

Meaningful Earth

An exploration of the hermeneutic life of Gaia



Adam Eaton Croft

“I am a question that extends from the earth to the sky.” – Janata Bennuna (2004)^[1]

Practicing a science of Gaia presents wonderful opportunities and enormous challenges. To understand the Earth’s living processes and dynamic stories offers human beings a chance to live in balance with our living Home. If scientists can learn how Gaia came into being, how she maintains her livelihood in the face of an ever-brightening Sun and ever-changing biota, how the creatures and waters and rocks and winds of her body live through her – perhaps such a gift of understanding from science to the rest of humanity could help us heal our wounded relations with our planet. In this time of great human-induced stress upon our living world, a science of Gaia has become a deep necessity.

Less obvious is how such a science of the living Earth should be practiced and interpreted. As the institutions of quantitative science begin to funnel resources toward the fields of Earth systems science, geo-biochemistry, and other such maps of Gaia, new insights into the workings of our Earth’s history and co-evolved homeostasis are entering the field of scientific understanding. While such fields of scientific inquiry are useful explorations of the various interactions which make up the Gaian system, their mechanistic basis belies a deeply determining epistemology which starkly opposes an understanding of Earth as living organism. David Abram argues that the mechanistic metaphor of modern science implies the presence of a ‘maker,’ as machines only come into being at the hands of one who makes them. While this maker was once understood as God, it has now been sublimated so that the scientist himself maintains illusions of control over nature – if only we can unravel the genetic code, or win the war on cancer, or build better dams, we’ll have finally wrested this control from the wilds of nature, our institutional science promises.^[2](Abram, 1996)

With this essay, I offer for consideration and exploration a different approach toward an understanding of the living Earth, one not in opposition to mechanistic science, but necessarily complementary. I set out to explore a new story of the continuous coming-into-being of our living planet, one that views the Earth as a self-creating, self-interpreting, living being: hermeneutic Gaia. A science of Gaia that can help to heal the wounds humans have inflicted upon our planet’s living being(s) must itself reflect those qualities which are inherent to all life, including meaning, agency, and finitude. The tools of hermeneutic philosophy and hermeneutic biology offer such qualities and are here synthesized with Gaia theory in pursuit of a holistic understanding of hermeneutic Gaia, our living, meaningful home.^[3]

Hermeneutic philosophy investigates the art of understanding, especially as practiced by a reader interpreting a text. In the eighteenth century, with the development of the hermeneutic circle, hermeneutics became ontologically based, thereby grounding itself in the act of being (Heidegger’s *Dasein*) and setting the stage for its eventual entry into science^{[4][5]}. Within the so-called “hermeneutic circle”, understanding a given text is only possible if we have an understanding of the author of the text, which is again only made possible by reading the text. The hermeneutic circle is also present in the reading of a sentence: “[W]e reach the meaning of the sentence through the meaning of the words, yet the meaning of the words in that sentence is determined by the meaning of the sentence as a whole.”^[4]

Henri Bortoft describes this hermeneutic circling as a relation of part to whole, whereby understanding the meaning of the part is only possible within the context of the whole, which is again only present within the meaning of the part(s)^[4]. We can say that this circling of part and whole is ontological because both text and reader are in the world, each engaged in an act of being and becoming. Hermeneutic understanding is therefore an embodied act of understanding, not just an approach to understanding this or that text, “but experience with reality itself.”^[5]

Bortoft demonstrates how this relation of part and whole illuminates Goethe’s “delicate empiricism,” a phenomenological approach to scientific understanding which offers a participatory understanding of the object of study. In Goethe’s methodology, careful attention to the parts allows the whole to come into being. In this “multiplicity in unity,” different parts are seen as articulations of the “intelligibility of the [whole] organism.”^[4] Bortoft contends that Goethe learned to *read* the object of his study, practicing a form of science which seeks to understand the language of the world. Through this reading of nature, Goethe’s holistic perspective, just as in the hermeneutic circle, understands parts as different places where the meaning of the whole is able to come into expression.

If a hermeneutic science of Gaia is to be further developed, then it will undoubtedly be informed by the hermeneutic approaches to evolutionary development now underway in labs across the planet. Here, the hermeneutic perspectives of language, interpretation, hermeneutic circling, and the expression of meaning are opening important new paths to understanding organisms^{[5][6]}. I will briefly outline this approach to hermeneutic biology before exploring its implications for a hermeneutic science of Gaia.

The hermeneutic approach to evolutionary development is summarized by the following statement of biologist Brian Goodwin:

‘It appears that when developing organisms read their genomes and make sense of them by constructing themselves as coherent, functional wholes appropriate to their environmental contexts, whether they be worms or plants or humans, they are engaged in making meaning through the use of a language of relationships that has deep affinities with spoken language.’^[6]

The role of language within an organism’s development is not just metaphorical. Goodwin and Franses’ work demonstrates that gene expression acts in much the same way as natural language. In both cases, a script (natural language or genes) is read/spoken by a being (the language speaker or the cell/organism) who acts on this language to create meaning (textual understanding or organismal form and behaviour). As Franses describes the process, “Meaning is the point at which potentialities collectively explored in a preparatory manner are called into functional actualization.”^[7] The implication is that organisms are engaged in self-creative acts of meaning that are always based within the contexts of their own internal environment and their ecological relations. Could such an approach succeed as a hermeneutic science of Gaia?

James Lovelock has defined Gaia as:

‘...the evolution of a tightly coupled system whose constituents are the biota and their material environment, which comprises the atmosphere, the oceans, and the surface rocks. ... The self-regulation of important properties, such as climate and chemical composition, are seen as an emergent consequence of this evolutionary process’^[8]. ... ‘Life and its environment are so closely coupled that evolution concerns Gaia, not the organisms or the environment taken separately.’^[9]

Whereas the Earth and life sciences have traditionally viewed life as shaped by the forces and constraints of an inanimate, geo-physical planet, the key concept of Gaia theory is that life and its abiotic environment maintain a tightly-coupled homeorrhetic^[10] relation^[11].

Hermeneutic Gaia reframes Lovelock’s description of the tightly-coupled relations of the bio- and abio-spheres as a hermeneutic circling of self-interpretation and self-creation. The meaning of Gaia is its form and behaviour, a wholeness that evolves in relation to its ever-changing internal state and external environment within the solar system and the cosmos. In the hermeneutic circling of Gaia, the parts (biomes, atmospheric- and geo-chemistry, etc.) express the wholeness of Gaia, while the whole of Gaia (global climate, mass

extinction events, liquid/solid water balance, etc.) comes into being through the self-interpretation of its constituent parts and their inter-relations.

For example, certain ancient bacteria, miniscule parts within the whole of Gaia, began releasing oxygen into the atmosphere roughly 2.5 billion years ago^[12]. This bacterial expression of Gaia's life reshaped the atmosphere and thereby re-contextualized these bacteria's own self-understanding, leading to further evolutionary change of both bacteria and the atmosphere, and thus Gaia as a whole. In this way, the meaning of Gaia shifted in relation to the hermeneutic circling of part (bacteria) and whole (Earth's atmosphere).

According to hermeneutic philosopher Hans-Georg Gadamer^[13], meaning comes into being through the play of reader and text: "Meaning 'asserts itself' within a game of understanding that plays itself." Meaning arises in the living relation of reader and text, the playful circling of part and whole^[14]. Likewise, the meaning of the living Earth is itself a holistic play of the biotic and abiotic, a play whose outcome must, like all true play, remain uncertain to both Gaia and our scientific inquiry.

Anton Markos'^[5] concept of "in-formation" (closely paralleling David Bohm's^[15] definition of meaning as the "activity of information"), the coming-into-form of organisms through a self-creation and self-interpretation, and Gregory Bateson's^[16] definition of information as "a difference which makes a difference", can further elucidate hermeneutic Gaia. In particular, this understanding of the reciprocal relation of information and behaviour/form leads to a reframing of the cycles of Gaia's most important chemical constituents: carbon, hydrogen, nitrogen, oxygen, phosphorous, and sulphur^[11]. Gaia in-forms itself through an ongoing act of self-interpretation and self-creation involving the cycling of these chemicals between the bio- and abio-spheres. Rather than mere cybernetic loops, viewed hermeneutically, these chemical cycles can be understood to express the meaningful wholeness of Gaia as each participates in the iterative self-interpretation and self-creation of biota and the tightly-coupled abiotic environment.

Each of these examples describes a facet of Gaia in which the biosphere self-organizes in relation to the abiotic environment. In this relation lies the ambiguity that allows for the living Earth's self-interpretation and self-creation to come into being. Gadamer's words are useful in understanding the dynamic wholeness of ambiguity:

'The self-playing-out of play does not take place in a closed world of aesthetic appearance, but as a constant integration in time. The productive ambiguity that constitutes the essence of a work of art is only another way of expressing the play's essential characteristic of continually becoming a new event.'^[13]

Within Gaia's "self-playing-out," the ambiguity present in the power law relations of the atmosphere, ecosystems, bacterial colonies, and extinction events (analogous to the ambiguity present in the power law relations of both natural language and gene expression)^[6] allows for the Earth's living novelty. The coherence and self-similarity of Gaia's tightly-coupled bio- and abio-spheres has enabled the living Earth to play within the ever-changing environment of the solar system while Gaia's own constituent parts play in relation to each other, from bacteria to hurricanes.

We can only come to understand the meaning of Gaia as participants at play in the hermeneutic cycles of the living Earth; we ourselves are parts wherein Gaia expresses its *self*. Whether we walk the shores of the Earth in conversation with the more-than-human world or choose instead to noisily interrupt Gaia's self-interpretation and self-creation through pollution and large-scale environmental depletion (deforestation, destruction of wetlands, damming of rivers, etc.), we cannot escape our participation in the dynamic wholeness of Gaia. We live upon, within, and *as* Gaia.

The science of hermeneutic Gaia provides a holistic understanding of the living Earth that could inform our actions as human Earthlings. Just as a reader can never quite come to fully understand an author's text, the horizon of our understanding of Gaia will always be out of our reach. This eternal ignorance should humble our science and our civilization's other grand projects. But along with the respect this ignorance demands, our ambiguous coming-into-being within the hermeneutic circling of Gaia also invites us to poetic play:

“It is true that poetic utterance has something ambiguous about it, like an oracle. But this is precisely where its hermeneutical truth lies. If we regard it as something that is simply aesthetic, nonbinding, and lacking in existential seriousness, we are obviously failing to see how fundamental is the finitude of man for the hermeneutical experience of the world. It is not the weakness but the strength of the oracle that it is ambiguous.”^[13]

Like a poem, we live in ambiguous relation with Gaia’s rhythms and rhymes. The question facing our civilization today is, Can we learn this Earthly poetry in time to help restore healthy relations with Gaia? Perhaps an understanding of hermeneutic Gaia can teach us how to play again in the meaningful wholeness of the living Earth.

The stars who were created by words
are circling over this house
formed of calcium, of blood –

this house
in danger of being torn apart
by stones of fear.

If these words can do anything
I say bless this house with stars.

Transfix us with love.

Joy Harjo (1996), final stanzas of “The Creation Story”^[17]

References

1 I wish to thank my friend Tamiko Beyer for sharing with me this line from Silvia G. Ponzoda’s film *A Woman’s Word*. Bennuna, J. (2004) dialogue, Ponzada, S. (Dir.): *A woman’s word*.

2 Abram, D. (1996). “The mechanical and the organic: epistemological consequences of the Gaia hypothesis”, *Gaia in action*. ed. Bunyard, P. p. 234 – 247.

3 This essay presents a brief summary of hermeneutic Gaia previously explored elsewhere Croft, A.E. (2007) “We comprehend that which comprehends us: an exploration of hermeneutic Gaia”, *Int. J. Innovation and Sustainable Development*, Vol. 2, Nos. 3/4, pp.340–355.

4 Bortoft, H. (1996) *The wholeness of nature: Goethe’s way toward a science of conscious participation in nature*, Lindisfarne Books, Barrington, MA, USA.

5 Markos, A. (2002) *Readers of the book of life: contextualizing developmental evolutionary biology*, Oxford University Press, UK.

6 Goodwin, B. (2007) *Nature’s due: healing our fragmented culture*, Floris Books, UK.

7 Franses, P. (2006) Lecture, Schumacher College, 27 October 2006.

8 Lovelock, J. (1991) ‘Gaia: a planetary emergent phenomenon’, in Thompson, W. (Ed.): *Gaia 2: emergence*, Lindisfarne Books, Barrington, MA, USA.

9 Lovelock, J. (1995) *The ages of Gaia: a biography of our living Earth*, W.W. Norton & Company, London, UK.

10 Homeorrhexis describes the regulation of a system around a moving point of reference, as opposed to homeostasis in which regulation resolves itself around a fixed point.

11 Harding, S. (2006) *Animate Earth: science, intuition, and Gaia*, Green Books, UK.

12 Lenton, T.M., Schellnhuber, H.J. and Szathmary, E. (2004) 'Climbing the co-evolutionary ladder', *Nature*, Vol. 431, p.913.

13 Gadamer, H-G. (2004) *Truth and method*, 2nd revised ed., translation revised by Weinsheimer, J. and Marshall, D.G., Continuum, London, UK.

14 Mellos, K. (1998). "The fragility of freedom Gadamerian," *Twentieth world congress of philosophy*, <http://www.bu.edu/wcp/Papers/Inte/InteMell.htm>, accessed 16 June 2007.

15 Bohm, D. (1989) 'Meaning and information', in Pyllkanen, P. (Ed.): *The search for meaning*, Thorsons Publishing Group, Wellingborough, UK, pp.43–85.

16 Bateson, G. (1979) *Mind and nature: a necessary unity*, Bantam Books, New York, USA.

17 Harjo, J. (1996). "The creation story", *The woman who fell from the sky: Poems*. pp. 3.

Adam Eaton Croft teaches ecology, climate science, environmental justice, Earthology, gender studies, and mathematics at The Nova Project, an innovative alternative high school in the Seattle Public School District, Seattle, Washington, USA. In 2007, he completed a Master of Science with Distinction in Holistic Science at Schumacher College, Devon, UK. There, he studied hermeneutic philosophy, Gaia theory, climate change, and holistic science with Professor Brian Goodwin and Dr. Stephan Harding. He also holds a Master in Teaching Degree from Seattle University; he has eight years of teaching experience in the fields of biology, mathematics, and earth science.
croft.adam@gmail.com

