



# The Biology of Business

## New Laws of Nature Reveal a Better Way for Business: Part 1

By Elisabet Sahtouris, Ph.D.

Academy Fellow **Elisabet Sahtouris** has built part of her brilliant career on observing the parallels between Nature and human systems such as business. In this provocative essay she argues that Western industry has subsumed science, using four publications by Charles Darwin and Rudolf Clausius to justify its own misguided and thoroughly unnatural approach toward its systemic self, the planet, and humanity.

"Nature is on our side in role-modeling the evolutionary leap that would rapidly bring about an energy-efficient and globally beneficial human economy that functions like a truly healthy living system."

In this Part One, she traces the evolution of the enlistment of science by industry, the misinterpretation of Darwin under the influence of Thomas Malthus to support and underpin unnecessarily competitive and often brutal models of commerce. She argues that these have no analogues in the world of natural systems.

An abridged version of this article originally appeared in Volume 3 Number 1 of [VIA: The Journal of Integral Thinking for Visionary Action](#), published by Vision In Action ([www.VIA-VisionInAction.org](http://www.VIA-VisionInAction.org)). This article is printed with the kind permission of VIA. © 2005, Elisabet Sahtouris, PhD



...the Darwinian model of biological evolution as an endless competitive struggle for scarce resources... holds up our own natural evolution.

### Introduction

As an evolution biologist, it is obvious to me that we humans are part of Nature and that Nature has been doing business for billions of years, if we take a broad definition of business to be the economy of making a living, of transforming resources into useful products that are exchanged, distributed, consumed and/or recycled. So, to talk about the biology of human businesses, I could simply point out that all our businesses are systems made up of people, who are living beings, and that therefore businesses are living systems or biological entities. QED. However, to say something more useful, I need to go back through history to show why most human businesses, despite being made up of people, do not function like living systems, at least not like healthy living systems. Those few that do are swimming upstream against the norm, usually with great difficulty, and that just should not be, need not be, and must not continue to be.

Our businesses, unlike those of other species, are organized and run in a socio-political cultural context, and that context has a history. Historical context has a great deal to do with what we believe about ourselves and our world, and when I sort through that socio-political history looking for the most salient influences on contemporary business from my own perspective, I am naturally drawn to the history of science.

Four very important publications by two great 19th century scientists have so strongly shaped our beliefs about our world that they affect everything about human culture, including our definition of human nature and the way we do business. They are:

1850, Rudolf Clausius's *On the Motive Power of Heat, and on the Laws which can be Deduced from it for the Theory of Heat*

1859, Charles Darwin's *On the Origin of Species*

1865, Clausius's paper on Thermodynamics reformulating the fundamental laws of the Universe as energy constancy and entropy

1871, Darwin's *The Descent of Man*

I will argue that Clausius's model of a universe running down by entropy and the Darwinian model of biological evolution as an endless competitive struggle for scarce resources both give us half-truths about Nature that seemed appropriate in their historical context but are now seen to be fundamentally flawed, thereby seriously misleading us and holding up our own natural evolution. The full truth—including the other half of a more holistic view in physics and biology, respectively—reveals that Nature is on our side in role-modeling the evolutionary leap that would rapidly bring about an energy efficient and globally beneficial human economy that functions like a truly healthy living system.

The bottom line of human experience is that it all takes place within our consciousness and that our minds form the beliefs on which we act by collectively creating a uniquely human world. Change those beliefs and that world changes accordingly.

How could science have failed to rectify such hugely important flaws in 19th century science even in the 21st century? I believe the answers lie in the fact that science, for all its protestations about being value-free, has never been an independent cultural endeavor free to pursue unbiased inquiry into Nature. Science was raised to the status of a secular priesthood—in the sense of being given the mandate and power to tell us how things are in our universe and who we are within it—by an even more powerful political economy, in turn for the great power of science in its engineering applications that keep that political economy in power.

Our world is now in sufficient crisis that transparency in all our endeavors is critical to our survival. Light shed on the relationship between science and political economy can, I believe, show us the way to true freedom and a healthy economy for all the world's people. It is Business that will lead the way, providing it, too, adopts transparency and belief in the mission of creating value for all stakeholders from people to planet.

### **Science and Political Economy: in which God Gives Way to Man**

Only a few centuries ago in Europe, a new alliance of industrial entrepreneurs and scientists forged the Industrial Revolution, bringing the modern age successfully into being and replacing the prior cultural hegemony of the alliance between Church and State. Let me address a few details of this process, while noting here the current attempt to reinstate the Church/State alliance in the U.S. at present.

Over the past few centuries, science became far more than a vast research enterprise that gave us an advanced technological society with more commercial products than any previous culture could possibly have imagined, along with "progress" at a breakneck pace that leaves us breathless and wondering if we can even hope to catch up with our own children and grandchildren. Science, in addition to spawning that technological society, also became the cultural priesthood appointed to give us our cultural worldview: our beliefs about How Things Are in this great universe of ours, and on our planet Earth in particular.

This is a relatively new and very important historical phenomenon in the history of civilization, as the priesthoods of most previous civilizations (large organized sociopolitical entities with urban centers) with notable exceptions such as China, were religious, getting their worldviews more from revelation than from research.

The scientific worldview founded by Galileo, Descartes, Newton, Bacon and others was of a non-living, non-intelligent mechanical universe—a clockworks projected from human mechanical inventions to God's as the "Grand Engineer's" Design of Nature in which humans were just complex robots, the males alone imbued with a piece of God-mind, according to Descartes, so that they, too, could invent machinery. As models of celestial mechanics, the Newtonian motion of stars and planets, became more elaborate, social institutions as well. They were increasingly seen and modeled on mechanism and expected to run like the well-oiled machines of factories. Time/motion efficiency studies of workers turned people themselves into machines as

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Charlie Chaplin movies so well caricatured. Most of today's businesses are still conceived, organized and run as hierarchical mechanics.

As men of science had come to feel increasingly competent and knowledgeable about the physical world, and in consequence felt themselves to be in control of human destiny, they had formally abandoned the "hypothesis" of God, thereby removing any notion of Nature, including humans, as existing through sacred creation. Rather, Nature was redefined as a wealth of natural resources to be exploited by Man, the pinnacle of accidental, natural evolution.

One of the most pervasive and persistent cultural beliefs we have been given by science is the concept of this godless universe as non-living, accidental, purposeless and running down by entropy, with life defined as a transient "negentropy" opposing this force of decay, yet never overcoming or even balancing its inevitable slide into heat death. To me, this is like describing the life of any one of us as a one-way process of decay toward death, with a negdecay process of birth and growth opposing it, though overall unsuccessfully.

This dreary view of life made me wonder deeply about the very concept of non-life, realizing in the process that it was invented by Western science. All cultures have understood life and death, but non-life is something that never was or will be alive—a concept that came into human culture with the invention of mechanism in ancient Greece and resurfaced some dozen centuries later in a new era of mechanics. Was it really appropriate, I asked myself, for science to force life to be defined within a context of non-life? Could one really explain the existence of living things as accidentally derived from non-living matter? Could one derive intelligence from non-intelligence, consciousness from non-consciousness, as I was consistently taught in the graduate science departments of several universities and research institutions?

### Entropy reconsidered

It was German theoretical physicist Rudolf Clausius who first formulated the two basic laws of Nature in 1865—exactly halfway between Darwin's publication of *The Origin of Species* in 1859 and *The Descent of Man* in 1871—as:

1. *The energy of the universe is constant.*
2. *The entropy of the universe tends to a maximum.*<sup>1</sup>

Clausius's work on the thermodynamics of entropy, openly acknowledged by Maxwell in England, was based on Sadi Carnot's experimental work with energy transfer in the closed mechanical systems of steam engines and applied (by Clausius) to the universe as a whole with no evidence that the universe was a closed system in which such extrapolation might be valid. Yet these two "inviolable laws", along with the more basic conceptualization of the universe as purposeless non-life, have ever since persisted as absolute dogma in physics and all other areas of science. But this model is a less satisfying conceptualization from scientific observation than the ancient Taoist, Vedic, and Kotodama model of a universe built on fundamental dualities within the Oneness of Cosmic Consciousness, which Yasuhiko Genku



Malthus

Kimura has explicated from a number of perspectives in the pages of [\[VIA: The Journal of Integral Thinking for Visionary Action\]](#). Dualities are essential to the process of creation, and the primary duality is often described as outward/inward, centripetal/centrifugal, expansion/contraction, translating in contemporary western science to radiation/gravity as the most fundamental forces or features of Nature. Elsewhere, I have cited Walter Russell<sup>2</sup> as well as Nassim Hamein and Elizabeth Rauscher<sup>3</sup>, for their models of a universe in which entropic radiation and centropic gravity are in a perfect dynamic balance of expansion and contraction that constitutes a unified field. Hamein and Rauscher's theory is so conceptually and mathematically elegant that universal forces are reduced from four to two, and the need to postulate hypothetical dark matter and energy in the universe is eliminated. In short, the work has been done to show that a universe of unified opposites satisfies our observations better than a one-way entropic universe, and shows that the universe is not running down at all.

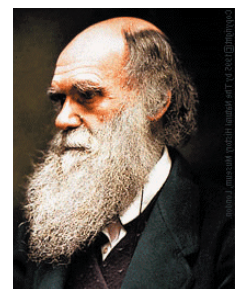
The still "official" entropic universe, conceptualized after Einstein as beginning with a Big Bang and deteriorating ever since, is in sharp contrast to previous worldviews of Nature as alive and vibrant with intelligent creation and purposive direction—a view closer to my own model of a self-organizing, living universe in which planetary life is a special case of extra complexity, now actually measurable as being halfway between the microcosm and the macrocosm, where "upwardly" and "downwardly" spiraling energies collide on physical surfaces where such life can evolve.<sup>4</sup>

Historically, the social consequences of the proclamation of an entropic universe by the scientific establishment were enormous, giving rise, for example, to belief in the Malthusian struggle for existence in a world soon to end (see below), interpretations of Darwinian evolution theory as a "dog eat dog" world and a philosophy of Existentialism extending this view of the purposeless and hopeless human struggle into psychology, art and Western culture at large. Such beliefs fostered the growth of our current consumer society with its "get what you can while you can" outlook in which advancing in the "job market" to increase power to consume became the driving force of modern and post-modern Western civilization. Humanitarian social values and morals were left to religions with lesser persuasive clout than science, which came to openly pride itself on being value-free, and therefore even more scientific (read: unassailable in its conclusions about How Things Are.) Small wonder that businesses carried out the competitive struggle justified as "social Darwinism" and deemed as "inescapable."

### **Darwin, Global Conquest and Evolution**

Darwin himself had concluded with great elaboration in his magnificent opus on *The Descent of Man*, that humans must exercise their evolved capacity for moral behavior, as David Loye has so beautifully pointed out in his book, *The Great Adventure*<sup>5</sup>, but this aspect of Darwin's work was not promoted by the science that took up his theory of evolution, focusing rather on his explanation of struggle in scarcity as the driver of evolution, which is best understood as rooted more in Darwin's historical context than in Nature itself. Had Darwin been able to see beyond that context, he might have

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Darwin

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Clausius

noticed that highly evolved natural systems evolved long before humans display cooperation, mutual support, altruism and other features we define as ethical, but that is getting ahead of my story.

Columbus's voyages in the late 15th and early 16th centuries had inspired commerce between Europe and the New World, including such feats as Pizarro's plunder of 24 tons of treasure collected for the Andean Inca Atahualpa's ransom before his murder—exquisite artworks of master craftsmen that were melted into gold bricks for transport to Europe—and trade in African slaves who were used to build colonial infrastructure, care for the colonists, etc. The American colonies were, in fact, settled by a corporation—the Massachusetts Bay Company, chartered by King Charles in 1628 for the purpose of colonizing the New World and its commercial ventures.<sup>6</sup>

Magellan's global voyage in the 16th century had established that all the world's territories were finite and could be owned, and the East India Company had been founded in 1600, Queen Elizabeth granting it monopoly rights to bring goods from India to challenge the Dutch-Portuguese monopoly of the spice trade. Eventually the East India Companies of eight European nations functioned as the world's first great multi-national corporation or multi-national cartel of corporations. Though it incited American colonists to riot in the Boston Tea Party rebellion of 1774, Betsy Ross was commissioned in 1776 to sew the circle of stars representing the first 13 states of the new union over the British emblem in the top corner of an East India Company flag to create the first US flag. To this day we retain its thirteen red and white stripes with a blue corner field. In Darwin's day, Thomas Malthus had been commissioned to inventory the Earth's natural resources as head of the Economics Department of the East India Company's Haileybury College. Malthus concluded from his work that the world would end soon because human populations would overwhelm food production, causing an inevitable dying off of humans. This prediction justified the East India Company's "us or them" policy of assaying and acquiring all the Earth resources possible for Europeans so that they, at least, could survive.

It was Malthus who hired Darwin to continue his Earth inventory work for the East India Company and, when at a loss to otherwise explain the driver of evolution for his theory, Darwin simply adopted Malthus's theory of competition in scarcity, thus giving us our social vision of scarcity and fierce competition for resources, of humanity doomed permanently to win/lose economics and warfare. As Darwin put it in *The Origin of Species*:

*... Nothing is easier than to admit the truth of the universal struggle for life, or more difficult...than constantly to bear this conclusion in mind. Yet unless it be thoroughly engrained in the mind, I am convinced that the whole economy of nature, with every fact on distribution, rarity, abundance, extinction, and variation, will be dimly seen or quite misunderstood ... As more individuals are produced than can possibly survive, there must in every case be a struggle for existence... It is the doctrine of Malthus applied with manifold force to the whole animal and vegetable kingdoms; for in this case there can be no artificial increase of food, and no prudential restraint from marriage.<sup>7</sup>*

Thus, Darwinian theory as Darwin himself established it, not just through



later misuse as "social Darwinism", was very essentially rooted in political economy, which was itself rooted in a scientific worldview of a godless, mindless, coldly mechanical universe ever running down.

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Dr. Sahtouris uses nature's principles and practice, revealed in biological evolution, as useful models for organizational change. She applies them in the corporate world, in global politics and economics, in our efforts to create sustainable health and well being for humanity within the larger living systems of Earth.