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Essay Review

Lessons from the Gaia controversy

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The Gaia Hypothesis: Science on a Pagan Planet, Michael Ruse. University of Chicago Press, Chicago (2013). 272 pp., Price: $26.00 cloth, ISBN: 9780226731704

Humans have a primordial desire to have a pivotal place in the Universe; a place that gives meaning to their lives. It flourished in ancient Greece, although traces of this are found even earlier in recorded history. Hesiod's account of creation and the birth of the gods, written around 700 BCE, sets the stage.

> First of all Chawos [Gap] came into being. But then Gaia broad-chested, always the unshakable seat of all the immortals who hold the peaks of snowy Olympus, and dark Tartaros in the recesses of the wide-wayed earth, and Eros, the most beautiful among the immortal gods, loosener of limbs, who subdues the mind and prudent counsel in the chests of all gods and of all men. (Hesiod, *Theogony*)

Aristotle solidified the pride-of-place of humans by locating the earth at the centre of the Universe and then ranking humans the highest of the animals because we are rational. For him, the essence of humans was a "rational animal".

Our pride-of-place has taken a beating, however, at the hands of science over the last seven hundred or so years. Few have captured this fall from grace more succinctly and eloquently than Sigmund Freud in his 1889 *Introductory Lectures on Psychoanalysis* (Freud, 1979):

> In the course of centuries the naïve self-love of men has had to submit to two major blows at the hands of science. The first was when they learned that the earth was not the centre of the universe but only a tiny fragment of the cosmic system of scarcely imaginable vastness. This is associated with Copernicus … The second blow fell when biological science destroyed man's supposedly privileged place in creation and proved his descent from the animal kingdom and his ineradicable animal nature … But human megalomania will have suffered its third and most wounding blow from the psychological research of the present time which seeks to prove to the ego that it is not even master in its own house, but must content itself with scanty information of what is going on unconsciously in its mind (pp. 284–285).

Nonetheless, there persists the primordial desire to be more than an animal that shares many characteristics and behaviours with other animals. There is a desire to have a more significant place in the grand scheme of things, as the extensive literature on the meaning of life in a scientific age suggests. Some people attempt to detach the meaning of life from science, as Pope Francis recently did:

> The Pope told an audience of religious leaders from different faiths that the human and natural sciences provide us with an "invaluable understanding" of aspects of our existence. But he said the disciplines cannot satisfy the "fundamental" question about why we exist. "They cannot satisfy the deepest longings of the human heart, they cannot fully explain to us our origin and our destiny, why and for what purpose we exist …". (As reported in the British Newspaper *The Telegraph*: September 17, 2010)

Others find science is the foundation for the meaning of life, as John Stewart does in his 2010 article, "The Meaning of Life in a Developing Universe" (Stewart, 2010). For him new developments in evolutionary theory suggest a way to imbue human life with meaning and with a significant role in the universe. As history shows, and the remarks by Pope Francis underscores, religions have often fulfilled the desire and for many continue to do so, but in the Anglo-European world fewer and fewer people find religious conceptions of reality fulfilling (see Joseph Cambell's *The Hero with a Thousand Faces* (Cambell, 1968) for one tracing of the religious basis for the meaning of life).

Against this background, the phenomenally positive reception of James Lovelock's 1979 book, *Gaia: A New Look at Life on Earth*, in the Anglo-European populace is not surprising. Lovelock had

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introduced Gaia in a 1972 paper in the journal *Atmospheric Environment* but it was the book that captured the attention of the populous and the extreme ire of scientists. Lovelock's hypothesis views the earth as a superorganism—much like a colony of social insects—where individuals are linked to act as one for a common good. Honeybees, for example, are genetically programmed to work together as a community and the genetic structure of the hive (a worker honeybee shares the majority of her genes with her sisters) makes such co-operation evolutionarily advantageous.

Michael Ruse skillfully dissects the political, social and intellectual dynamics of this differential reception. He begins with two stage-setting chapters; one explaining the Gaia Hypothesis, the second the paradox of the reception of Gaia. It is on this second that his historical story focuses most. There are two elements to the paradox and Ruse explores them both in detail. One part of the paradox is that the key early advocates of Gaia—James Lovelock and Lynn Margulis—were well-respected, established scientists. Margulis was even a biologist; she knew organisms well. So why did the scientific community from the outset pillory the Gaia Hypothesis? The other part of the paradox is why the general public embraced the Gaia Hypothesis. As I have suggested they embraced it, in part, because of a primodial desire to be a meaningful entity in the universe; Ruse provides a different, complementary, reason from the one I have suggested, one rooted in social dynamics.

With this background, Ruse begins his historical journal. As one might expect, it starts with classical Greek philosophers, especially Plato and Aristotle. After all the word Gaia (γαια) is a variant of the Greek γη (ge) meaning "earth". And, as Hesiod, in the quotation above explains, Gaia, Tartaros and Eros emerged from Chaos at the dawn of the Universe. Although mythology, Hesiod's *Theogony* gives voice to our primordial desires and was enormously influential in the Greek construction of the world of the gods and humans. Ruse sketches the views of Plato and Aristotle, highlighting the key difference between them. For Plato the essences of things (that which makes them what they are) exist in another realm—the realm of the forms; things are what they are because they are copies—imperfect copies—of their form. For Aristotle, the essence of things resides in the things themselves; there is no external realm in which the forms exist. Plato is more important to this story, even though Aristotle was far more influential in other areas. Both embraced teleology in nature—there is purpose in nature: ends and goals—but Plato's philosophy also embraced a profound unity of everything; a unity that involves a unifying consciousness grounded in the ethereal world of the forms. Aristotle's unity was much weaker; he accepted that body and soul are one, with the soul animating the body—a view known as hylomorphism—but thought there was no world of souls or world soul. Aristotle's unity came from a Prime Mover but that view plays little role in Gaia—past or present.

Plato's influence on the Gaia story is mediated by one of his greatest interpreters, the philosopher Plotinus, whose, *Form of the Good* has the central place in Ruse's narrative., providing as it does three features: the One (all is connected), the Intellect and the Soul. Ruse provides many more fascinating details but this is the essence of the beginning of the journey.

From the Renaissance onward, teleology has been under attack. Science took a mechanistic turn during this period, which Ruse traces well. Scientific explanations take the form of understanding the ways in the physical machine, the Universe, worked. Machines do not have purposes, goals, ends; they function purely in terms of natural law. Organisms were always difficult on this view; they really did manifest purpose. The physical world seemed more amenable to a mechanistic approach but as Ruse points out there were always controversial exceptions. Copernicus, for instance, was deeply influenced by Platonism, and Newton and others believed in invisible forces that acted at a distance (magnetism, which predated Newton, is another example). Invisible forces seemed more occult than mechanistic, as did many of the properties and forces in contemporary quantum mechanics. So, teleology seems to lurk in some form in some part of the mechanistic view of the physical world, even though it is minimal and the spirit of mechanism dominates modern physics and chemistry.

Organisms seemed less amenable to a mechanistic explanation until Charles Darwin published *On the Origin of Species* in 1859. Ruse devotes a chapter to this pivotal concept in the *Gaia Hypothesis* and to the controversies past and present over the nature of organism.

In the first 60 pages of his book, Ruse has firmly set the origin of the idea of Gaia with the ancient Greeks, especially Plato, has exposed its holistic and teleological elements, and has contrasted the mechanistic science arising from the scientific revolution of the sixteenth and seventeenth centuries, with the holism and teleology of Gaia. There is more to be said about mechanistic science, especially in the context of biology; hence, he returns to it in Chapter 4. But that is an interlude in his narrative. The backbone of the story traces the influential ideas and individuals from the eighteenth century to the present. This narrative begins with Immanuel Kant (1724–1804) but it is the idealist philosophy of Joseph Schelling (1775–1854) that really marks the point of departure. Schelling was deeply influenced by Plato, especially Plato's Timaeus, on which Schelling wrote a 58-page essay when he was just 19 years old (Schelling, 1794). Accepting the framework of Plato, specifically the Plato of the *Timaeus*, Schelling held that things and ideas are one—indivisible—which renders his philosophical framework completely holistic; it is also imbued with teleology but it is his holism that unifies the narrative from then until today. Rudolf Steiner, the founder of the Waldorf schools, was explicit about the influence of Schelling on his Neo-Platonic, holistic thinking. According to Ruse, however, the completely essential link in the chain from Schelling to today is Herbert Spencer. Ruse traces the ideas of many contemporary scientists to the influence of Herbert Spencer. A potent anecdote underscores his overall claim. In the page before the introduction, Ruse writes:

> Finally, the opinion of Herbert Spencer expressed by Edward O. Wilson dates back to 1982, when I first met Wilson and expressed shock and horror that he not only had a picture of Spencer on his wall but displayed it more prominently that that of Charles Darwin. (p. xiv)

What Wilson—one of the world's leading contemporary entomologists and experts on biodiversity—retired from Harvard University—said on that occasion occurs later—on page 116: "'Great man Mike!' he said to me, 'Great man!'" Ruse sees the influence of Spencer nearly everywhere: on the Swiss-born ichthyologist Louis Agassiz, the population geneticist Sewall Wright, the evolutionary entomologist Alfred Emerson, the paleontologist Stephen J. Gould to name just a few.

The scientific conflict about Gaia, with James Lovelock and Lynn Margulis being the most prominent expounders and advocates, is interestingly chronicled in Chapter 7. The captivating narrative that Ruse provides from chapter 1 through chapter 7 is all a prologue to the central question raised at the beginning of the book and tackled in chapter 8: why was the view of two accomplished and prominent scientists so summarily rejected—indeed vilified—by the larger scientific community and yet embraced by the public? Although Ruse accepts the complexity involved in scientific controversy, including this one, the fundamental element is easy to state: