

# VIEWPOINT

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## Humans playing doctor with Mother Earth

Activity jeopardizes planet's health until we learn game plan

**EDITOR'S NOTE:** *This is the second installment of a two-part series.*

If the Earth is alive, what does that make humans? Not the center of the universe, anyway, at least in the physical realm. We become a part of the whole; whether we are essential ingredients or destructive components remains open for discussion.

Let's pick up that discussion from where we left off last week. We were considering James Lovelock's compelling theory that the Earth is the world's largest organism, which he calls Gaia after the Greek name for Mother Earth.

Theory holds that the web of life that comprises Gaia's "biosphere" has managed to regulate the climate over the ages, keeping it within a comfortable range for life despite at least a 25 percent increase in the sun's luminosity since life began.

The biosphere does this mainly through the chemicals it releases into the atmosphere, as some molecules can block out the sun's warmth while others hold it in. Albedo — the degree of reflectivity, often related to color — also serves a function in this scenario.

So how do humans fit into this picture? It seems clear to me that we have a



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*Eco Logic*

potentially large influence on Gaia's health, whether good or bad. We may be stressing the planet's ability for self-regulation, leading to high fever . . . or we may be the crucial element in preventing a fatal chill.

Sometimes we're too powerful for our own good. This was the case with our invention of chlorofluorocarbons; CFCs have damaged the ozone layer protecting us from the sun's ultraviolet rays, which increase cancer and mutation rates throughout the biosphere.

At times like this, humans may be comparable to a cancer — the unrestrained growth of certain cells within an organism that causes eventual destruction to the host. (Or in Gaia's case, hostess.)

Our booming population growth over the last few centuries could resemble the spread of a harmful disease, particularly as it has resulted in the loss of hundreds of thousands of other species, some of

which could prove essential to Gaia's health.

The human population has grown from about 1 billion in 1850 to 5½ billion today. Meanwhile, the extinction rate of other species has climbed by about 1,000 times what it would be without humans. Our occupation of the planet threatens to displace at least one-half of all other species in the coming decades, biologist E.O. Wilson projects in "Biodiversity," (1988, National Academy Press).

What's more, our release of fossil fuels and designer chemicals into the atmosphere threatens to disrupt the planet's climate.

Most scientists agree that world temperatures could escalate by 2 to 5 degrees Celsius by the end of the next century due to the "greenhouse effect." The carbon dioxide in petroleum products contribute to 60 percent of the predicted global warming, with methane and CFCs contributing most of the remainder. (Contrary to what some industrialists would have us believe, there is little skepticism about global warming among scientists. Arguments involve the degree of warming and its effects.)

Can we assume that this poses a problem in the long run? Keep in mind that Gaia's longevity goes back at least 1 billion years, when multicellular life arose and began arranging itself in a myriad of combinations. During this time, there have been several mass extinctions, and many times when average temperatures were higher or lower than they are now.

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During the recent ice ages, for instance, the globe's average temperature was lower by about 4 degrees Celsius, a degree of change within the same range as that which would accompany global warming.

Coincidence or fortuitous? Russian scientist M.I. Budyko outlines a theory in his 1982 book, "The Earth's Climate: Past and Future," that could give a hero's role to our obsession with oil and other fossil fuels.

Budyko sums up studies on the climate since the Cambrian period 5 billion years ago and concludes that carbon dioxide levels are reaching a dangerous all-time low. In his opinion, our release of fossil fuels corresponds to a need for a warmer blanket around the Earth. Otherwise Gaia might stabilize as a "white planet" with a coat of ice.

In fact, Lovelock touches on the same issue in his 1988 book, "The Ages of Gaia." He writes: "The Earth's mean temperature is well below the optimum

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temperature for plant life. There are periodic climatic oscillations as we cycle between the glaciations and their intermissions, and carbon dioxide is attenuated close to its lower possible limit. All these are physical signs of a system on the verge of failure."

In the end, though, he concludes that humans are better off in a glacial climate. He bases this on the premise that a cooler climate supports more life.

If this premise were indeed true, he might have a point. His computer model of population dynamics — much more sophisticated than the typical model, which generally isolates foxes and rabbits in a non-realistic predator-prey dance — shows that the more variety of life a system has, the more stable it is.

In other words, the greater the biodiversity, the greater the stability of the system, whether it's a forest, a sea or an entire planet.

But Lovelock uses some questionable information to conclude that cooler climates offer a greater biodiversity. For instance, he maintains that a cooler ocean offers a better environment for life because of nutrient distribution. He considers this especially important to Gaia's health because he believes the oceans contain half of the world's life, although he never cites a source to support this contention.

Other scientists put the ocean's contribution in the 1 percent range, and place the lion's share of the biosphere's mass in the forests. Swedish researcher Bert Bolin estimates that forests hold 90 percent of the world's living biomass (Science, May 1977).

The tropical rain forests boast the highest biodiversity among Gaia's ecosystems, a matter Lovelock and virtually everybody else agree on. E.O. Wilson summarizes many findings to estimate that half the world's species live in the 7 percent of the land comprising the rain forests. Coral reef systems are another area of exceptional biodiversity.

Both of these ecosystems thrive in warmer climates, which makes me suspect that, overall, life prefers a slightly warmer climate than the one we have today. Just ask yourself: Do you find more life per square meter on a frozen tundra in Alaska or in a tropical savannah in Africa? The expansion of tropical conditions would seem to favor life, then, as long as the climate followed the general rule of bringing more rainfall with increasing temperatures.

Human tampering of forest systems, though, can disrupt rainfall regimes, as it already has in areas like Ethiopia, once the breadbasket of the world. Lovelock and I agree heartily on the need to guard biodiversity.

The areas with high biodiversity likely have many functions we can only guess at, including perhaps serving as Gaia's sweat glands if the going gets too hot.

Even in a best-case scenario where global warming improves Gaia's eventual health, there is cause for concern over the abruptness of the change.

Lovelock compares the warming to trying to revive a freezing animal by plunging it into warm water; the technique is more likely to induce shock than inspire recovery. We may be seeing this in regard to the coral reefs, as island researchers Ernest H. Williams Jr. and Lucy Bunkley Williams have documented

Bill Day Deloitte, Price, Frost  
Davis, Brown, White, Yarnall

deadly "bleaching" of corals, citing evidence connecting it to a sudden change in surrounding water temperature by as little as 1 degree Celsius.

Within a century, global warming is expected to:

- alter regional climate regimes, sometimes creating droughts;
- inspire more and stronger storms, especially along the coasts;
- raise sea levels with melting ice caps; and
- threaten even more species as they scramble to change their geological locations to follow their biological demands.

Only a limited number of species could win the competition for cooler northern latitudes and mountain heights. Obviously, some of the northernmost

creatures and greenery would lose out altogether as tropical conditions enveloped more of the Earth, leaving less room for cold weather's friends.

The competition among species for a suitable domain would be aggravated by another problem: Climate shifts would likely wreak havoc among wildlife reserves, as fluxing rainfall and temperature regimes challenged the protected species' ability to survive. All too often, attempts at migration would fail as animals and plants confronted human settlements, bodies of water and stretches of desert.

The coming clashes would eclipse last week's rampage of 50 elephants through India, where they trampled at least six people to death before being turned away from Calcutta and back toward their sanctuary 125 miles away. In this case, it

was bush fires that scared them out of their little corner of the world.

What if there's no room left for elephants in the next century? Can we take the risk of driving them to extinction when we're unsure of their role in the overall system?

The same question could be posed for virtually any species. Sea turtles, walrus and some whales, for instance, sometimes forage along the ocean floor. Their habit of disturbing sediments, thereby flinging settled nutrients back into the food chain, could be the key to improving conditions for deep sea life.

Yet we are dumping toxics and radioactive materials into the ocean, much of which eventually settles on the bottom. Perhaps this provides a clue to the rash of tumors the Williams have been finding on sea turtles, or the disorientation of whales when they inadvertently ground themselves.

We just don't know enough about these animals — or any other species, including our own — to assume that Gaia can maintain a suitable climate without them.

Whether global warming turns out to be good, bad or even nonexistent, we can be sure that our encroachment on the planet's biodiversity threatens Gaia's health.

Lovelock champion Michael Allaby sums up the threat we pose to ourselves by our carelessness in the following phrase from his 1990 book, "A Guide to Gaia."

"... No particular group can expand beyond a certain level because a point is reached at which its own proliferation renders its environment hostile to it."

It's time to launch Operation Mother Earth to save the remaining natural systems, any one of which could prove close to Gaia's heart. If we continue on our destructive path, the planet might well schedule a surgical removal of humans.

Melanie Lenart writes a weekly column on environmental issues.

## Taking action to help Gaia

Here are a few things individuals can do to help keep the planet healthy:

**Urge governments to provide vegetation links between animal reserves, giving animals the latitude to move around if necessary.** (Rodents often use the stretches of grass along highways for travel, for instance.) The corridors would need to offer cover but not necessarily a lot of space.

**Support non-profit groups that work toward protecting species, such as World Wildlife Fund, the Nature Conservancy, the Sierra Club, the Puerto Rican Conservation Trust, the Puerto Rican Foundation and various regional island groups that focus on conserving the environment and/or natural history.**

**Demand that the Pentagon release the data on sea ice thickness that it gathered with its nuclear submarines.** This information could help chart the pace of ice cap melting so we could determine how serious of a problem this is.

**Promote reauthorization of the U.S. Endangered Species Act, up for renewal this year in Congress.** The act has proven to be one of the few tactics with teeth when it comes to protecting species and the ecosystems in which they live.

**Encourage the federal government to include the Forest Service in the newly-created National Biological Survey.** The government is to be commended for providing \$170 million to fund the survey, an ambitious effort by 1,734 to inventory plant and animal species in the United States and computerize the data for easy access. But it should include the Forest Service in the effort along with other federal agencies.