

THE EPIC OF EVOLUTION AND NATURE LITERACY

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Like many others attending the Journey of the Universe conference, my fascination with the Epic of Evolution was sparked by Thomas Berry. As an evolutionary biologist, I was struck by his visionary expansion of evolution into a unified grand epic of cosmos, life, and culture. As an educator, I suddenly found myself deafened by his clarion call to the “Great Work.” I eventually left my tenured faculty position at the University of Utah and moved with my wife to the San Francisco Bay area, with the goal of pursuing a range of education-related initiatives. I soon found myself writing a general audience book, hosting a television show for preschoolers about science and nature, given more public lectures on evolution, and consulting with natural history museums. I also spent several years immersed in reading and reflection, attempting to come to grips with the dire circumstances surrounding our pivotal moment in history and my potential role in any solutions.

I have recently come to the conclusion that the most pressing issue of our time is promoting “nature literacy” among children. This position rests on a trio of assumptions. First, the eco-crisis is fundamentally an internal crisis of mind founded on a dysfunctional worldview, one that perceives humans as outside and above non-human nature. Second, the rapid transformation in consciousness now required will not occur among adults; rather our efforts must be focused on children, who are still engaged in the process of constructing worldviews. (Far from passing responsibility on to future generations, however, my contention is that we must demonstrate the courage, wisdom, and foresight to cultivate the “Insider’s” perspective, at least to the degree possible.) Third, in order to be effective, the “humans-inside-nature” perspective must be rooted in local places through a combination of knowledge and direct experience. It is with the third assumption that the Epic of Evolution comes into play, and thus I focus the comments that follow on this point.

Cultural origin stories, or cosmologies, provide explanations for the origin and ordering of the world and cosmos, validating beliefs and organizations while offering a deep sense of meaning. Throughout human history, virtually all cultures have been rooted to their native place by such narratives—until recently that is. Although present-day indigenous peoples and most followers of religious traditions have a cosmology, the bulk of us living in Western industrial societies exist largely without one. It seems likely that the lack of both a story and a sense of deep time contribute to the dearth of greater meaning and purpose that many of us experience, with one result being the dysfunctional human-nature relationship at the heart of the sustainability crisis.

As participants of this conference are well aware, an astonishing and staggeringly beautiful account of our deep time evolutionary history has emerged from

within science over the past several decades. Various called the Epic of Evolution, the Great Story, the Universe Story, the New Story, or Big History, this grand narrative has the potential to unite humanity and root us in both local places and deep time. Far from leading to the desolate view that the universe is dead and meaningless, as commonly conceived, this saga provides the foundation for seeing ourselves as deeply embedded within the fabric of a creative cosmos. The Epic of Evolution, informed by virtually all scientific disciplines, is perhaps science's greatest contribution, offering a direct glimpse into where we come from and what it all means.

Several individuals, including Thomas Berry and many participants of the upcoming JOTU conference, have argued strongly that the Epic of Evolution must be a pivotal element in re-envisioning the human-nature relationship. Yet, despite ongoing efforts spanning almost three decades, this saga remains effectively absent from Western culture, all but ignored by scientists, philosophers, educators, environmentalists, and spiritual practitioners alike. Today, few people can convey anything of this epic beyond perhaps an incomplete sequence of origins—for example, galaxy, Earth, bacteria, fish, amphibian, mammal, upright primate, *Homo sapiens*—with humans typically situated at the pinnacle. How can it be that we, who have access to by far the most rigorous and comprehensive story of the cosmos, do not use it to inform the arc of our lives?

Some would point to the efforts of the religious fundamentalism to suppress evolution, particularly in the United States. Others would underline Western culture's myopic focus (faithfully conveyed within education) on the present day, with the implicit message that almost everything that came before is meaningless, or at least irrelevant. Still others would note that the deep scientific insights at the core of the Great Story tend to be highly counterintuitive; to grossly understate matters, it's not easy to grasp the notion that we are chunks of starstuff living on the side of a giant, spherical rock hurtling through space at thousands of miles an hour! While these factors and others are certainly involved, I would like to suggest that the single greatest obstacle preventing widespread dissemination of the Great Story may well be abstraction. To date, the evolutionary epic has been presented as a grand saga uniting all of humanity within a single cosmic unfolding. Yet absent has been a clear means of grounding this story in everyday experience, where it could assert its full emotional (as opposed to merely intellectual) impact.

Recently, a remarkable "schooling for sustainability" movement has emerged, with a strong emphasis on ecological literacy, or "ecoliteracy." Advocates, among them David Orr and Fritjof Capra (see: www.ecoliteracy.org), argue persuasively that ecology taught through a systems approach deserves to reside at the core of the academic curriculum. Although still nascent, this effort to learn from nature and to focus education on place and community is exciting and revolutionary. Programs such as school gardens and reclaiming local watersheds promote understanding of, and passion for,

local places. A major thrust of ecoliteracy programs is experiential learning outdoors, including service learning. And a growing body of research shows that students who receive a place-based education typically outperform their traditionally educated peers.

Nevertheless, critical concepts inherent in the Epic of Evolution—among them deep time and transformation—are effectively absent from the ecoliteracy approach. Meaning, purpose, and belonging have less to do with where we are at any given moment than where we've been and where we're going. Thus, while fully supportive of the ecological emphasis, I maintain that the curricular core should be two-pronged, with cosmic evolution serving as a vibrant addition. In addition to communicating the horizontal connections viewed through the temporal snapshot of "ecoliteracy," equal attention should be given to evolution literacy, or "evoliteracy", the vertical, transformational context that roots us in deep time. Whereas ecoliteracy addresses *how nature works* at any given moment, evoliteracy informs us about *how nature came to be*. The Epic of Evolution deserves to be told and retold, with appropriate increases in complexity, from childhood through adulthood.

Combining eco- and evoliteracy yields "nature literacy," by which I refer not only to intellectual knowledge, but also to a much deeper, affective kind of knowing grounded in outdoor experience. If science is to inform the meaning of our lives, we must experience key concepts bodily (as advocated by Brian Swimme and others). Scientific ideas become meaningful when we experience and reflect upon them directly with multiple senses. An understanding of nature must enter our bodies through all of our sensory channels—eyes, ears, nose, mouth, and pores—as well as via the sharing of information. Above all, we must engage children in outdoor, natural settings. Abundant evidence exists, moreover, that meaning must be actively constructed; that is, learning is most effective when students engage directly in the learning process rather than act as information receptacles. And the whole-to-parts approach—that is, beginning with the "big idea" and filling in missing pieces—is far more successful in generating meaning than the more traditional parts-to-whole method. Following Berry's wisdom, I maintain that the Epic of Evolution should serve the role of overarching "big idea."

To be clear, I am not advocating that humanity embrace a single, global cosmology. The beauty of the evolutionary epic is that it allows for an endless variety of interpretations, with and without God(s). Of course, the Great Story is not compatible with all religious beliefs, particularly fundamentalist notions of creation within the past 6,000 years. Just as the world's spiritual traditions have adapted to the notion that the Earth does not exist at the center of the universe, so too must we now accept, indeed embrace, the fact that we live in a universe that has been evolving for billions of years. The Great Story provides the framework, one that can be molded into a spectrum of cosmologies informed by specific historical, cultural, and ecological contexts.

If local place and the Epic of Evolution are arguably *the* critical concepts necessary for nature literacy and a biocentric worldview, how might these ideas be

woven together? At first glance it would seem that cosmic evolution has little in common with local place. After all, the former deals with the biggest scales of time and space, whereas the latter is concerned with the very intimate nearby. Nevertheless, I propose that the particulars of place are best communicated in tandem with the evolutionary epic, with the two concepts reinforcing each other.

Imagine for a moment communicating the Epic of Evolution entirely through reference to characters and features of local place? To give just a few examples, a mountain might serve to tell of the origins of galaxies and stars (with all heavy elements in the rocks forged within stellar furnaces); a creek could become the vehicle for speaking of the birth of molecules (combining oxygen and hydrogen to become water); a tree could convey the story of life learning to harness the sun's energy; a fish within that creek could then become the entry point for telling of the first back-boned animals and their transition onto land; a bird offers a handy starting point for presenting the evolution of reptiles, dinosaurs, and birds; and a local indigenous tribe might offer the vibrant focus for telling of the birth of humans and their changing relationship to the land. The entire story might be conveyed outdoors in a natural setting, engaging the full range of listeners' senses, as indigenous storytellers have done for millennia. The key point is that the varied key innovations in the cosmic evolutionary story (galaxies, stars, landscapes, bacteria, plants, animals, culture, etc.) have all persisted to the present day, and every place possesses these elements in one form or another. So any place can be used to convey the full splendor of our cosmic saga in a manner both engaging and accurate (at least to the best of current knowledge).

This "cosmolocal approach" provides the opportunity for reciprocal illumination of place and story. On the one hand, the Epic of Evolution offers a wondrous narrative context that adds meaning to local place. On the other, local places provide the characters and direct experience that makes this evolutionary epic alive, immediate, and engaging. Each version of the story can be tailored not only to place, but also to the age and knowledge base of the audience, from children through adults. Importantly, these stories should not be presented as received 'truths.' After all, like science generally, the story of cosmic evolution, although well established in its fundamentals, is still provisional, and will undoubtedly "evolve" itself. More importantly, the cosmolocal approach opens the door for each person to construct his/her own unique version of the Universe Story, selecting the most meaningful local characters with which to explore and convey this saga.

Ultimately, then, a cosmolocal, nature literacy-based approach has the potential to foster simultaneously a sense of place and a "sense of cosmos." If literacy is the ability to read, we might think of nature literacy as the ability to read nature—using both sensory experience and learned knowledge to guide our daily decisions. Of course, the approach advocated here is not new; indigenous peoples have employed it for many thousands of years, rooting their origin myths in the intimate details of local place.

“The universe is made of stories, not atoms.” So said poet Muriel Rukeyser, underlining the power of narrative. Why does the Epic of Evolution merit a central place in education, and culture generally? Because this grand saga represents our best understanding of the evolving universe; because internalizing the idea of common ancestry through deep time will help us reconnect with nonhuman nature; and because disseminating this story widely may well be critical to shifting worldviews and achieving sustainability. Only when the evolutionary epic is finally expressed throughout our culture—not just in science, but in poetry, song, fine arts, dance, and other arts—will we begin to truly understand what it means to be part of a single, evolving universe at this pivotal moment in deep time. Only then will we begin to conceive of nature not as resources for our exploitation, but as relatives deserving of our compassion and empathy.

Using the above approach as an organizing philosophy, I have now begun working on a multifaceted national campaign for nature literacy. I look forward to the JOTU conference with eager anticipation, confident that the many conversations shared during this event, and cascading in its wake, will be pivotal in “scaling up” dissemination of Epic of Evolution in time to play a key role in Berry’s Great Work. Thank you very much in advance to all participants.