

Some Earthy spiritualism

The Gaia hypothesis

By Gregory Lynch
The Suburban

The Gaia Hypothesis is evoked in the environmental field both as a scientific theory and somehow as an article of faith. This term holds the strange duality that environmentalists can embody: fact based, scientific literacy and earthy spiritualism. The Gaia Hypothesis, however, is a scientifically sound theory with interesting repercussions as to how we make decisions on global environmental issues.

The Gaia hypothesis was first posited by James Lovelock in the 1970s to describe the ensemble of Earth's biological and geophysical systems. It was around this time that the first images of the entire Earth were released to the public. The Blue Marble, the iconic image taken by the Apollo 17 mission, became a unifying image for the environmental movement. The Gaia hypothesis fit in perfectly with the idea that seeing the planet in its entirety would be a unifying force for humanity.

Lovelock had been contracted by NASA to explore the possibility of life on other planets. His research focused on the chemical composition of atmospheres that may indicate life. It was throughout this period of research that he first proposed the Gaia hypothesis.

Lovelock's theory says that life on Earth not only adapts to its environment but also creates and maintains the conditions that are optimal for life. This is done through the metabolic activities of individuals, species and communities acting and interacting systematically on a planetary scale. When discussing this theory with his friend William Golding (author of *Lord of the Flies*), Golding suggested the name Gaia — referencing the ancient Greek mother goddess.

By naming the theory after Gaia, Lovelock allowed for a level of spiritualism and poetry to develop around the theory. Because of this, some groups have used the theory to promote the idea that the Earth is a single organism of which we are just one part. As lovely as this image is, it should be appreciated for its metaphoric beauty — not for its scientific merit.

The fields of geography and earth sciences have flourished since the '70s. This is thanks to impressive strides forward in satellite technology allowing for a major

increase in planetary data, as well as the motivation to understand the systems that maintain our planet. Looking at our current understanding of the planet, we can judge how much value the Gaia hypothesis holds.

Going back to early life on the planet, we know that oxygen levels were essentially zero. Through the metabolism of bacteria and algae, oxygen level were brought up to a level that favours more complex life. Since these major changes, these levels have been maintained by a balance of metabolic processes by the myriad of creatures on the planet.

Maintaining oxygen levels is done through positive feedback loops: as levels get too high, the oxygen is consumed (throughout photosynthesis) at a higher rate and CO₂ is released. When oxygen levels are too low, carbon dioxide consumption increases (through animal respiration) releasing oxygen. This is a constantly changing system, which adapts slowly to minor planetary changes.

This kind of self regulating cycle can also be seen in ocean salinity, nutrient distribution and the biological processes involved in the water cycle. While all of these cycles are taken as support for the Gaia hypothesis, there remains doubt and a lack of consensus. Unfortunately, we have only one planet, which fosters life and we have yet to see if this can be replicated elsewhere and what those systems would look like. As we know replicating an experiment is essential to proving its value.

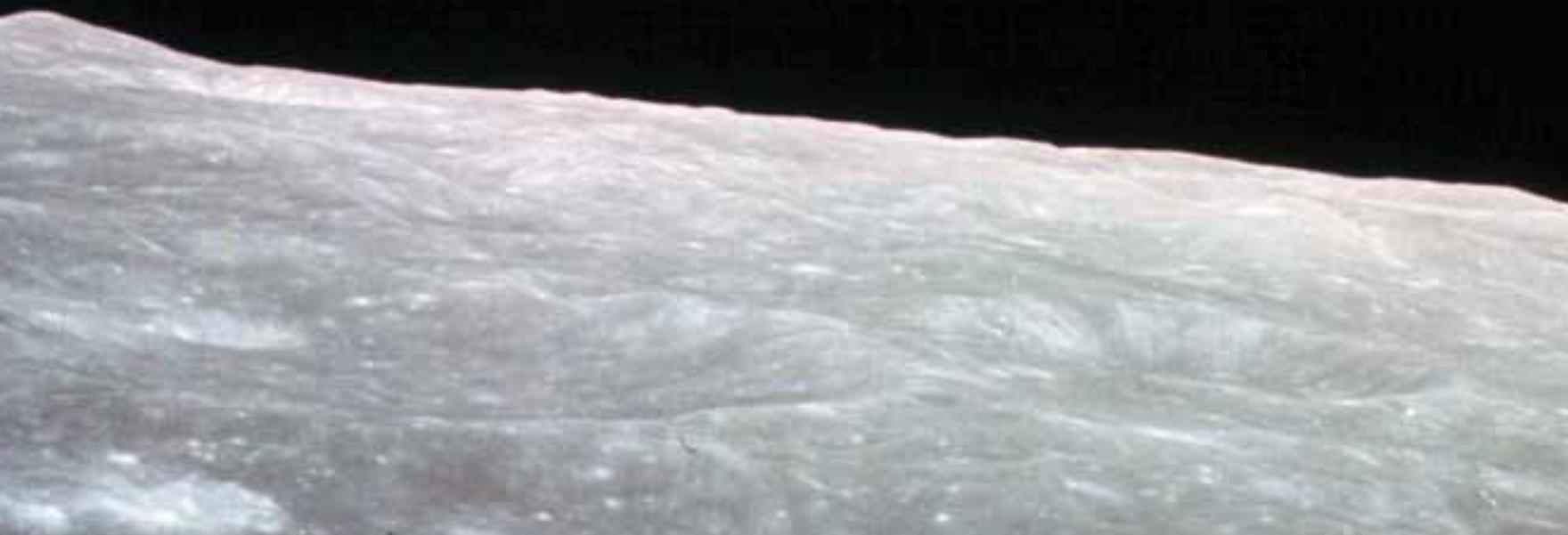
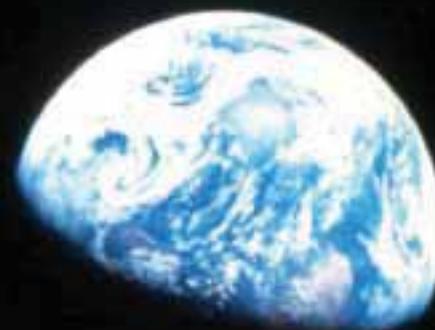
Though there is a lack of data, the Gaia hypothesis remains a useful theory, which provides a global perspective on the biological systems of which we are a part. Knowing there is some scientific basis for the Gaia theory, it can be helpful in addressing global environmental issues.

Drawing a parallel between our bodies and the Gaia hypothesis, we can understand that there is both resilience and fragility in both systems. As in human bodies, the earth's systems can absorb and dissipate trauma, toxins and harsh treatment. However, like ourselves, there are limits to how much damage these planetary systems can take, while maintaining our health and life on the planet.

The Gaia hypothesis can be a strong structure to use to address environmental issues. Using this theory, we

can study and understand how our actions affect the planetary systems, which maintain life. It is important that we address these issues on a global, systematic scale so we can decide what risks we are willing to take and what sacrifices we are willing to make to protect our planet and ourselves.

Gregory Lynch has a Masters degree in environmental science from the University of Luxembourg. He has spent the last 10 years working in community development, environmental education and research, largely for non-profit organisations, including Katimavik, the Sierra Club, Falls Brook Centre and several organizations in Central America. You could reach him at greg@themantis.ca



Apollo 17 gave us the first full photo of Earth in 1972, and the world was never the same again: