

## **Epic of Evolution**

### **1363 words**

The Epic of Evolution, like its synonymous terms, “cosmic evolution” and “the universe story,” encompasses what Eric Chaisson has labeled “the broadest view of the biggest picture.” This epic tells the sprawling story of the evolution of the cosmos, from the first moment of creation to the present state of the universe. It is the attempt to construct a unified and comprehensive narrative of systematic development throughout the history of the universe, including the origins and the diverse organization of matter, life and consciousness. The Epic of Evolution is premised on the insight that the universe as a whole is best understood as a single unfolding event, beginning with the big bang, perhaps 15 billion years ago, and continuing through the emergence of macroscopic structures (e.g., galaxies, stars, solar systems), and microscopic structures (e.g., atoms, molecules, cells).

The Epic of Evolution has been inspired by the remarkable theoretical unification of scientific disciplines taking place during the course of the twentieth century. The most exciting theoretical advances in science in recent decades are those enabling an integration of the sciences of the large with the sciences of the small. In physics, astronomy has been theoretically coupled with particle physics to produce quantum cosmology. In biology, evolutionary theory has been coupled with molecular biology to produce a grand synthesis. Theoretical breakthroughs have continued into the social sciences, where behavioral genetics and neurobiology are being integrated with cognitive, developmental and social psychology. These advances have gradually revealed what

Edward O. Wilson has called “consilience,” that is, a fundamental continuity and theoretical coherence among the physical sciences, the life sciences and the behavioral sciences. Consilience among scientific disciplines now makes it possible to construct a coherent narrative of the emergent properties of matter, life and consciousness. Implicit in contemporary science is an Epic of Evolution.

The task of making the Epic of Evolution explicit is not itself a part of science, although it is directly informed by scientific disciplines. It may rather be said that the Epic of Evolution is a product of imaginative mythmaking under the critical and watchful eye of contemporary science. As such, we must allow for a relatively wide range of variation on the central theme of cosmic evolution. Here follows an attempt to summarize the broadest view of the biggest picture.

In the beginning was singularity. Everything that would eventually become the universe was contained in an unimaginably small and dense region. About 15 billion years ago the singularity was released in an expanding burst of pure radiant energy, out of which particles of matter distilled into copious amounts of hydrogen and helium atoms. For about a billion years the universe billowed forth in an expanding cloud of cooling gas. Under the influence of gravity, irregularities in the expanding cloud fragmented into billions of galaxies, and within galaxies matter was condensed into stars. At this point in our cosmic history, physics was the only science that would have made any sense. Many stars eventually exploded in supernova events, synthesizing the nuclei of diverse atomic elements in the process. As exploding stars emptied their contents into space chemistry would begin to make sense. Atoms of many types commenced to form molecules in interstellar space. Second- and third-generation stars were condensed out of interstellar

matter, and around some of these new stars there swirled disks of particulate matter, gradually accumulating into orbiting planets. Our own solar system was formed in this process about 4.6 billion years ago. The young earth was a semi-fluid cauldron of physical and chemical activity, allowing heavier elements to gravitate toward the center and lighter elements to be pushed toward the surface. By 3.8 billion years ago the earth had sufficiently cooled and settled so that distinct regions of earth (lithosphere), water (hydrosphere), and air (atmosphere) were formed. Chemical interactions at the interfaces of these regions eventually produced the biosphere, the region of the earth's surface where living systems emerged from the prebiotic soup. The prebiotic soup was a chemical quagmire of molecular evolution, wherein molecules competed for the attention of unbound atoms. The big winners in this chemical free-for-all were large molecules having special properties, such as those for catalyzing chemical reactions (metabolism), making copies of themselves (replication), or both. Once the functions of metabolism and heredity were coordinated within the membranes of primitive cells biology would begin to make sense. Living systems diversified aggressively. The earliest prokaryotic cells specialized in pioneering diverse metabolic pathways. Drawing on these biochemical breakthroughs, eukaryotic cells introduced a stunning diversity of shapes, sizes and movements – all variables that prepared organisms to adapt to new environmental niches. The next frontier for bioexperimentation was to diversify behavior. This eventually led to multicellularity and sexual reproduction. The evolution of behavior took a dramatic leap forward when some organisms developed cell lines (nerve cells) specialized for processing information. Increasingly complex neural systems enabled the capacity for learned behavior and conscious experience. Psychology

would now begin to make sense. About a million years ago our human ancestors acquired the rudiments of language, thus introducing potentials for organizing consciousness in diverse ways. Social systems, technologies and ideologies would now develop and diverge rapidly as cultures responded to environmental challenges.

The Epic of Evolution is inherently controversial because it has astringent implications for traditional religious worldviews. Every cultural tradition is nourished by a distinctive myth, a metanarrative providing individuals with a shared orientation in nature and history. Myths engender a collective identity by informing us about our ultimate origins, our common human nature and our shared destiny. The meanings embedded in our cultural stories give us the essential resources for thinking and acting with a unity of purpose. Epic of Evolution enthusiasts have found many of the elements of a religio-cultural myth implicit in the story of cosmic evolution. Any story telling us that we are star-born, earth-formed creatures, who are absolutely dependent on the integrity of the earth's [now threatened] natural systems, cannot fail to arouse religious and moral sensibilities. Moreover, the Epic of Evolution engages the imagination in a way that relativizes prescientific mythic traditions. The Epic of Evolution is religiously controversial because it affronts the intellectual plausibility and the moral relevance of traditional religious worldviews.

The many ancient religious traditions of the world originated in historic circumstances very much like our own, that is, moments of deepening crisis when nothing short of a transformation in human consciousness would save the day. Human beings are presently faced with an emergency of global proportions. Every natural life-support system on the planet (air, water, soil, climate, ozone, biodiversity) is in a state of

serious and rapid decline, creating a suicidal trajectory accelerated by the very social institutions we have invented to safeguard the future. Human beings presently lack the intellectual and moral resources required to achieve solidarity and cooperation on a scale commensurate with the problems we collectively face. We find ourselves spiritually maladapted to our environmental circumstances.

When faced with comparably dire prospects our ancestors did the reasonable thing: they turned to new sources of wisdom and fashioned new myths of enduring promise. It is in this spirit that Epic of Evolution enthusiasts have turned to the scientifically informed narrative of cosmic evolution as a point of departure for proselytizing a new religious orientation that sanctifies the natural order. What they hope for is the emergence of Religious Naturalism, that is, new forms of ritual and practice that celebrate and serve the sacredness of the earth. It remains to be seen whether religious naturalism might eventually replace traditional religious orientations, merely stimulate their radical self-transformation, or prove to be of little influence on religion and environmental practice.

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### **Further Reading**

Chaisson, Eric. *Cosmic Dawn*. New York: W. W. Norton, 1981.

Chaisson, Eric. *The Life Era*. New York: W. W. Norton, 1987.

Ferris, Timothy. *The Whole Shebang*. New York: Simon and Schuster, 1997.

Goodenough, Ursula. *The Sacred Depths of Nature*. New York: Oxford, 1998.

Layzer, David. *Cosmogenesis*. New York: Oxford, 1990.

Rue, Loyal. *Everybody's Story: Wising Up to the Epic of Evolution*.

Albany: SUNY Press, 1999.

Swimme, Brian, and Thomas Berry. *The Universe Story*. New York: HarperCollins, 1992.