



International Big History Association

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Adventures in Cosmic Evolution

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There are a number of ways that Big History can enter undergraduate and even high school curriculums. One way, pioneered by the International Big History Association (IBHA), is through extending world history to include all of “history,” i.e. the physical evolution of the cosmos, the biological evolution of life on earth, and the cultural evolution of our own species. Where world history texts devote just a single stage-setting chapter to pre-history—rarely going back earlier than the beginning of our hominid line—big history texts boldly go all the way back to the Big Bang and devote significant attention to the cosmos and Earth before humanity.

Another approach to history on a cosmic scale is to consider it as a grand evolutionary story. Connie Barlow’s *Evolution Extended* first alerted me to the importance of story. In *The Universe Story*, Brian Swimme and Thomas Berry literally present a story replete with fictional names for the story’s characters. This and other more straight-forward story approaches have a special appeal to instructors and students in the liberal arts. The late anthropologist Joseph Campbell suggested that all societies need stories—myths—to provide them with inspiration

An Interview with *William Grassie*, the founder of the Metanexus Institute.

William Grassie received his doctorate in religion from Temple University and his bachelor degree in political science and international relations from Middlebury College. He has taught in a variety of positions at Temple University, Swarthmore College, and the University of Pennsylvania. Prior to graduate school, Grassie worked for ten years in international relations and conflict resolution in Washington, D.C; Jerusalem, Israel; West Berlin, Germany; and Philadelphia, PA. He is the recipient of a number of academic awards and grants from the American Friends Service Committee, the Roothbert Fellowship, and the John Templeton Foundation. In 2007-2008, Grassie served as a Senior Fulbright Fellow in the Department of Buddhist Studies at the University of Peradeniya in Kandy, Sri Lanka.

Grassie is the founding executive director of the Metanexus Institute, which works to promote scientifically rigorous and philosophically open-ended explorations of foundational questions. Metanexus has worked with partners at some four hundred universities in forty-five countries and publishes an online journal. Grassie is author of *The New Sciences of Religion: Exploring Spirituality from the Outside In and Bottom Up* (Palgrave Macmillian, 2010) and a collection of essays *Politics by Other Means: Science and Religion in the 21st Century* (Metanexus, 2010).

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and guidance. He felt that the religious stories have lost much of their power and we needed a new science-based story to illuminate our path. Edward O. Wilson, the Harvard entomologist and world-famous expert on ants, suggested that the epic of evolution is the best story humanity will ever have.

My own approach to the evolutionary epic began in 1952 when I was in the seventh grade. I was inspired by my social studies teacher, David Poore, to look beyond my religious views and read books from the adult section of the local public library starting with Greek philosophy. This led in short order to philosophy in general, world history, and astronomy. I immediately fell in love with astronomy, and stellar evolution prepared my mind for biological evolution. Darwin's *Origin of Species* soon appeared among my books at home, somewhat to the horror of my missionary parents. Many weekends were spent discussing what I had read with my best friend Richard Fallick and his little sister Cheryl—regular weekend “graduate” seminars at their nearby Rainbow Ranch. By the end of the seventh grade I was reading what little I could find on cultural evolution in an effort to pull astronomy, biology, anthropology, and world history together under a seamless evolutionary umbrella.



Rich, Cheryl, and Russ at the Rainbow Ranch in 1955

Since the seventh grade I have been an avid reader of books on all aspects of the evolutionary story. However, it wasn't until I retired at age 50 and was living in a tent under a few palm trees on the beach in remote Abel Tasman National Park in New Zealand that I began outlining my book *The Chimpanzees Who Would Be Ants*. My good friend of many decades, Dwight Collins, flew over to New Zealand, took a boat to my remote location, and came ashore in a small dinghy. Together we developed the book's first outline.

From the outset, the book's goal was to produce a scientifically accurate but readable—even entertaining—book of modest length that could be readily understood by high school students. I even went so far as to beta test the book with high school students, incorporating their suggestions to make it more understandable and entertaining.

As all Big History writers and teachers know only too well, one can not be an expert in every aspect of the evolutionary story. Thus one needs to either take a cooperative group project approach or, if solo, as was my case, obtain much expert advice. I located several experts in each area—often experts that had written books intended for intelligent lay persons on their topic. I then interviewed them in person, taking copious notes. After drafting a chapter in their area, I shamelessly asked them to help me “straighten up” my chapter so as not to embarrass their field, not to mention their good names.

My most difficult task, however, was finding an appropriate story line. Being a somewhat conservative astronomer, I felt the story line needed to be subtle yet compelling. I had no problem with the first two chapters of the book, which covered physical and biological evolution; clearly the story line was, over time, the evolution of physical and biological complexity in a layered, hierarchical manner. Lower level “modules” combined to form higher level, emergent entities. The sequence was quarks, subatomic particles, atoms, molecules, prokaryotes, eukaryotes, and multi-cellular organisms.

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The difficulty was covering humanity without introducing human bias. How could I remain the dispassionate scientist? My approach was to take a close look at chimpanzees, our closest genetic relatives. I dug deeply into what we know, scientifically, about chimpanzees—not only the “common” chimps, but also the other species of chimpanzees, the bonobos. I even attended a chimpanzee science conference organized by Jane Goodall, not to mention spending time observing the sizeable bonobo colony at the San Diego Zoo. Chimpanzees, however, are a rare species nearing extinction that lives in small bands in the forest. We humans, on the other hand, are numerous and live in cities by the millions. Chimpanzees are top-of-the-food-chain omnivores living off fruit, supplemented by occasional meat. As Paul Colinvaux pointed out in his book, *Why Big Fierce Animals are Rare*, to become numerous, a species needs to tap the bottom



Baby Bonobo

of the food chain. To dispassionately capture this side of the story in another species, I turned to the social insects such as termites, bees, and ants. I quickly zeroed in on the leafcutter ants. Although ants are carnivorous, and thus one would expect them to be somewhat rare, the leafcutters live by the millions in underground factories where they feed mushrooms with mulched-up leaves harvested from the surrounding jungle. As with humans, ants can't live off of leaves, but mushrooms are a delicacy. Dwight Collins and I visited the lowland jungle in Costa Rica where we observed the leafcutters in action. Hoisted up by ropes to the jungle canopy, we watched large scissor ants cut out small squares of the leaves which fell to the jungle floor in a green

rain. Transporter ants, in columns at least 12 abreast, carried the giant (to them) leaf pieces to their huge underground nest where even smaller ants mulched up the leaves. Finally, itsy bitsy ants fed the mulch to the miniature underground mushrooms which provided the food for the entire colony. Had he known about the leafcutters, Henry Ford would have been impressed with their highly organized factory production system.



A leafcutter transport ant in the Costa Rican jungle hauls a leaf section to the nest to feed miniature mushrooms

The central story line in the rest of my book then became, quite simply, how did a rare chimpanzee-like species in Africa become a numerous ant-like species living in cities by the millions? How, like the leafcutter ants before us, did we move from the top of the food pyramid to the bottom, from being rare to being numerous? The answer, of course, lies in our species evolution, the rapid interplay of physical and cultural evolution as outlined by my friend Peter Richerson in his recent book, *Not by Genes Alone: How Culture Transformed Human Evolution*. We are, primarily, a cultural species that has used our technology to take the planet by storm.

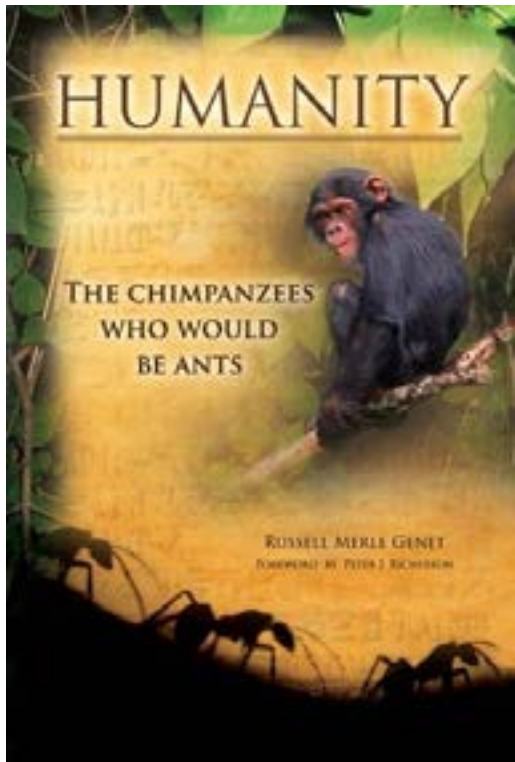
A good story needs a satisfying ending. Not knowing whether or not humanity is going to crash leaves one hanging. Yet we don't know our story's ending, and providing an ending would be hard to justify either scientifically or academically. I struggled with this dilemma for quite some time. Eventually I hit on the idea of presenting multiple endings—widely different endings that represented the range of possible futures. Readers could choose their own preferred ending or

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read all of them if they wished.

The Chimpanzees Who Would Be Ants came out in 1997 in a readable, less than 200 pages hardback edition. I used the book as a text in my liberal studies course, the Epic of Evolution, at Northern Arizona University. I spent the next decade continuing my research and morphing my first book into a second book, *Humanity: The Chimpanzees Who Would Be Ants*. The back cover synopsis of *Humanity* remains the favorite summary of my story, and I'm sticking to it!



Front cover of *Humanity: The Chimpanzees Who Would Be Ants*. The graphic was provided by Cheryl's son, John Davidson.

Humanity is the science-based story of how, in a remote corner of an ordinary galaxy 13.7 billion years after the Big Bang, the descendants of a third line of chimpanzees evolved into millions of humans who organized themselves into ant-like societies. Originally rare hunters, we humans took up agricultural ways, aping the clever ants that became numerous by developing ingenious herding and gardening skills. Evolving our simple chimp tools into machines,

we then tapped a bonanza of fossil fuel energy and blitzkrieged the planet. Now, facing planetary limits, what is our fate? Reversing direction, will we return to a planetary Garden of Eden or, pedal to the metal, crash into oblivion? Will we transform the Earth into a sustainable global farm or, leaving our birth-planet behind, voyage to the stars with our machine partners to establish a galactic empire?

In the course of researching and writing the two versions of my book, I presented the story as talks at many dozens of public forums and university as well as high school classes. I also taught it as a series of short courses. My book became the theme for three conferences. The first one in 1995, while the first book was still being written, was jointly organized with Brian Swimme and was entitled *The Epic of Evolution*. Dwight came to this pioneering conference as did Cheryl, my childhood buddy and later my wife. David Christian and I met in 2003. We spent a day together at the San Diego Zoo including, of course, significant time watching the bonobos. It didn't take us long to realize that whether one was an end-of-the-story historian incorporating earlier portions of the epic, or a beginning-of-the-story astronomer describing later portions of the epic, both academic approaches were valid and, to our delight, portrayed the same thing. We were quite astounded that our takes were essentially identical. In 2004, David and I organized a conference, Cosmic Evolution and Big History. The conference was held at the picturesque Hacienda on California's Central Coast—William Randolph Hearst's ranch headquarters near Mission San Antonio.

In 2008 I organized a conference with Cheryl and Dwight, The Evolutionary Epic. Held in Hawaii, it led to the book of the same title with a foreword by David Christian and chapters by Nancy Abrams, Craig Benjamin, Cynthia Brown, David Christian, Chris Corbally, Todd Duncan, Mark Gilbert, Ursula Goodenought, Pauline le Bel, John Mears, Joel Primack, Loyal Rue, Brian Swimme, Art Whatley, Allen Wood, and many others. More recently, Cheryl and others went on to organize a conference with an

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edited book proceedings, *Science, Wisdom, and the Future: Humanity's Quest for a Flourishing Earth*.

Currently I am working on a course, book, and video that take yet another approach to teaching the evolutionary story as an undergraduate or even high school course. I have taught introductory astronomy courses at the college level for many years—most often at community colleges with many high school students taking my course as their first college course. Many of these students enter my course with a sizeable anti-science chip on their shoulder, expecting to be blasted with a “big wad of facts.” My aim, by the end of my course, is to not only leave them with a positive attitude toward science but to provide them with an understanding of how science really works and, more importantly, their place as an intelligent species in the cosmos. I call my course Discovery of the Cosmos. The course is doubly historic. The historical story of scientific discovery also uncovers the historic evolution of the cosmos, life on Earth, and the potential for life and intelligence in the universe. Here in a nutshell is my Discovery of the Cosmos:

As I have suggested, there are a number of academic disciplines that can be an academic entry point for inserting a broad evolutionary perspective into the curriculum. Perhaps the two most successful academic entry points so far are Big History and Life in the Universe. The latter is taught at dozens of schools and has several text books.

Of course most of humanity does not consist of undergraduate or high school students that might be enticed (or even required) to take a Big History, Life in the Universe, or similar academic course. Yet reaching the rest of humanity with the evolutionary epic would be beneficial to the future of our species and the planet we share with other life. So, beyond academia per se, let there be picture-story books for kindergarteners, wall murals for public buildings, and joyful songs and



Dwight is hoisted up by rope to the top of the jungle canopy hundreds of feet above the ground where he joined Russ to observe leafcutter ants.

ceremonies that celebrate evolution and our place in the cosmos. It is my hope that the International Big History Association will adopt a wide view of its mission, welcoming other academic disciplines beyond history into their midst and even non-academic portrayals of the Great Story. We are all, after all, on a small planet, cruising together through the void on a voyage of cosmic discovery.

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