



# JOURNEY OF THE UNIVERSE

## Bibliography

### Annotations by the Forum on Religion and Ecology

#### Comprehensive Science Bibliography

<http://fore.research.yale.edu/disciplines/science/fablebib/index.html>

The Forum on Religion and Ecology at Yale provides an extensive science bibliography, which proceeds from highlighting self-organizing principles to understanding their embodiment at each stage in the emerging universe from galaxies, stars, planets, and ecosystems. Ranging from cosmology to ecology to complexity sciences, this bibliography documents a remarkable body of literature that depicts the relational qualities of our planet and the universe in which it evolved has emerged.

#### Selected Bibliography with Annotations (in chronological order)

**Lyell, Charles. *Principles of Geology*. First published 1830-1833.**

In his *Principles of Geology*, the prominent 19<sup>th</sup>-century geologist Charles Lyell argued that Earth's crust has been formed through small changes taking place gradually over long periods of time. This groundbreaking work popularized the concept of uniformitarianism, which proposes that the present is the key to the past, that is, the forces currently shaping Earth are the same forces that have been forming it throughout the whole history of its development. Charles Darwin read *Principles of Geology* while on his famous voyage on the *Beagle*, and he extended the uniformitarian principle to biology, thus claiming that the forces currently shaping life on Earth (e.g., reproduction, inheritance, etc.) are the same forces that have been shaping life throughout its history.

**Darwin, Charles. *Origin of Species*. First published 1859. New York: Signet Classics-Penguin Books, 2003.**

In this foundational text for evolutionary theory and for the life sciences, Darwin proposes his theory that species evolve through the process of natural selection, whereby adaptations that help organisms survive and reproduce are passed on to successive generations. Writing the work to be accessible to the general reader, Darwin presented evidence that the diversity of species emerged through a branching evolutionary pattern or “tree of life.” Among the research presented in his *Origin of Species*, Darwin included his findings from his famous voyage on the HMS *Beagle*. Along with its revolutionary influence on subsequent scientific inquiry, Darwin’s *Origin of Species* has also been the focus of many philosophical, religious, and political inquiries and debates.

**Eiseley, Loren. *The Immense Journey*. New York: Vintage Books, 1956.**

In this work by an “imaginative naturalist,” the anthropologist and nature writer Loren Eiseley describes his vision of the journey of evolution, with particular attention to the unique place of humans in this immense journey. Integrating scientific inquiry, imaginative wonder, and philosophical reflection, Eiseley articulates a lyrical narrative that weaves together his experiences in the natural world with reflections on the mysteries of life and the evolutionary process. Eiseley covers numerous themes through this book, including the ancestors of the human species, the magical importance of water for life, the depths and abysses of the sea, the lives of birds, the transformative impact of flowers on planetary life, the future of humanity, and much more.

**Teilhard de Chardin, Pierre. *The Human Phenomenon*. First published 1960. Brighton: Sussex Academic Press, 1999.**

In *The Human Phenomenon* (originally published posthumously in French as *Le Phénomène Humain* [1955]), Teilhard draws on his diverse background as a philosopher, Jesuit priest, and paleontologist to articulate his vision of evolution. Teilhard gives a description of evolution as a process that is both subjective (“interior”) and objective (“exterior”). The evolutionary process leads toward greater degrees of complexity and consciousness, from the evolution of the material cosmos, to the development of life on Earth, to the emergence of the human species and its self-reflective consciousness. For Teilhard, the human species marks a new level of evolution as it constitutes a sphere of thought or mind (“noosphere”) around the sphere of life on Earth (“biosphere”). Teilhard proposes that evolution culminates in the Omega Point, where all other points of complexity and consciousness converge.

**Toulmin, Stephen and June Goodfield. *The Discovery of Time*. Chicago: University of Chicago Press, 1977.**

Presenting a history of the idea that the world is historical, Toulmin and Goodfield trace the main lines of thought that have conditioned the basic features of the contemporary view of the history or “life-story” of the world. In other words, *The Discovery of Time* depicts the evolution of the idea of evolution. The authors provide a comprehensive outline of the development of ideas about time, history, and evolution throughout the various epochs of human civilization, from prehistoric and ancient to modern and contemporary worldviews. This genealogy of ideas about history involves complex relationships between multiple perspectives, including the mythological and theological perspectives of religious worldviews to the perspectives of philosophical and scientific systems.

**Worster, Donald. *Nature’s Economy: A History of Ecological Ideas*. First published 1977. Cambridge: Cambridge University Press, 2008.**

In *Nature’s Economy*, environmental historian Donald Worster presents a comprehensive overview of the history of ecology. Worster covers predecessors to the contemporary field of ecology (e.g., Carl Linnaeus, Henry David Thoreau, and Charles Darwin) as well as main figures and ideas from the history of ecology after it was explicitly designated as a field of study by Ernst Haeckel, who coined the word in 1866. Worster covers such notable twentieth-century figures in ecology as Aldo Leopold, Rachel Carson, Eugene Odum, James Lovelock, and more. Worster also considers some ways that the development of ecological ideas has shaped contemporary understandings of the place of humans in the natural world, including implications for ethics, economics, and the challenges of the global environmental crisis.

**Sagan, Carl. *Cosmos*. New York: Ballantine Books, 1980.**

This book accompanies the 13-part television series presented by Carl Sagan, *Cosmos: A Personal Voyage*. Each of the book’s 13 chapters corresponds to an episode of the television series. In this widely read book (which can be read independently of the series), Sagan describes the evolution of the cosmos and the history of philosophical and scientific ideas that have led to the development of the current understanding of the evolving universe. Sagan also accounts for the development of human civilization and the place of humans in the cosmos and, more specifically, the place of humans on Earth. Along with a his presentation of a vast breadth of philosophical and scientific ideas, Sagan also speculates about the future, including the future of science, the future of human civilization, and the future of life on Earth.

**Prigogine, Ilya and Isabelle Stengers. *Order Out of Chaos: Man’s New Dialogue with Nature*. New York: Bantam, 1984.**

A collaboration of Nobel Prize-winning chemist and physicist Ilya Prigogine and the philosopher Isabelle Stengers, this work presents the historical development of scientific and philosophical

ideas about order and chaos. In particular, Prigogine and Stengers focus on the distinction between predictable systems which are in or near equilibrium and unpredictable chaotic systems, which are “far from equilibrium.” The authors describe how, in far from equilibrium situations, systems do not simply fail or break down: new systems emerge. With its exclusive focus on predictable and deterministic systems, the paradigm of classical science cannot account for this generation of order out of the turbulent chaos of systems that are far from equilibrium. The authors call for a new paradigm, where the dialogue between humans and nature is open to the uncertainty, complexity, and mystery of nature.

**Wilson, Edward O. *Biophilia: The Human Bond with Other Species*. Cambridge: Harvard University Press, 1984.**

In this book, the American biologist E. O. Wilson articulates his concept of “biophilia” or the “love” (*philia*) of “life” (*bios*), which he defines as “the innate tendency to focus on life and lifelike processes” (p. 1). Biophilia is essential to humanity, as it is the source of the bond whereby humans relate to other species. Wilson argues that the attitudes of biophilia provide the elements from which a conservation ethic could be constructed. To describe biophilia and its implications for relations between humans and other species, Wilson embeds his presentation of technical concepts and definitions within a compelling and easily accessible narrative that invites the reader to follow him through his experiences doing research in the Amazon basin.

**Swimme, Brian and Thomas Berry. *The Universe Story*. San Francisco: Harper San Francisco, 1992.**

*The Universe Story* is a collaboration of the cosmologist Brian Swimme and the cultural historian and “geologist” Thomas Berry. With an accessible and lyrical style that integrates the perspectives of the sciences and humanities, it presents the epic journey of the universe from its beginnings in the Big Bang (the “primordial flaring forth”) through the formation of galaxies, the evolution of life on Earth, and the development of human civilization. Swimme and Berry propose that the future of humanity and the Earth community could be envisioned in terms of a transition into an “Eozoic Era,” wherein humans would cease being a destructive presence on the planet and would become a presence that would take responsibility for the well-being of the entire Earth community.

**Tucker, Mary Evelyn and John Grim, eds. *Worldviews and Ecology: Religion, Philosophy and the Environment*. First published 1994. Maryknoll, NY: Orbis Books, 2008.**

Bringing together essays from leading scholars of philosophy and religion, this book addresses the importance of including religious and philosophical perspectives in efforts to identify the roots of and develop responses to the ecological crisis. The book begins with introductory essays that outline the challenges of the ecological crisis and the need for a transformation of ethics, values, and worldviews, a transformation that would move away from the anthropocentrism of the modern Enlightenment and toward a multiform environmental ethic that would support a

sustainable global society. The following section of the book includes essays on the ecological implications of the world's religious traditions, including indigenous North American traditions, Judaism, Christianity, Islam, Baha'i, Hinduism, Jainism, Buddhism, Taoism, and Confucianism. The final section includes essays on contemporary perspectives that integrate worldviews and ecology, including the new cosmology (Swimme, Metzner, Rasmussen), ecofeminism (Spretnak), process philosophy (Griffin), deep ecology (Sessions), and the integral Earth study of ecological geography (Berry).

**Rogers, Pattiann. *Firekeeper: New and Selected Poems*. Minneapolis: Milkweed, 1994.**

This is a collection of poems from the award-winning American poet Pattiann Rogers. It includes poems from throughout her career, poems that evoke the wonder and mystery of relationships in the natural world and the place of humans therein. Throughout her work, which is occasionally compared to that of Walt Whitman and Ralph Waldo Emerson, Pattiann blends lyrical beauty and poetic imagination with the scientific insight of a naturalist. Pattiann is both thought-provoking and emotionally evocative as she expresses the intimacy that connects humans with other forms of life and with the material world, an intimacy that is vulnerable, erotic, passionate, and spiritual.

**Barlow, Connie, ed. *Evolution Extended: Biological Debates on the Meaning of Life*. Cambridge, MA.: MIT Press, 1994.**

This is an anthology of selections of writings on debated issues related to evolutionary theory, covering many issues that intersect with theological and religious questions about the meaning of life and the place of humans in the universe. The selections come from prominent figures who have contributed to debates on the meaning of evolution, including Charles Darwin, Julian Huxley, E. O. Wilson, Richard Dawkins, Gregory Bateson, Lynn Margulis, Karl Popper, Pierre Teilhard de Chardin, Jacques Monod, Brian Swimme, Pope John Paul II, and many more. Some of the key themes that are addressed include the progress and goals of evolution (i.e., teleology), chance, complexity, diversity, symbiosis, evolutionary worldviews, and responses to creationism. This anthology includes helpful references and suggestions for further reading.

**Deacon, Terry. *The Symbolic Species: The Co-Evolution of Language and the Brain*. New York: W.W. Norton, 1997.**

In this book, the American anthropologist Terrence Deacon presents a thought-provoking and groundbreaking account of the evolution of the symbolic thinking that characterizes the uniqueness of the human species. Drawing on anthropology, cognitive science, evolutionary theory, and theories of signs (semiotics), Deacon provides a comprehensive and accessible overview of the evolutionary adventure of the human species. Dividing the book into three sections which deal respectively with language, the brain, and their co-evolution, he shows how human cognition is rooted in the co-evolutionary relationship between language and the brain, where language can be understood metaphorically as a parasite that has evolved with the brain

by adapting to it as to a host. Deacon invites the reader to participate in an imaginative reassessment of human origins and human consciousness.

**Liebes, Sidney, Elisabet Sahtouris, and Brian Swimme. *A Walk Through Time: From Star Dust to Us*. New York: John Wiley, 1998.**

This book is based on the exhibition, “Walk Through Time... from stardust to us,” a one mile-long illustrated walk that portrays the journey of life’s evolution, where each foot in the exhibition represents one million years of the evolutionary adventure. Along with the text and illustrations from the original exhibition, the book includes additional texts on the story of evolution written by cosmologist Brian Swimme and evolutionary biologist Elisabet Sahtouris. The editors provide a helpful glossary that makes the book more accessible to the general reader. The book also directs the reader to resources for converting any mile-long walk into a self-guided version of the “Walk.” *A Walk Through Time* can be read as a way to experience the acclaimed exhibition or a way to enjoy the wondrous and compelling story of evolution.

**Tattersall, Ian. *Becoming Human: Evolution and Human Uniqueness*. New York: Harcourt Brace, 1998.**

The evolution of the unique traits of the human species is the focus of this book by Ian Tattersall, anthropologist and curator of the American Museum of Natural History. Opening the book with an account of his experience of cave paintings in France that were created approximately thirteen thousand years ago, Tattersall takes the reader on a tour of the world, describing the adventure whereby the human species evolved and developed its capacities for art, cognition, language, love, and religious experience. To explore what sets humans apart from their closest relatives in nature (including early human ancestors and the great apes), Tattersall integrates insights from many areas of study, including art history, primates, archaeology, fossils, evolutionary theory, and more.

**Goodenough, Ursula. *Sacred Depths of Nature*. New York: Oxford University Press, 2000.**

In this book, the biologist Ursula Goodenough weaves together scientific and religious perspectives on evolution and the natural world. Covering topics ranging from the epic of evolution to sex, consciousness, and spirituality, Goodenough draws on insights from multiple areas of inquiry, including evolutionary theory, philosophy, theology, cosmology, chaos theory, and more. She brings together personal narrative, thought-provoking ideas, and religious devotion to reflect on nature and the place of humans in the evolutionary journey. Goodenough proposes a religious naturalism, which integrates sciences and religions to participate in the mysteries of the universe and enact a global or planetary ethic whereby members of the diverse traditions of the world would cooperate to facilitate respect and reverence for all forms of planetary existence.

**Rue, Loyal. *Everybody's Story: Wising Up to the Epic of Evolution*. Albany: State University of New York, 2000.**

Loyal Rue, religious naturalist and professor of philosophy and religion, discusses the evolutionary epic in *Everybody's Story*, which is a scientific story about the nature of the universe, a story with profound implications for morality and religion. The book includes two parts, which are preceded by an introduction that provides a succinct overview and summary of the book. In the first part of the book, Rue tells the story of evolution, beginning with the evolution of matter and proceeding through the evolution of life on Earth and the emergence of consciousness with the evolution of the human species. In the second part, Rue presents the moral implications of the evolutionary epic, arguing for a moral objectivity that includes dimensions of nature (ecotherapy), consciousness (psychotherapy), and social systems (politics).

**Rees, Martin. *Our Cosmic Habitat*. Princeton: Princeton University Press, 2001.**

Cosmologist, astrophysicist, and Great Britain's Astronomer Royal, Martin Rees presents *Our Cosmic Habitat*, a fascinating overview of current scientific perspectives on the nature of the universe. Rees provides an accessible and comprehensive introduction to the complex and mysterious phenomena that compose the universe, including the big bang, black holes, dark matter, dark energy, antimatter, supernovae, the formation of galaxies, the evolutionary origins of intelligent life, and much more. With a narrative that covers everything from the beginning of the universe through the evolution of life and the long-term future of the universe, Rees proposes that we are living in a "biophilic" universe, which is to say, our universe is hospitable to life.

**Holmes, Barbara. *Race and the Cosmos: An Invitation to View the World Differently*. Harrisburg: Trinity Press International, 2002.**

In *Race and the Cosmos*, Barbara Holmes invites a transformation of worldviews that would overcome the injustices of racism and other related systems of domination that oppress people based on socioeconomic class, sexual orientation, ethnicity, etc. Integrating scientific, religious, and philosophical perspectives, Holmes draws on multiple fields of inquiry, including the new cosmology, quantum physics, liberation theology, black theology, indigenous traditions, feminism, and ethics. According to Holmes, these fields of inquiry can support a view of the world that recognizes and respects the interconnected and holistic nature of the universe. Such a worldview would preclude actions or systems that promote marginalization or domination, and it would instead facilitate the realization of a visionary dream of what Holmes calls, following Martin Luther King Jr., the "beloved community."

**Dellinger, Drew. *Love Letter to the Milky Way: A Book of Poems*. Mill Valley, CA: Planetize the Movement Press, 2002.**

Drew Dellinger is an American poet, activist, teacher, and founder of Poets for Global Justice. *Love Letter to the Milky Way* is a collection of poems that express the profound intimacy and

immensity that characterize the place of humans in the unfolding universe. Influenced by figures from the new cosmology, hip hop, and social and environmental justice movements, Dellinger's poems present an integrative, inspiring, enchanted, and erotic vision of the interconnectedness of humans, the Earth community, and the cosmos as a whole. This visionary book also includes forewords from the "geologist" Thomas Berry and the Creation Spirituality proponent Matthew Fox.

**Christian, David. *Maps of Time: An Introduction to Big History*. Berkeley: University of California, 2004.**

Historian David Christian is a founder of the "Big History" movement, which proposes that an account of human history must include an account of the place of humans within the larger-scale history of evolution dating back to the origins of the universe. *Maps of Time* is a book of Big History that corresponds with a World History course that Christian developed, with fifteen chapters for fifteen weeks, divided into sections on the early history of the universe, the evolution of life on Earth, various eras of human history (i.e., evolutionary beginnings, agrarian civilization, and the modern era), and possibilities for the near and distant future. Presenting an engaging and informative story that brings together perspectives from the sciences and humanities, Christian articulates a comprehensive overview of the evolutionary past, the present, and possible futures of human civilization. The book includes many references and suggestions for further reading.

**Tyson, Neil deGrasse and Donald Goldsmith. *Origins: Fourteen Billion Years of Cosmic Evolution*. New York: W.W. Norton, 2004.**

A companion to the NOVA miniseries *Origins*, this book presents the history of cosmic evolution, from the big bang through the origins of galaxies, stars, and planets, up to the evolution of life on Earth and the emergence of the human species. Tyson and Goldsmith include perspectives from many scientific disciplines to portray the most accurate picture of the universe that can currently be given. The authors also point to the mysteries that pervade the universe and to the limits of scientific knowledge. Written in a very accessible style that presents scientific facts and theories with wonder, skepticism, and humor, the book covers a vast array of topics, including discussions of contemporary debates regarding dark energy, antimatter, string theory, multiverses, the anthropic principle, and UFOs.

**Miller, James, ed. *The Epic of Evolution: Science, and Religion in Dialogue*. (AAAS Conference at the Field Museum) Upper Saddle River, NJ: Prentice Hall, 2004.**

This comprehensive book is a collection of essays that bring together scientific and religious perspectives to discuss the implications of the epic of evolution. A book of evolutionary theory and religious studies, the essays in this volume further research into issues related to evolutionary theory, and they also further dialogue between sciences and religions. Topics covered include cosmic evolution, the evolution of life on Earth, Charles Darwin and neo-

Darwinian theories of evolution, the emergence of the human species, cultural evolution, the relationship between religions and society, the evolution of morality and ethics, and the effect of humans and the evolution of the natural environment.

**Chaisson, Eric. *The Epic of Evolution: Seven Ages of the Cosmos*. New York: Columbia University Press, 2006.**

Astrophysicist and science educator Eric Chaisson draws on research from multiple fields of scientific inquiry to present an illuminating account of cosmic evolution in *The Epic of Evolution*. Aiming to communicate the evolutionary epic to a general audience, Chaisson divides cosmic history into seven ages, beginning with the early history of the universe in the Particle Epoch, proceeding to the formation of galaxies, stars, and planets in the Galactic, Stellar, and Planetary Epochs respectively, then moving on to the building-blocks and emergence of life in the Chemical and Biological Epochs, and concluding with the emergence of human civilization and technology in the Cultural Epoch. Chaisson ends the book with some considerations about the unpredictable and uncertain future of the human species.

**Primack, Joel and Nancy Abrams. *A View from the Center of the Universe*. New York: Riverhead Books, 2006.**

In this book by cosmologist Joel Primack and philosopher Nancy Abrams, perspectives from contemporary sciences and the humanities are brought together to depict the nature of the universe and the central place of humans therein. Expressing a vision of the universe that includes scientific insights with the spiritual wisdom of ancient and traditional myths and symbols, Primack and Abrams articulate a shift away from the mechanistic cosmology of the modern era (exemplified by the Newtonian view of the world) toward a cosmology that affirms the central role of meaning, life, and intelligence in the universe. According to Primack and Abrams, the new cosmology they present promotes concern for our unique evolutionary context and thus promotes more harmonious and sustainable relationships between humans and the natural world.

**Brown, Cynthia Stokes. *Big History: From the Big Bang to the Present*. New York: The New Press, 2007.**

In *Big History*, Cynthia Brown weaves together historical and scientific knowledge to provide a comprehensive multidisciplinary narrative of history from the origins of the universe to the 21st century. The book begins with a section of chapters that cover “the depths of time and space,” from the initial unfurling of the universe 13.7 billion years ago through the evolution of life on Earth and the emergence and early development of the human species. The next section covers the “ten thousand warm years” that have led to the present situation of human civilization, beginning with early agriculture and early cities and continuing through the formation of the world’s cultures and up to the processes of globalization and industrialization that have emerged

in recent centuries. Brown concluded with a discussion of the future of the human species in light of the global ecological crisis.

**Genet, Cheryl, et. al. *The Evolutionary Epic: Science's Story and Humanity's Response*. Collins Foundation Press, 2009.**

This book is a collection of papers delivered at *The Evolutionary Epic* conference held in Hawaii in 2008. The book focuses on the new story of the universe (also referred to in terms of the new cosmology, the epic of evolution, and Big History). The selections include contributions from scholars, artists, and teachers who integrate perspectives from the sciences, humanities, and religious traditions in their engagements with the epic of evolution. The book addresses the relevance of the evolutionary epic for numerous dimensions of human existence, including education, sustainability, environmentalism, scientific research, politics, art, psychology, spirituality, religion, and more. The book reflects the diverse ways in which the evolutionary epic can be told and the profound implications of this epic for the future of humanity and for the future of life on Earth.

**Sampson, Scott. *Dinosaur Odyssey: Fossil Thread in the Web of Life*. Berkeley: University of California Press, 2009.**

In *Dinosaur Odyssey*, paleontologist Scott Sampson provides a comprehensive and fascinating account of dinosaurs and the world they inhabited. Covering everything from the emergence of dinosaurs 230 million years ago through dinosaur extinctions, this book is an epic tale of the world of dinosaurs as well as a scholarly and accessible survey of contemporary research in dinosaur science. Sampson discusses the evolutionary odyssey of dinosaurs while showing how an understanding of dinosaurs requires an understanding of the place in cosmic evolution and of their ecological context, including the climate, the position of the continents, and the various birds, plants, insects, and bacteria living and evolving with the dinosaurs. The topics addressed often have relevance for contemporary ecological issues (such as species extinction and climate change). This book also includes many photos and illustrations.

**Duncan, Todd and Craig Tyler. *Your Cosmic Context: An Introduction to Modern Cosmology*. Addison-Wesley, 2009.**

Introducing the vast field of modern scientific cosmology, this comprehensive and fascinating book addresses the questions of what the universe is and how do the thoughts, feelings, and actions of humans fit within their cosmic context. Guiding the reader with questions, the authors cover the history of cosmological research along with the phenomena, facts, and theories of contemporary cosmology, ranging from the origins and nature of the universe to the evolution of life on Earth and the emergence of human consciousness. The chapters of the book provide thorough introductions to principles of heat, light, motion, gravity, spacetime, cosmic expansion, photons, electrons, nuclear interactions, the big bang theory, complex life, the anthropic principle, and much more. Each chapter concludes with a reflective essay, a quick review with a

crossword puzzle, and exercises for further explorations of the topics covered. This book can be used as a textbook or as a guide for the general reader who wonders about their place in the universe.

### **Books for Children**

Morgan, Jennifer. *Born with a Bang: The Universe Tells Our Cosmic Story*. Nevada City, CA. Dawn Publications: 2002.

Morgan, Jennifer. *From Lava to Life: The Universe Tells Our Earth Story*. Nevada City, CA. Dawn Publications: 2003.

Morgan, Jennifer. *Mammals Who Morph: The Universe Tells Our Evolution Story*. Nevada City, CA. Dawn Publications: 2006.