

Michael Ruse, *The Gaia Hypothesis: Science on a Pagan Planet* (Chicago and London: The University of Chicago Press 2013), 251 pp.

Here is the riddle: how could the dire Gaia hypothesis endure despite repeated onslaughts from the scientific community? In discussing its history, Michael Ruse argues that the Gaia hypothesis survived because it tapped into a deeper history of ideas about the earth as a whole – ideas that appealed to an audience outside the narrow world of professional biologists.

The Gaia hypothesis has generated a stream of intense debate since James Lovelock and Lynn Margulis put forward their idea in the early 1970s. The hypothesis hinges on the premise that everything happens for a purpose: namely the good of an Earth that has the attributes of a giant organism. Scientists mostly agreed that this was not the case, and biologists were particularly stern in their rejections. The larger public, however, found the Gaia hypothesis not only convincing, but spiritually and intellectually uplifting, to say the least. To scientists' dismay, Gaia became for many a new way of understanding and healing the Earth.

Starting with his articulation of this schism, Ruse goes on to investigate the nature of science itself along with the deeper history of 'the pagan planet' – the term favoured by organicist thinkers since ancient times. Beginning with Plato's *Timaeus* along with Aristotle's

Metaphysics and Cicero's *De Natura Deorum*, Ruse offers a tour de force of teleological philosophy of science, including discussion of works by Nicolaus Copernicus, Galileo Galilei, René Descartes, Isaac Newton, Johannes Kepler, Friedrich Schelling, Charles Lyell and many more. There are also chapters dedicated to the mechanist and organicist philosophies of the 19th and 20th centuries, including a section about 'Harvard holism', which occurred long before the term 'holism' was coined. Ruse devotes about half of *The Gaia Hypothesis* to discussing how books on these topics talk to each other before returning to the Gaia case.

Lovelock and Margulis may at one point have been exposed to some of this history of organicist ideas, perhaps in an undergraduate course or a similar setting, though Ruse provides no evidence to that effect. Ruse also ponders whether the audiences that came to embrace Lovelock and Margulis' ideas, such as the counterculture, may also have been under the influence of such ideas, though Ruse hardly provides any evidence for that either. What he claims is that Lovelock and Margulis should be applauded for revitalizing these old philosophies and making them relevant for our current science and environmental affairs. In the process of making this argument, he explores the cultural cartography of science and pseudoscience, and investigates how the boundaries of science are sought out in complex entanglements with the political and cultural forces of our time.

One of the likable aspects of Ruse's book is that he does not come down on either side of the Gaia-divide. He is surely sympathetic to criticisms from the biologists who argue that the Earth cannot be an organism, but he also recognizes the virtues of the philosophical trajectory from which the Gaia hypothesis is the latest outcome. Both adherents and opponents of the Gaia hypothesis will, in reading the book, find that they have been heard, understood and appreciated. Moreover, the science-illiterates (and the Lovelock acolytes are definitely among them according to the Gaia opponents), will find that Ruse lays out complicated arguments in an accessible, elegant and engaging style.

One of the problems with the book is that Ruse has overlooked literature on the history of the Gaia hypothesis, most notably John and Mary Gribbin's biography *James Lovelock: In Search of Gaia* (2009), and articles co-authored by Lovelock and Margulis that would have shed light on some of their shared scientific views, such as 'Ecological considerations for space colonies' published in *Bulletin of the Ecological Society of America* (1976). He has also overlooked scholarly support for the Gaia hypothesis such as Eugene Odum's 'Biosphere 2: New kind of science' published in *Science* (14 May 1993). Apart from a personal interview with Lovelock, Ruse has not done archival work or tracked down intramural documents that might have shed light on the entangled bank of Gaia scholarship. On the other hand, the book is sprinkled with references to Ruse's own work. One would have expected an author as experienced as Ruse to put in a bit more practice before playing the keyboard.

As a result, *The Gaia Hypothesis*, for all its grand history of philosophical ideas, lacks a more detailed social history of Lovelock and Margulis's life and work. They both had a lifelong commitment to space exploration, for example, and one is left wondering if seeing the Earth from outer space was as important to the conceptualization of Gaia as Lovelock himself claimed. The spaceships and imagined colonies they both admired were designed by ecologists as self-regulating cybernetic systems. These were envisioned as a means to maintain the chemical components of the atmosphere through negative and positive ecological feedback loops that provided comfortable living conditions for the astronauts. This raises the question of whether or not the Gaia hypothesis basically postulated Earth as a giant spaceship, complete with a self-regulating system that maintained climate and chemical compositions comfortable for living organisms. Such an alternative history of the Gaia hypothesis would contradict Ruse's emphasis on placing it within the pantheon of history of philosophies.

The Gaia hypothesis was met by not only scientific but also ethical objections, another

topic Ruse hardly explores. The suspension of humanist ethics in favor of biocentrism was at the heart of Lovelock's thinking when he argued that humans were 'pollution' spreading 'like a disease' threatening to kill Gaia. Environmental activists such as David Foreman and Christopher Manes took this anti-humanism seriously. By the late 1980s one could observe them taking part in heated arguments on whether AIDS was Gaia's solution to population growth.

The trained historian of science will surely find this book disappointing. Let's hope philosophers and Gaia enthusiasts will enjoy reading it.

Peder Anker
New York University