionals and the public in an interdisciplinary dialogue to examine Gaian thought and practices for understanding life on Earth. My 2010 book, *Gaia in Turmoil*, co-edited with noted scholar Eileen Crist with incisive contributions from some 30 scientists and educators, was an upshot of this impressive gathering. Note the "model and metaphor" reference in the conference title, a point to which I will return shortly as I close this essay.

So far as I can tell, however, the turning point for Gaian thinking occurred in 2001 when more than 1,000 scientists attending the landmark meeting of the European Geophysical Union in The Netherlands signed the Declaration of Amsterdam. That important document on global environmental changes stated unequivocally:

"The Earth System behaves as a single, self-regulating system comprised of physical, chemical, biological, and human components. The interactions and feedbacks between the component parts are complex and exhibit multi-scale temporal and spatial variability. The understanding of the natural dynamics of the Earth System has advanced greatly in recent years and provides a sound basis for evaluating the effects and consequences of human-driven change."

At that point in July 2001, it seems that the Gaia hypothesis matured into Gaia theory. Still, like his omission of key thinkers, Michael Ruse excludes this crucial stage, advertently or inadvertently, thereby diluting his message about Gaian thinking. In his preface, he states explicitly that *The Gaia Hypothesis: Science on a Pagan Planet* "is not really a book about Gaia. It is rather a philosophical and historical meditation on the nature of science itself, one that uses Gaia as its

focus and as a tool to explore broadly important questions.” But this unconvincing disclaimer seems much like calling a book *Darwin’s Hypothesis* and then leaving off the contributions of Asa Gray, Ernst Haeckel, Thomas Henry Huxley, and Gregor Mendel – and making no reference whatsoever to the 1858 meeting of the Linnean Society during which were read the joint papers by Charles Darwin and Alfred Russel Wallace. My point is not to establish an exacting parallel between the theory of evolution and Gaia theory, but instead to note that both lines of thought relied upon pivotal gatherings of their principal players to launch the hypothetical into the theoretical.

In sum, the title of Michael Ruse’s book begs the question: why didn’t he name it instead, *The Gaia Theory*? For me as a Gaian scientist, it’s a prickly throwback, almost like backpedaling or even casting down the gauntlet, which is never explained directly. Only at the end, in the final paragraph of the book, do we find a hint of the reason: “Hence, the Gaia hypothesis was doomed to failure.” Hence? As in foregone conclusion? For a book that’s not supposed to be about Gaia, this disappointing, even vacuous closing censures Gaia theory with a disingenuous sputter. All along, as it turns out, Michael Ruse is a suspected ferret in the chicken coop of debate about hypothesis versus theory.

I found a second aspect of his title equally provocative: the subtitle, “Science on a Pagan Planet.” This time, however, Michael Ruse explains – though not with complete satisfaction – his choice of the word, pagan. He devotes large sections of the book to the topic of paganism – part of his preface, an entire third chapter, a substantial portion of chapter six, other references here and there – weakly tied together in what reads like the sin of association. If Gaian thinking is embraced by such outliers as Timothy Zell (aka Oberon Zell-Ravenheart, an odd self-proclaimed “wizard” of deep ecology) and other New Age prophets, then Gaian thinking must be flawed in some fundamental fashion. In a comparative vein, does any highly regarded thinker suggest that, since the biological concepts of natural selection and “survival of the fittest” were embraced by advocates of eugenics, racism, and Nazism, then Darwin’s theory of evolution must be a defective ideology on some fundamental level? Tedious nonsense in an otherwise enlightening text. Michael Ruse’s book would have been better served if he had devoted these same critical pages alterna-

tively to orthodoxy rather than fringe. At the outset, I had been reassured by something the author promises in his preface: “Understand, therefore, that I speak of Earth as a ‘pagan planet’ precisely to highlight its vibrancy, its life, and its value that stems from this.” Yet, at the end, he fails to deliver on this eloquent promise.

My reading of Michael Ruse’s book was haunted by these two components of his ill-chosen title: his willful reference to Gaia hypothesis rather than Gaia theory, and his dogged association of Gaian thinking with some clownish (perhaps even distasteful) sense of paganism.

Gaia theory is, appropriately, both metaphor and model for our 21st century view of life and nonlife on Earth, “a mote of dust suspended in a sunbeam,” to borrow from Carl Sagan’s *Pale Blue Dot: A Vision of the Human Future in Space* (1994, Random House). Gaia theory, which holds that Earth’s physical and biological processes are inextricably bound to form a self-regulating system, is paradigmatic for our Epoch (please let’s stop referring to the so-called Anthropocene, a span of geological history lopped off superciliously and unadvisedly from the Holocene) plagued by biodepletion and human-accelerated climate change. The words, metaphor and model, can be incarcerating terms because Earth is much more than either can describe. It’s more than a figure of speech. It’s much more intricate and far-reaching than any existing equation, experiment, simulation, or ontology. But attributing both concurrently to Gaia theory is saying appropriately that the whole is greater than the sum of its parts. And it’s probably as political a statement as one can offer in the sciences today: Gaia theory is not reductionist, not mechanistic, not “a mere fragment of dead history, stratum upon stratum”

These two key points notwithstanding, Michael Ruse’s book, *The Gaia Hypothesis: Science on a Pagan Planet*, is a thought-provoking read, most of which I found scholarly and intriguing. But it’s only a start for a necessary dialogue on Gaian thinking and the nature of science: sometimes lucid and penetrating, at other times irksome and lofty. Hylozoism, the belief that Earth is an organism, is a term that Michael Ruse claims extends back to the transcendentalists. But, surely, it’s a much more ancient idea, reaching back through St. Francis of Assisi’s “Canticle of the Sun” to Greek philosophers such as Heraclitus and the Stoics.

Michael Ruse concludes his book by claiming almost snappishly that Gaian thinking's "failure as science is balanced by success as philosophy." Then, in his last lines, he states, "Whether science likes it or not, the vision lives on." Through this meditation on the nature of science with its focus on Gaian thinking, one point remains doggedly clear: the vision of James Lovelock, Lynn Margulis, and so many others in the Earth-as-living-system camp has matured and broadened its applicability to multiple fields of science since the 1960s and 1970s. That vision confirms humankind's almost-innate, long-standing belief that Earth is not a fossil planet but a living world, animate, bejeweled, and watery in a far-flung corner of an ever-evolving cosmos.