

## **Prologue to a New Model of a Living Universe**

**(Chapter in *Mind Before Matter* 2007)**

**Elisabet Sahtouris, Ph.D.**

### **Introduction**

The ancient Greek word for science was philosophy—*philos sophias*, the love of wisdom. This name was intended to set science on a course of searching for wisdom, for practical guidance in human affairs through understanding the natural order of the cosmos to which we belong.

Science and philosophy, originally one and the same pursuit, were separated when western science adopted its materialist stance of positivist reductionism, yet the first part of the *Cambridge English Language Dictionary*'s definition of philosophy is still “the use of reason in understanding such things as the nature of reality and existence” (including epistemology and moral judgment). Thus, over the past several centuries, science and philosophy have remained inextricably intertwined on the subject of understanding reality, though philosophy shared morality with religion and got exclusive rights to epistemology—“the study of, or a theory of, the nature and grounds of knowledge, especially with reference to its limits and validity,” in other words, “what can we know and how do we know that we know?”

From my perspective, this separation of science and philosophy such that science was no longer concerned with how it knew what it knew or with exercising moral judgment

about the consequences of its discoveries and pronouncements has led to fundamental scientific errors in the first case and a misplaced lack of accountability in the second.

Western science assumed the existence of an objective material universe that can be formally modeled through objective observation and measurement. Thomas Ehrlich describes objectivity as follows:

Objectivity is commonly taken to mean, "freedom from idiosyncrasies." An idea is objective to the extent that it is unpolluted by the individual's beliefs or presuppositions; a critique is objective to the extent that the person making the criticisms and suggestions ignores their own personal feelings and biases. Objectivity in this sense is often defined as the negative of personal subjectivity, or as the opposite of personal opinion.<sup>1</sup>

Science set out not only to eliminate idiosyncrasy and bias by decreeing the separation of subjectivity (our inner world) from objectivity (our outer world), but to create a comprehensive and detailed model of the outer world as a universe independent of any individual human conception of it (whether revelatory or observed) and independent of human participation within it—an undisputed, public model of a “reality” entirely independent of our thoughts and actions.

This heroic exercise (never seen as an act of creation) depended in both conception and practice on the prior creation of two formal languages abstracted from natural language. It was mathematics and logic, together with their “translation” into physical machinery, that inspired the western scientific model of a physical universe.

The symbols of logic and mathematics have no intrinsic real-world meaning, even though Aristotle devised logic for ordering human thought around the same time that Euclid devised geometry (literally, the measurement of Earth) to order the physical world. Engineers assigning real-world meaning to mathematics made it possible to translate that formal language into physical buildings, bridges, ships and all sorts of mechanisms, or

machinery. Similarly, European scientists, heirs to Arabic and Greek math and logic, found mathematical patterns to be very useful in modeling those aspects of nature they could quantify (measure).

European scientists thus adopted the positivist stance that reality is made up only of measurable things, and that their description as natural mechanisms provides the only possible uncontaminated knowledge of reality. Machinery, having been invented and assembled from parts by man, could be totally understood by man. Formalizing nature as machinery was intended to make it equally understandable.

The task of positivist science was thus twofold: to discover what the parts of natural mechanisms are, and to see how the mechanisms work through the movement of these parts in relation to each other. Scientists took things apart in order to see how they were constructed as well as how they 'ticked' within the great Cosmic Clockworks. This method of reducing things to their parts came to be known as the *reductionist method* of positivist science.

Renaissance and Enlightenment Era mathematical models of the cosmos followed from Plato's insistence that God was a mathematician and from Descartes' conception of God as more than mathematician, as the *Grand Engineer* of Nature's mechanisms. Although Descartes, in his famous recognition "*I think, therefore I am,*" came very close to recognizing consciousness as fundamentally self-evident, therefore axiomatic to any model of the universe conceived by humans, he became a 'double dualist' by seeing God as the external Creator of Nature's mechanisms and Man as the external creator of his own simpler machinery by virtue of God's gift to him of godlike consciousness. (I call this kind of creation *allopoeitic* to distinguish it from self-creation, which is *autopoeitic*; see later.) Descartes claimed that man could eventually learn to make his bejeweled wind-up nightingales as complex as God's feathered ones. This belief underlies the whole of robotics, man-machine interface, artificial intelligence (AI) and artificial life (AL) today, and contributes to our failure to understand life as autopoeitic.

Logically complete, if not satisfying in a contemporary world, Descartes' scheme was adopted, though its logic was soon destroyed when scientists decided they had no need for the hypothesis of God in their conception of Nature. *It was utterly illogical to eliminate the inventor engineer while keeping the concept of nature as mechanism.* Any dictionary defines mechanism as the purposive (invented) assembly of parts. Having no inventor for the mechanical universe, scientists were forced into the bizarre stance that nature's complex machinery had arisen accidentally, that the universe is a vast *purposeless* mechanism filled with smaller purposeless mechanisms, all running down by entropy (as machinery does). Western science is still devoted to rationalizing this illogical model taught to new scientists in every university.

### **The Axioms of Western Science**

With Nature reduced to mechanism, and no proposal of some life force deemed acceptable in lieu of God, positivism arrogated to the physics of non-life the responsibility for modeling the universe. The fundamental assumptions—the 'self evident truths' or axioms—underlying this positivist science include a) that the universe exists objectively (not subjectively) as matter located in three-dimensional space and linear time, b) that the universe is non-living, measurable and describable in familiar mechanical terms of matter and energy, c) that the universe has linear causal order discoverable through the science of physics, using mathematical measurement and logical reason (including induction and deduction), d) that the material universe is accidentally assembled from the smallest physical units into larger structures and interactive patterns through the workings of discoverable natural laws, e) that large structures can be understood by reducing them to their component parts, and f) that life is a rare and peculiar emergent phenomenon in a non-living universe, possibly restricted to a single planet's surface and ultimately subject to the laws of physics.

The most fundamental laws of physics were formulated (on the basis of these axiomatic 'truths') in contained laboratory experiments and then extrapolated from laboratory to

cosmos. They are well known as Newton's laws, including inertia, energy conservation and entropy—the dissipation of working energy, and with it the disintegration of order, along the “arrow of time.”

Much, of course, has happened in the world of physics since these axioms were formulated and the laws ‘discovered,’ but despite later understanding of light and the broader electromagnetic spectrum, Big Bang theory, Einstein's equivalence of matter and energy and adjustments to laws of time and motion, the dissolution of hard particles into quantum waves, string theories, multi-dimensional worlds, zero point energy, non-locality and many candidates for a Grand Unified Theory, all together seeming to push for a fundamental change in worldview, a true paradigm shift in physics is yet to happen (or at least to be accepted).

The word physics is taken literally from the Greek word for nature: *physis*. European scientists from Galileo on assumed that physics in its modern meaning, including astronomy, *was* the true science of nature, while life sciences from organic chemistry to biology, evolution biology and psychology, were (and still are) deemed secondary. Natural laws are still limited to the physics of a non-living universe, into which biologists are expected to fit their explanations of life. Toward this end, the concept of *negentropy* was coined as a kind of swimming upstream that could increase order locally within the overall river of entropy. Negentropy is credited with the descent of man, according to Darwin, his predecessors and his followers, as the natural creature of an evolutionary process billions of years long.

Biological evolution has become virtually axiomatic in the scientific worldview, though its recognition of man as a naturally evolved creature has had questionable social benefits, giving him scientific license to exploit fellow humans, often cruelly, along with the rest of the natural world now suffering a degree of devastation that threatens even human survival. The lack of moral accountability of science for social interpretations of Darwinian descent by natural selection, along with its failure to see the grave errors in the Darwinian hypothesis, has led to social ills from chaining children to machines for the sake of profits to the Holocaust and even to the current capitalist tyranny of the quarterly

bottom line competition. The entrenched belief that man is doomed to perpetual hostile competition—the scientific belief underlying these social ills—is, as I will attempt to show, a serious misinterpretation of the evolutionary record.

The fundamental concept of a cold and lifeless, meaningless universe running down by entropy made decidedly poor inspiration for man to become the good and moral creature Darwin personally hoped he would become by overcoming his evolutionary heritage. One can argue that the marvels of engineering this mechanical scientific worldview did inspire had a great deal to do with the social attitude of scientific industrialism to “get what you can while you can” as things deteriorate. It is interesting to note that the one species that believes in the prevailing rule of one-way entropy has visibly created such entropy by destroying ecosystems and degrading Earth’s atmosphere, waters and soils to the level of previous extinctions. Man standing on the Moon sees, as the only mark of his presence on Earth, its deserts. Biologically, we are a desert-making species.

### **New Assumptions for an Integral Science**

An alternative scientific worldview or model cannot be justified on moral grounds, but what if we can construct a model of the universe that fits the data of human experience, including scientific experiment, better than the prevailing one *and* leads to morality, wisdom and health for humanity and other life forms, as in the original Greek intention?

Consider what might have happened had Galileo looked down through a microscope into a drop of pond water teeming with gyrating life forms instead of up through a telescope into the heavens, already conceived in his time as celestial mechanics? Might biology, rather than physics, have become the leading science into whose models all others must fit themselves? Might scientists then have seen life not as a rare accidental occurrence in futile struggle to build up syntropic systems against the inevitably destructive tide of entropy, but as the fundamental nature of an exuberantly creative universe?

Instead of projecting a universe of mechanism without inventor, assembling blindly through particular, atomic and molecular collisions a few of which came magically to life and further evolved by accidental mutations, I propose that there is reason to see the whole universe as alive, self-organizing endless fractal levels of living complexity as reflexive systems learning to play with possibilities in the intelligent co-creation of complex evolving systems.

I propose that it is actually more reasonable to project our life onto the entire universe than our non-living machinery, which is a derivative of life, a truly *emerging* phenomenon, rather than a fundamental one. I propose that it is possible to create a scientific model of a living universe, and that such a model is not only scientifically justified but can lead to the wisdom required to build a better human life on and for our planet Earth as the ancient Greeks intuited it should.

The current revolution—the impending paradigm shift—in science is forcing reconsideration of its most fundamental assumptions, that is, of the worldview described above, of the basic beliefs supporting the current scientific model of our universe or cosmos and ourselves within it. *Cosmos* is defined as “the universe as an orderly construct,” so because I am proposing an orderly model of the universe, I will usually prefer the word *cosmos*.

In eliminating those aspects of the perceived world that are not measurable, western science relegated them variously to subjective, mental, mythological, imaginary, storytelling, fictional, spiritual and other categories identified as *unreal*. A few aspects of our world, such as taste, smell and electromagnetism were shifted from unreal to real as ways of measuring them were discovered.

My model of the cosmos includes *all* human experience. The goal of this new framework for science is proposed to be a) to model a coherent and self-consistent cosmos as a public reality conforming as much as possible to necessarily private individual realities,

and b) to interpret this model for the purpose of orienting humanity within the cosmos and thus permitting it to understand its particular role within the greater cosmos.

Toward that end, I propose:

- a) The scientific definition of reality should be the collective human experience of self, world and universe as inner and outer worlds perceived from individually unique perspectives. (We have no other legitimate basis for creating cosmic models.)
- b) Consciousness (awareness) shall be axiomatic for the simple and obvious reason that no human experience can happen outside it.
- c) Formal experiments have as their purpose the creation of publicly shareable models of reality that permit common understanding and prediction.
- d) *Autopoiesis* (continuous self-creation) shall be adopted as the core definition of life. Since galaxies, stars, planets, organisms, cells, molecules, atoms and sub-atomic particles all fit this definition, this implies that life is the fundamental process of the cosmos, a self-creating living whole with self-creating living components in co-creative interaction.
- e) Nature shall be conceived in fractal levels of holons in holarchy, holons defined as relatively self-contained living entities such as those listed in d) and holarchy defining their embeddedness and co-creative interdependence on energy, matter and information exchange.

Beginning with these few assumptions and definitions as a conceptual framework for an integral science, we can reassess the past findings of science based on previous models, discover past errors and redesign experiments as necessary. We can also look for new patterns of regularity. (I shall avoid the term *laws* because of its implication of a lawgiver.)

### **Reality as direct human experience**

The idea of defining reality in terms of human experience may seem strange to any western scientist accustomed to firm belief in a firm firmament that includes our Earth and humanity but exists separately from human experience of it. Yet the whole edifice of a separate, objective world has been built on a belief in objectivity that has been discredited by philosophers of science and increasingly by scientists themselves. If the claim of basing science on reason, on experiment (a word derived from *experience*) and on rational argument is to be upheld, then *we cannot postulate a world that is not within human experience as long as we have no way to be outside human experience.*

The simplest case for conceiving reality as human experience, as stated above, is that we have no other legitimate basis for creating cosmic models. Note that this conception happily eliminates the need to define nonreality.

*Merriam Webster* defines reality as

**1 : the quality or state of being real, 2 a (1) : a real event, entity, or state of affairs (2) : the totality of real things and events; b : something that is neither derivative nor dependent but exists necessarily.**

The first three definitions tell us nothing as they define reality in terms of *real*. Only the final definition begins to tell us something meaningful, that reality “is neither derivative nor dependent but exists necessarily.” The only thing fitting this latter definition is direct perception, for once any perception is reported to another, whether by a three-year-old, a scientist or a theologian, it clearly becomes derivative.

The *Cambridge English Language Dictionary* adds “**existing in fact; not imaginary**” to its definition of reality, but a perusal of its definition of *fact* tells us:

**fact: something which is known to have happened or to exist, esp. something for which proof exists, or about which there is information**

The only way to truly *know* that something has happened or exists is to have direct experience of it, as we just determined. This clearly implies that truth can only be subjective. Unfortunately, western science has denied subjective (direct) experience as a valid reality in maintaining that the objective practice of science is the only way to demonstrate it. This belief is still strong among scientists though philosophers of science have long held that science cannot reach truth but only useful hypotheses.

The way in which hypotheses are determined to be useful or not lies, of course, in testing them experimentally. If the experimental outcome predicted by the hypothesis is found, they are considered useful. The validity of extrapolation beyond the experiment itself can only be judged in terms of consistency with our direct experience of the world.

It has now been shown in very careful research, for example by Elisabeth Targ<sup>2,3</sup> and Marilyn Schlitz<sup>3,4</sup> that remote intention and experimenter expectation clearly influence experimental outcome despite laboratory controls. The repercussions of such research have only begun to be felt, but certainly threaten to undermine the basic premises of western science if not its results.

More generally, the objectivity so sacred to western science has proved logically impossible. As Gregory Bateson noted decades ago, philosopher of science Alfred Korzybski warned us (in discussing the relationship between scientific models and reality) that “the map isn’t the territory and the name is not the thing named.” As Bateson himself put it, “there are no pigs or coconuts in the brain.”<sup>5</sup>

No human has ever had a direct (real) experience except in the eternally present Now; all the rest can only be stories that weave particular and more general past experience into the present. We cannot directly experience the past or the future. Whatever we are experiencing, from whatever combination of inner or outer sources, *is* our in-the-moment reality. Esoteric traditions have made much of this fundamental truth—the only truth there can be—while western science has totally ignored it until now. The only exception I

have found was on a scientific delegation to China (in 1974), where a Chinese scientist defined science as “the summation of people’s experience.”

The task a science accepting this fundamental truth is to sort and order reports of direct experience into an abstract public model of reality, using tools of reason, math, logic, experiment and narrative to construct it.

### Consciousness as axiomatic

In two of my books,<sup>6,7</sup> I introduced the idea of consciousness as fundamental to the cosmos without discussing human consciousness as fundamental to the construction of scientific models themselves. The fundamental assumptions of my model as listed above have to do with human experience of the universe and human conjecture about the universe based on, or derived from, human experience of it, because these are *all we have to go on* in creating models—scientific or other—of that universe. Human experience includes the perception of a tangible, substantive world, but this experience of a material world, even if coming through sense organs, lies entirely within human consciousness, or awareness.

The *Merriam Webster Dictionary* defines **consciousness** as “**the quality or state of being aware**” and **awareness** as “**having or showing realization, perception, or knowledge.**” The *Cambridge International Dictionary of English* calls consciousness “**aware, thinking, knowing**” and **awareness** as “**knowing that something exists, or having knowledge or experience of a particular thing**”.

Consciousness and awareness *are usually listed as synonyms of one another*, though awareness is more often linked to the concept of knowledge than is consciousness. The problem with this link to knowing is that knowledge is clearly culture bound. I shall therefore distinguish cosmic consciousness—a universal field of awareness—from

human consciousness in its broadest, most fundamental, cross-cultural understanding as awareness of self-in-world and world-in-self.

This human awareness of *having* an internal and external life perceived in images, sounds, touch, smells, feelings, thoughts, stories, etc. can be shared with others to a certain extent through verbal and other forms of language, thus giving rise to a broader cultural, or public, shared awareness of many-in-world. Once humans acquire language, this awareness arises in large part as verbal thought, which is why Descartes' stated his bottom-line of *knowing* as: "*I think, therefore I am.*"

Taking Descartes' lead in seeking my most basic observations, they are:

- I experience myself and others as alive.
- I experience myself at the center of an apparently spatio-temporal "outer reality" or universe.
- I experience myself as an inner self of perceptions, feelings and thoughts.
- I/we have no experience of the apparently spatial "outer world" outside of our conscious awareness.
- I/we have no direct experience outside of an eternal present or Now, yet I perceive my experience as though it lies on a continuum from past through Now to future.
- We can share our experiences in stories that transcend direct experience because of this timeline and our ability to communicate.

Thus we clearly perceive ourselves as existing in a physical spacetime world, and are able to describe it, model it symbolically and create other sharable stories of past (memories, histories, evolutionary trajectories) and future (forecasts, projections, anticipations) experience within it. But we can only describe it from the perspective of human experience. If we believe other species, planets, etc. to exist in their own right, we must also believe in the possibility of alternative scientific descriptions of the cosmos from other perspectives.

Therefore:

- Science can only order and model human experience within consciousness as communicated among humans;
- We cannot prove any "true" reality other than that composed of both uniquely personal and collectively shared experience;
- Recognizing our formalization of spacetime as a model of perception, rather than an objective reality, it becomes an important way of ordering shared experience.

That human individuals *can and do* share considerable (though far from perfect) agreement on external reality and varying degrees of agreement on internal reality is of very significant interest as it both makes society possible and produces a larger reality than any one individual can experience independently.

The best argument we have for the existence of a “real” vast universe is the *limitlessness* of human conscious awareness, whether it is focused inward or outward. Every scientific or spiritual discovery can be contained within its expansive capacity. Inner focus, when sufficiently practiced through meditation and other spiritual practice gives rise to the experience of ultimate truth in a limitless Source, called I AM, Cosmic Consciousness or God by many names across all cultures and felt as loving bliss. Outer focus, when sufficiently practiced through scientific study and reasoning gives rise to the experience of a coherent, comprehensible, though limitless universe or cosmos and recognition of arrival at its truth also produces “breakthroughs” felt as bliss. Those who practice both disciplines come to recognize the unity of these end results as a non-dual cosmic reality.

Thus, building a scientific model on the fundamental assumption of consciousness as the source of reality does not shrink the cosmos one whit. But it keeps us within that cosmos as co-creators of it, as reflections of cosmic creation at all other levels. For reality co-created by humans through a private and public collaborative process suggests a greater

holarchic universe of collaborative process. All Nature can thus be elegantly conceived as conscious collaborative process.

Note that as we have found no limits to human conscious awareness, our awareness is (necessarily) coextensive with any models we build of the entire universe. Anything we "discover" scientifically about the universe becomes part of our conscious awareness, and therefore of our experience.

Sophisticated ancient cultures such as Vedic, Taoist and Kotodama, along with many indigenous cultures, recognized the fundamental consciousness of all Nature, the entire Universe or Cosmos, and much in the findings and conceptualizations of physics and biology today leads us in that direction.

### **The Model and its Implications**

We stand at a critical time in human history where the “self-evident” axiomatic “truth” of a depressingly meaningless mechanical universe running down by entropy, magically giving rise to biological creatures doomed to endless competitive struggle to get what they can while they can, is no longer defensible. Most fundamentally, we see now that this model was built on the false concept of an objective universe independent of human observers. We are also in a position to see just how this western scientific model, which overrode previous religious models of “How Things Are,” has led human society astray. Our mechanistic social organizations no longer serve us, nor does the competitive economy that destroys ecosystems and impoverishes vast numbers of humans and leads to the endless warfare so basic to its model.

In its place, happily, we can construct a new scientific model on the far more self-evident truths outlined above, one that takes into account the entire gamut of human experience and recognizes the cosmos as fundamentally conscious and alive. Much progress has already been made by myself and many other scientists to flesh it out.

The new model offers a holistic view of life in which biology, physics and consciousness studies are mutually compatible and consistent. The new axiomatic definitions and assumptions given here for this model of a living universe sees it not as a collection of accidental biological entities evolving on rare planets of a non-living universe through the mechanics of natural selection, but as a holarchic, evolving, intelligent, process intrinsic to the cosmos itself—in short, as *the* natural process of the cosmos itself, as self-organizing expressions of a cosmic field of consciousness.

Cosmic autopoiesis—the self-creation of a living universe—promises to become an elegant view of the whole, with essentially the same production *and* recycling processes at all scalar or fractal levels. The highly complex life forms familiar as “biological” are seen to emerge uniquely at a holarchic level halfway between microcosm and macrocosm.

Because this model offers a framework for understanding, and more consciously creating, our own human nature and trajectory within the greater cosmic process, it is consistent with the original Greek intent to develop scientific understanding of the Cosmos in order to find wise guidance for human affairs.

A conscious, self-creating living cosmos is one in which life is sacred, ethics are inherent in evolutionary maturation processes and humanity itself can follow countless other species out of a juvenile mode of competitive aggression and into mature cooperation, a process I believe is apparent in our struggle to move beyond win/lose oil economics and into the establishment of true global family.



### References

- 1) Ehrich, Thomas, "Defending Beliefs: Objectivity as Validation for Critiques of Health Care Resource Allocation," Gustavus Adolphus College, April, 1996  
<http://www.gustavus.edu/oncampus/academics/philosophy/ehrich.html>
- 2) Sicher, F, Targ, E, Moore, D, Smith, H. (1998) "A Randomized Double-Blind Study of the Effect of Distant Healing in a Population With Advanced AIDS" Western Journal of Medicine, December 1998, Vol 169, No. 6, pp. 356-363
- 3) Targ, E., Schlitz, M., & Irwin, H.J. (2000). Psi-related experiences. In E. Cardeña, S.J. Lynn, & S. Krippner (Eds.), *Varieties of anomalous experience: Examining the scientific evidence* (pp. 219-252). Washington, DC: American Psychological Association.
- 4) Wiseman, R. & Schlitz, M. (1998) Experimenter effects and the Remote Detection of Staring, *Journal Of Parapsychology*, 61, 197-208.
- 5) Bateson, Gregory (1980) *Mind and Nature*. Bantam edition: New York
- 6) Harman, Willis and Elisabet Sahtouris (1998) *Biology Revisioned*. North Atlantic Books: Berkeley, CA
- 7) Sahtouris, Elisabet (2000) *EarthDance: Living Systems in Evolution*. iUniverse.com: Ingram: New York