

Big History—A Study of All Existence

Part 1: A World Connected

Barry Rodrigue 罗柏安

Symbiosis School for Liberal Arts, Symbiosis International University

Correspondence | rodrigue@archinets.org

Citation | Rodrigue, Barry H. 2022. “Big History—A Study of All Existence: Part 1: A World Connected.” *Journal of Big History* 5 (1): 1-47.

DOI | <https://doi.org/10.22339.jbh.v5i1.5101>

PROLOGUE

This is a brief overview of the field of big history and my personal reflection on its significance. Like others, I developed a macro-perspective of existence from the 1950s onward, as a natural way of thinking, without label or rubric. It was only in 2003 that I heard of big history and realized this concept expressed much of what I had been doing.¹

This realization mirrored the experience of many others around the world in the second-half of the 20th century—interdisciplinary and macro-historical studies had emerged independently around the planet in a global conjuncture. It was a general human expression, representing an impulse of humanity.

For my part, I had engaged in ethnographic studies in various locations, with a focus on human adaptation. I therefore saw cosmic evolution, big history, and universal studies as a component of humanity’s survival strategy—a concept especially understood by our post-Soviet and Asian colleagues. As a result, my focus in this two-part article is on how macro-historical studies relate to the theme of human survival in this modern era of climate crisis.

Others will have a different focus and have been effected by different concepts and authors. Their views are just as valid, and I encourage them to share them. Big history is a house with many rooms.

This article is done in collaboration with and is jointly published with the *Journal of Globalization Studies*.

究天人之际，通古今之变，成一家之言。

To inquire into the relationship between heaven and human, to comprehend the vicissitudes of past and present, and to form a single narrative of it all.

— 司馬遷 Sima Qian, 100 BCE

Like Sima Qian, our ancestors wondered about their existence as they looked up at the stars, watched red lava flow down volcanic slopes, heard waves roll softly along a beach, and felt the breath of other life on their skin. However, this creative process was not just a poetic legacy—it took root in brutal shifts on the landscape three-million years ago, when such questions were a serious strategy for human survival.

As ice sheets absorbed the world’s moisture, the global climate cooled and dried. In East Africa, forests retreated, forcing our ancestors onto arid grasslands. They had to find a new way of life, searching out wetlands and new foods to harvest. Their repertoire of skills grew to match the shifting climate and

biome—from stone tools, fire, and clothing to shelters and snares, along with increasingly complex languages. Those who could not adapt, perished.²

Additional shifts in the glacial period forced our ancient families farther afield, but our surviving kin prospered and migrated into new landscapes, adding to their collective knowledge as they went. Family bands grew and used their keen observations to craft complex worldviews. We get glimpses of these new understandings in calendars built by early foragers and farmers.

In these early times, gaps in understanding were filled in by fables and magic. Although the instructions for making a stone hand axe differed from explaining



Image 1: The markings on the Ishango bone have been interpreted as a lunar calendar by some scholars. At its top is a quartz tool for incisions. Dated to 20,000 years, it was crafted by a fishing community along the Semliki River in today's Democratic Republic of Congo. Courtesy of the Royal Belgian Institute of Natural Sciences. For more information, see Royal Belgian Institute of Natural Sciences 2018.

bright objects in the night sky, all explanations involved intangible meanings, which often served as memory devices flavoured with fantasy. Stones were thought to have hidden qualities as much as constellations. Myth and science coexisted with a rich use of metaphor and narrative.³

As the last glacial advance began to wind down twenty millennia ago, sea levels and fresh water tables rose, which contributed to new abundances along with the development of horticulture and pastoralism.

Then another period of aridification began 8000 years ago—the Great Drying. In North Africa, wetlands evaporated as grazing herds compounded the climate problem. Prairies degraded into Sahara dunes. Some adapted to desert life, such as the Bedouin, but others relocated to new areas of water: the Mediterranean, Lake Chad, and the Niger and Nile rivers. One of these transitional sites was Nabta in southern Egypt, where cattle remains and climate change are seen in archaeological sites, including celestial-oriented stones. Their later migration to the Nile is thought to have contributed to the Egyptian cult of the sky-goddess, Hathor.⁴

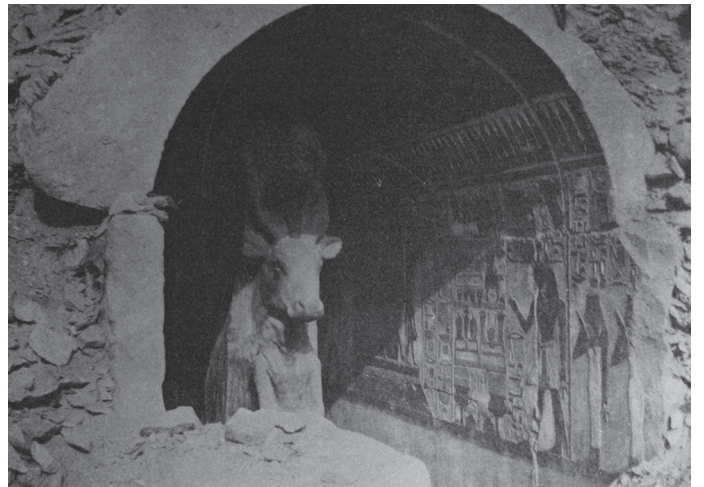


Image 2a: Upper – Reconstruction of the Nabta calendar circle of c. 7000 BP at the International Museum of Nubia, Aswan, Egypt. Photograph by Raymond Betz, 2009, *Wikimedia Commons*. 2b: Lower – Hathor shrine, Deir el-Bahari, Egypt, c. 1500 BCE. Photograph by Henri Édouard Naville, 1907, *Wikimedia Commons*. The cult of the sky-goddess, Hathor, represented as a cow, is considered an artefact of Saharan pastoralist integration into what would become Egyptian civilization. For more information see Brass 2017.



Image 3: Artefacts of the Indus Valley Civilization, c. 2400 BCE. Harappan script on a stone seal (above) at Lothal and water reservoir (below) at Dholavira, in Gujarat, India. Photographs by Barry Rodrigue.

Other peoples around the world moved to the Tigris and Euphrates, Indus and Ganges, Yellow and Yangtze, Norte Chico and Barka, as well as smaller wetlands.⁵ This inter-ethnic clustering required them to share resources and led to new social dynamics. Complex agriculture arose, along with centralized religions, new craft specializations, wider communication skills (writing in a dominant language), and stratified society. Today, we call this survival strategy: *civilization*.

Such links between climate, resources, and civil society were noted by Islamic scholar Abū Zayd Ibn Khaldun in his *مقدمه* [Muqaddimah / Prologue] almost 800 years ago.

This [lack of water] can be observed in countries where springs existed in the days of their civilization. Then, they fell into ruins, and the water of the springs disappeared completely in the ground, as if it had never existed.⁶

While we think in terms of the steady advance of civilization, its establishment and spread were a fractured process. Many societies continued traditional foraging lifestyles, while others adopted a few attributes of civilization but not others. Some abandoned civil life when circumstances changed, while others took it on when events suited them. An example is the Oxus Civilization in the Aral Sea watershed, which shifted with climatic changes 4000 years ago, before finally succumbing to aridification and its people taking on the nomadic and farming lifestyle of the surrounding steppe peoples.⁷ Civil society was a mixed global pattern of human adaptation.

With these adaptations, worldviews also changed, as seen when Yorùbá Babalawo in West Africa, pre-Socratic philosophers in the Eastern Mediterranean, Mauryan sages in South Asia, Zhou scholars in East Asia, and Mayan astronomer-priests in Central America codified holistic cosmologies. Rational answers slowly replaced myth to become fact-based understandings. This process accelerated as peoples began more and more to connect via trade routes. Besides an exchange of precious commodities, they shared ideas.

In these early stages of global networking, scholars knit together larger ideas about humanity and nature and, in the process, began to transcend imperial, religious, linguistic, and ethnic frontiers. In the first century BCE, Roman philosopher Lucretius expressed a material view of the Universe and a unitary sense of humanity in *De Rerum Natura* [*On the Nature of Things*]. Likewise, medieval scholar Abū Zayd Ibn Khaldun composed his vast universal history, *باباتك رب عل* / *Kitāb al-‘ibar* [*Book of Lessons*], which assesses human experience in a pragmatic worldview through the lens of Islamic civilization. These collective understandings of a common existence went through times of intense thought called axial, renaissance, enlightened, and revolutionary.⁸

Besides holistic family-community instruction, dedicated centres for learning sprang up in places like Nalanda (India) over a thousand years ago, while Inca aristocracy along the Andes attended the *Yacha Huaci* [House of Knowledge] for lessons in reading *quipu*,

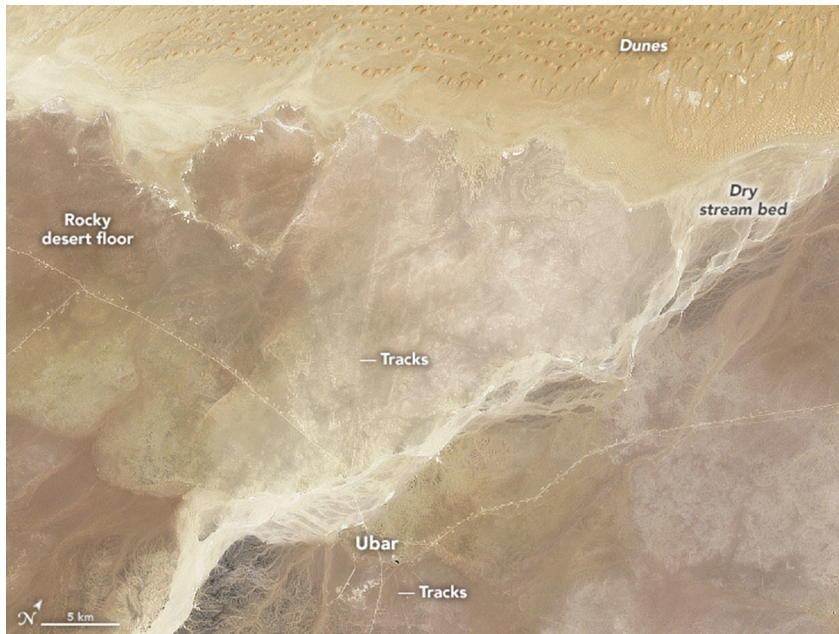


Image 4: Orbital image of routes used in the frankincense trade through the Arabian Peninsula, which flourished from about 5000 to 2000 years ago, as part of the wider Eurasian trade network (including the Silk Roads). These tracks also served for idea exchange, as at the *caravanserai* of Ubar, which fell to ancient climate change. Image from the *Landsat 5* satellite, 27 May 1994. Courtesy of NASA. For more information, see the NASA *Landsat* Gallery at <https://landsat.visibleearth.nasa.gov/view.php?id=90847> and Nabataea.net / 'Ubar' https://nabataea.net/explore/cities_and_sites/ubar/. Page of a rhinoceros, bull and forest life from Zakariya al-Qazwini's *Marvels of Creatures and Strange Things Existing*, a popular collection of Eurasian cosmogeography, c. 1280; an image from an mss. painted in Shiraz, Persia, c. 1545 CE. Folio 109, Chester Beatty Library, Dublin, Ireland. Courtesy of *Wikimedia Commons*. Al-Qazwini lived in Qazvin in northern Iran. For a local big history of Qazvin, see Ravandi-Fadai and McNeer 2016.

mathematics, and public affairs. In China, Emperor Yongle ordered a vast encyclopaedia, 永樂大典 [*Yongle Dadian*] in 1403. Almost a million pages in length, it has been superseded in scope by only *Wikipedia*. Even some of the brilliant works of Leonardo da Vinci drew inspiration from Asian innovation.⁹

By our early modern period, European colonial expansion in the fifteenth century led to profound changes in understandings about humanity, but there was no metaphysical quality of north-west Eurasian society that unleashed their hegemony on the world. Far from just a European phenomenon, the new global engagement had grown from the silk-road system into a planetary sphere of interaction that is more properly

designated as 'global civilization.'¹⁰

Neo-Confucian scholar Miura Baien (1723–1789) merged Japanese concepts with Chinese and European ideas to develop a new vision of the world and existence, as in his masterpiece, 玄語 [*Deep Words*]. Miura's work has been compared favourably with the later studies of Alexander von Humboldt (1769–1859). Anthropologist Keiji Iwata, for example, sees Miura's work as an expression of Eastern cosmology / existence, with Humboldt's studies expressing Western perspectives. Humboldt had studied at the University of Göttingen, where his professors sought to unify knowledge and deploy it so individuals, society, and nature could coexist. His five-volume study,

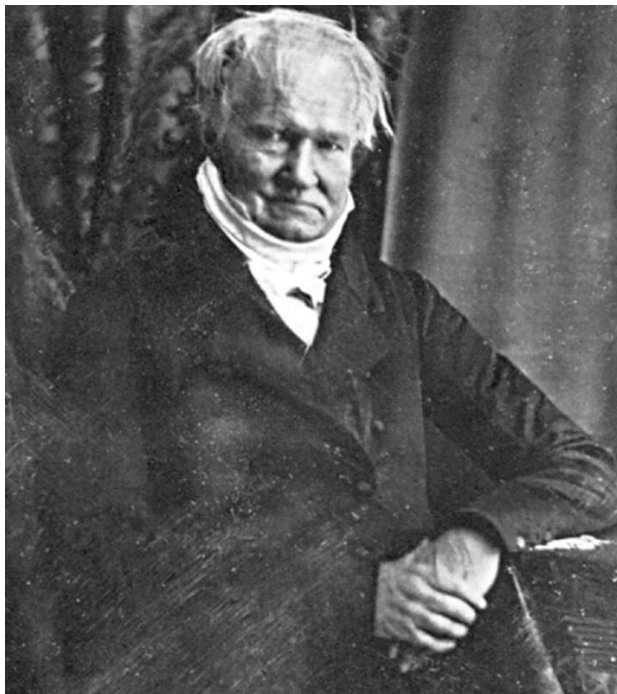
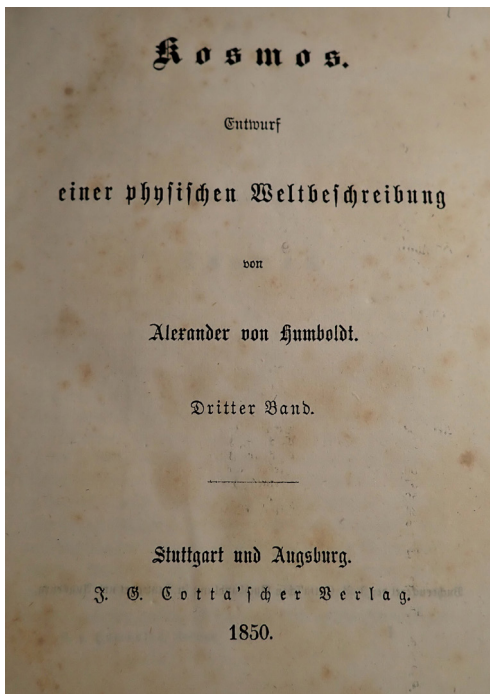
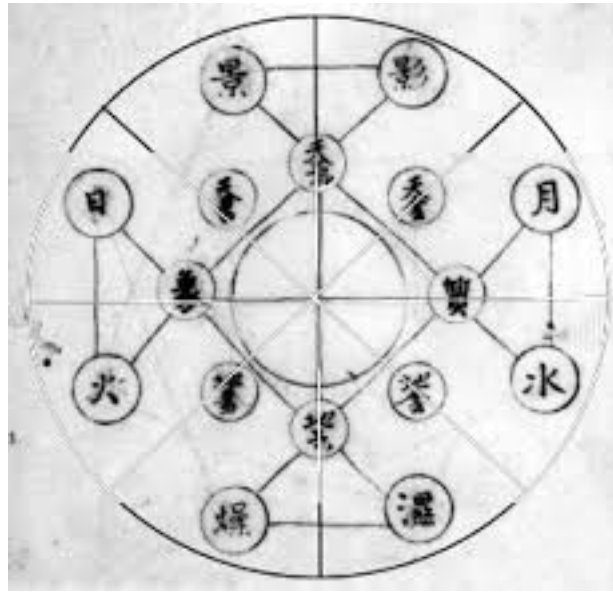


Image 5: Top – Miura Baien, c. 1785, and one of his 玄語圖 [thought-diagrams] to conceptualize Earth and its place in the universe (much as Albert Einstein used *Gedankenexperiment* or thought-experiments). Alexander von Humboldt (bottom), 1847. Photograph by Hermann Biow. On the left is the jacket of Vol. III of his series *Kosmos* (1850). Images from *Wikimedia Commons*.

Kosmos (1845), is a precursor to what would come to be called big history.¹¹

As historian Daniel Smail at Harvard University points out, “... all universal histories before 1859 [a revolution in historical understandings of deep time]

were big histories, since they began with cosmology (as it was then understood) and subsequently linked in the human genealogy.”¹² Ironically, just as such synthesis was coming together, its diffusion was interrupted by counter-trends in the modern university system that led to specialization, disciplines, and departmental studies.¹³ This partitioning of knowledge led to deepening insights about the world and cosmos, but it also led to silos that divided categories of thought and caused pervasive distrust of attempts to synthesize concepts into larger narratives.

In these days of the late 1800s, the new academic departments represented more general ‘fields’ than narrow ‘disciplines,’ while much of their work lay in defining intangibles—such as ‘culture’ in anthropology or ‘consciousness’ in psychology.

These studies also debunked older concepts, such as ‘aether,’ which chemists dismissed as a relic of alchemy. Universal history participated in this process, as it built links between these fields and disciplines.¹⁴

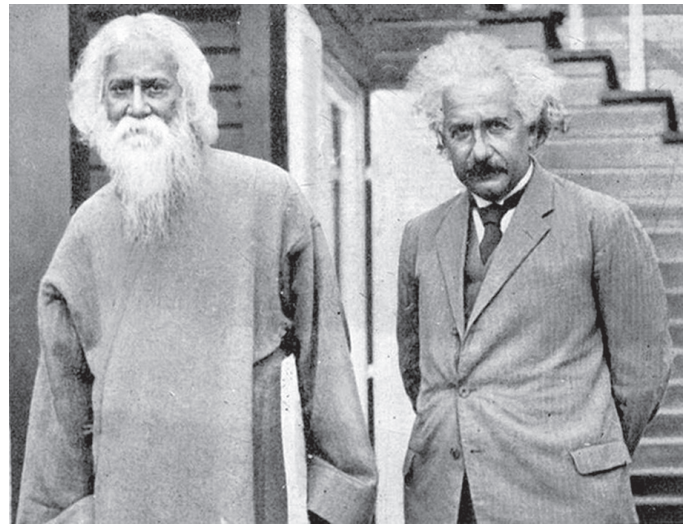


Image 6: Top left – Peter Kropotkin reading his book, *Mutual Aid*, to his friends, the animals. Sketch by Geoff Olson, writer and artist in Vancouver, British Columbia (Canada); used with artist's permission. Top right – Rabindranath Tagore and Albert Einstein in Caputh, Germany, 14 July 1930. UNESCO image. Bottom left – Maria Montessori (left-front) in India, 1939. *Wikimedia Commons*. Bottom right – Kinji Imanishi (centre) in Uganda, 1958. Matsuzawa and McGrew 2008: 588. Itani Junichiro Archives, Primate Research Institute, Kyoto University (Japan).



From Departmentalism to Cross-Disciplinary Studies

Despite growing institutional resistance to universal models of knowledge, holistic frameworks continued. Geographer Peter Kropotkin's Siberian natural his-

tory fieldwork in the 1860s and 1870s contributed to his theories of global social responsibility, as in *Mutual Aid: A Factor of Evolution* in 1902. The next year, biogeographer Alfred Wallace, co-discoverer of evolutionary theory with Charles Darwin, released his synthesis of existence, *Man's Place in the Universe*. Such macro-thinking percolated widely through popular

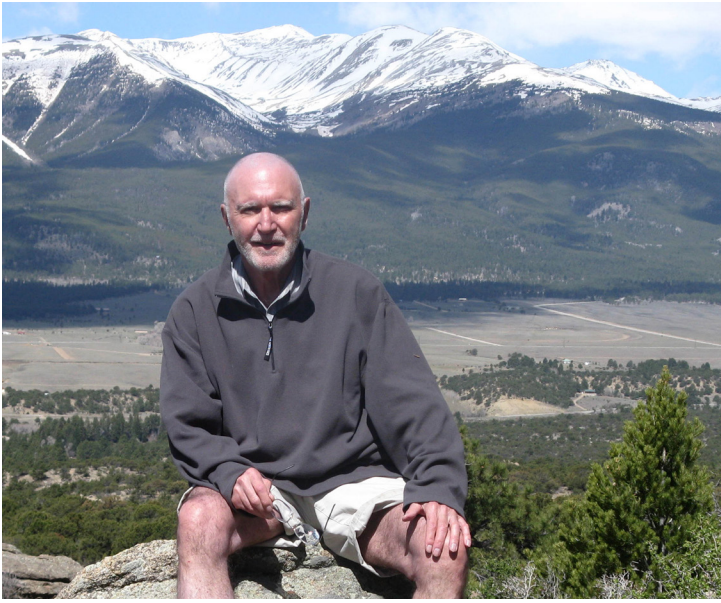
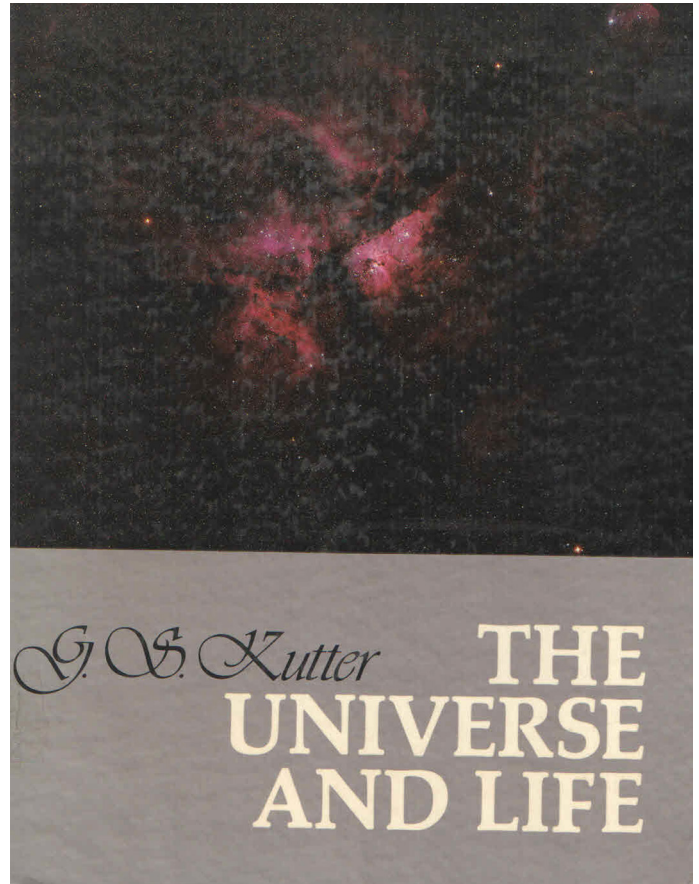


Image 7: G. Siegfried Kutter (left) in the Rocky Mountains above Breckenridge, Colorado (USA), May 2010. Photograph courtesy of Sheryl Kutter. His book, *The Universe and Life* (1987). Author's collection.



and ecumenical culture.

Author H. G. Wells's *Outline of History* (1920) was updated with new scientific breakthroughs over the next fifty years. Engineer Hiram Maxim composed *Life's Place in the Cosmos* (1933), which considered the existence of life beyond Earth, based on the latest scientific knowledge. Scholar, artist, and Nobelist Rabindranath Tagore encouraged the global-networking of science and philosophy, ideas that he collated in Bengali essays as *বিশ্ব পরচিয় হ* [*Our Universe*] in 1937. Christian scholars like palaeontologist Pierre Teilhard de Chardin and astronomer Georges Lemaître advanced science and how it related to the human condition.¹⁵

By the 1940s, universal notions entered primary education, as in Maria Montessori's pedagogy of *cosmic education*, adopted from an English model and developed while she was interned in India during the Second World War.¹⁶ Similarly, ecologist Kinji Imanishi composed his thoughts of life's commonalities in *生物の世界* [*The World of Living Things*] in 1941, on the eve of his military deployment. He survived the war

and expanded on his concept of 自然学 *shizengaku* or 'deep nature thought' as an integrated view of existence.¹⁷

Each rendition incorporated the latest discoveries of science and considered how they could be applied to society. In industry, cross-disciplines arose in new fields like astro/physics and bio/chemistry. The scientific and technological ferment of the World War and Cold War eras led to new data, which required ever-larger frames of reference, from aerospace and oceanography to medicine and computer science. It was a time of new frontiers.

In 1949, the United Nations Educational, Scientific & Cultural Organization (UNESCO) set up a commission to assemble a history of all humankind, producing a multilingual, multi-volume series: *The History of Humanity* (1966, 2009).¹⁸ The Space Race also galvanized efforts for new interdisciplinary discoveries, while socio-historical scholarship struggled to understand the post-colonial world through its many disciplinary and

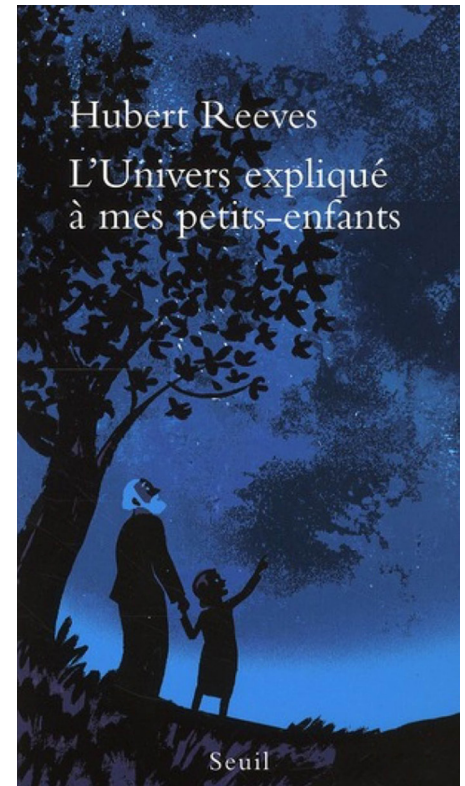


Image 8: Left – Hubert Reeves with his grandchildren, Elsa and Cyprien Reeves-Coutand, in Italy, 2011. Photograph by Benoit-Reeves; from Hubert Reeves. Right – His 2011 book, *L'univers expliqué à mes petits-enfants* [*The Universe Explained to My Grand-Children*]. Author's collection.

social lenses.

Soviet scholars developed an integrated pedagogy that spanned the natural and social sciences.¹⁹ Astrophysicist Josif Shklovsky wrote an early book of this new view of existence: Вселенная. Жизнь. Разум. [*Universe, Life, Intelligence*] in 1962. Four years later, an expanded English adaptation was produced with US astrophysicist Carl Sagan as *Intelligent Life in the Universe*.

This international co-operation was not accidental as a similar macro-study had developed in the United States. From the 1920s through the 1950s, Harlow Shapley had promoted cosmography, a study that examined the interlinked nature of stars, the Earth, life, and humanity at the Harvard College Observatory. In the 1960s, Carl Sagan offered his rendition, and, in 1974, astrophysicists George Field and Eric Chaisson

began a course on cosmic evolution.²⁰

Likewise, in the 1970s, astrophysicist G. Siegfried Kutter integrated celestial studies with studies of life and society as part of the cutting-edge, interdisciplinary course structure at Evergreen State College. His synthesis appeared as *Universe and Life: Origins and Evolution*.²¹ Astronomer Tom Bania taught Cosmic Evolution: Search for Extraterrestrial Life at Boston University, while Earth scientist Michael Rampino had organized The History of the Universe from the Big Bang to the Big Brain at New York University.²²

This wide thinking reflected the high-stakes competition going on among the respective allies of the Soviet Union and the US in the second half of the twentieth century. Many of these scholars began to move beyond the technological rivalry of the times in order to look at the possibilities of peaceful coexistence, not



Image 9: Aerospace engineer Qian Xuesen (left) worked on complexity studies in the 1980s, which led to a meta- synthesis of scientific knowledge: 开放的复杂巨系统 [The Open Complex Giant System]. From Xinhua News Agency, 2009. Evolutionary biologist Lynn Margulis (centre 2005) participated in the synthesis of knowledge through the lens of microbiology in her 1986 study, *Microcosmos*. Photo from *Wikimedia Commons*. Mathematician Antonio Vélez (with his daughter and collaborator, Ana Cristina Vélez Caicedo) began his trilogy on universal history in 1984. Photograph from the Vélez family, 2019.

just with other humans but with our habitat and other lifeforms. This progress toward assembling a big picture of our place in the vast scheme of things emerged in other parts of the world as well.

Hubert Reeves studied physics with developers of the atomic bomb and became an astrophysicist at France's Centre national de la recherche scientifique. He brought his studies down to Earth in popular books like *Patience dans l'azure: l'évolution cosmique* [*Patience in the Azure: Cosmic Evolution*] in 1981, where he explained the stars, along with the significance of water, Einstein's dog, and jazz. His work has become a mainstay of the environmental movement and a youthful audience seeking to change the world.²³

In the 1980s, Chinese scholars, including the celebrated rocket scientist, Qian Xuesen, began studies of complexity. They developed a paradigm that served as a meta-synthesis of scientific knowledge, 开放的复杂巨系统 [The Open Complex Giant System].²⁴ Such global awareness took place in many fields and began to produce a wealth of integrated knowledge about our existence. Other works included bio-geologist Preston Cloud's *Cosmos, Earth and Man* (1978) and astrophysicist Erich Jantsch's *The Self-Organizing Universe* (1980). Mathematician Antonio Vélez in Colombia began a trilogy on universal history with *Del Big Bang al Homo sapiens* [*From the Big Bang to Homo Sapiens*] in 1984.²⁵

Evolutionary biologist Lynn Margulis developed a universal view of existence via microbiology, which led her into collaboration with chemist James Lovelock to study self-regulating global systems; Lovelock's friend and neighbour, author William Golding, helped to name this the Gaia hypothesis.²⁶ Some works became very popular. The television series, *Cosmos*, with Carl Sagan (1980), was viewed by over 500 million people in sixty countries, while the book, *A Brief History of Time* (1988), by astrophysicist Stephen Hawking, sold over nine million copies.²⁷

This search for meaning also found expression in various faith traditions. Philosopher Jiddu Krishnamurti generated an understanding that embraced humanity, nature, and the cosmos, as in his *Beginnings of Learning* (1975). A global movement of 'Teilhard associations' sprang up, based on Teilhard de Chardin's thinking in *Le phénomène humain* (1955). One of these activists, cultural historian Thomas Berry, expounded a 'new story' that integrated a global narrative of humanity and nature, as in his *The Dream of the Earth* (1988). Both Krishnamurti and Berry set up organizations that developed education programs, multimedia productions, and converged with the new science and scholarship in the global articulation of holistic thinking.²⁸

Parallel to this activity, social and economic studies coalesced with international relations in an effort

to comprehend the many faces of global development. Economic historian Andre Gunder Frank moved global studies outside Cold War frameworks to describe a one-world system, while social scientist Immanuel Wallerstein envisioned interlocking subsystems. This socio-historical work began to merge with larger paradigms, as when economist Graeme Snooks moved his Theory of Global Dynamic Systems to encompass Earth history.²⁹

The Merging of Cross-Disciplinary Studies

Another manifestation of these cross-disciplinary connections appeared in calls for reform of higher education. In 1985, world historian John Mears advocated for an integrated curriculum of general education around a theme of evolutionary and universal history. Four years later, he began a course that spanned existence in the context of history at Southern Methodist University in Dallas, Texas (USA), as did David Christian at Macquarie University in Sydney (Australia).³⁰ As Christian explains, he began asking the question: ‘When does history begin?’ Receiving different answers, he realized that students were getting confused fragments about our origins:

The astronomer talking of ‘galaxy and star formation,’ the geologist discussing ‘plate tectonics and erosion,’ and the biologist describing ‘life and evolution’ were all referring in different ways to

what historians might describe simply as historical change or change through time.³¹

So Christian sought to erase the jagged edges between these studies and design a course that was more unified. In 1991, he coined the term *big history* in a moment of whimsy, when asked what such a perspective was called ... and the name stuck—for many social scientists.³²

Physical scientists still use the term, *cosmic evolution*, while the other designations remain in use, such as *open complex giant system* among cybernetic scholars in China and *the story* among progressive Christians, or under no special name whatsoever, when seen as just an extension of a discipline, as in *macro-sociology*. This holistic trajectory continued, arising elsewhere quite independently and often acquiring regional identities.

In China, some social scientists began to adapt ideas for an integrated view of history from their physical science colleagues. Historians Qi Tao (1991) and Cheng Ming (1994) each argued for interdisciplinary and holistic interpretations of ancient history. In 1996, science historians Dong Guangbi and Tian Kunyu published *The Origin of Heaven and Earth—Natural Evolution and the Birth of Life*. Three years later, historian Ma Shili, at Nankai University, extended his text on world history to include cosmic origins and the evolution of life. In 2000, historian



Image 10: From left – Eric Chaisson, John Mears, and David Christian. Photographs from Eric Chaisson, Barry Rodrigue, and David Christian.



Image 11: Akop Nazaretyan, one of the founders of modern universal history. Left – His 1991 Russian text, *Intelligence in the Universe* (in Russian). Right – At the Eurasian Center for Megahistory & Social Forecasting, Institute of Oriental Studies, Russian Academy of Sciences (Moscow), c. 2015. Photos from the author’s collection and courtesy of Karina Nazaretyan.

Huang Liuzhu called for uniting natural science and human histories, urging his colleagues at Northwest University (Xi’an, Shaanxi) to initiate such a program.³³

Historical psychologist Akop Nazaretyan codified his research in the Russian Academy of Sciences under the Education Ministry’s category of ‘conceptions of modern sciences,’ which he considered Универсальная история [universal history]. In 1991, he produced *Интеллект во Вселенной: истоки, становление, перспективы* [*Intelligence in the Universe: Sources, Evolution, Prospects*], a bridge between Shklovsky’s research and his own work in social psychology and conflict resolution. He joined with global historians and scientists in this effort, such as biologist Alexander Markov, anthropologists Andrey Korotayev and Dmitri Bondarenko, historian Leonid Grinin, and astrophysicist Alexander Panov.³⁴

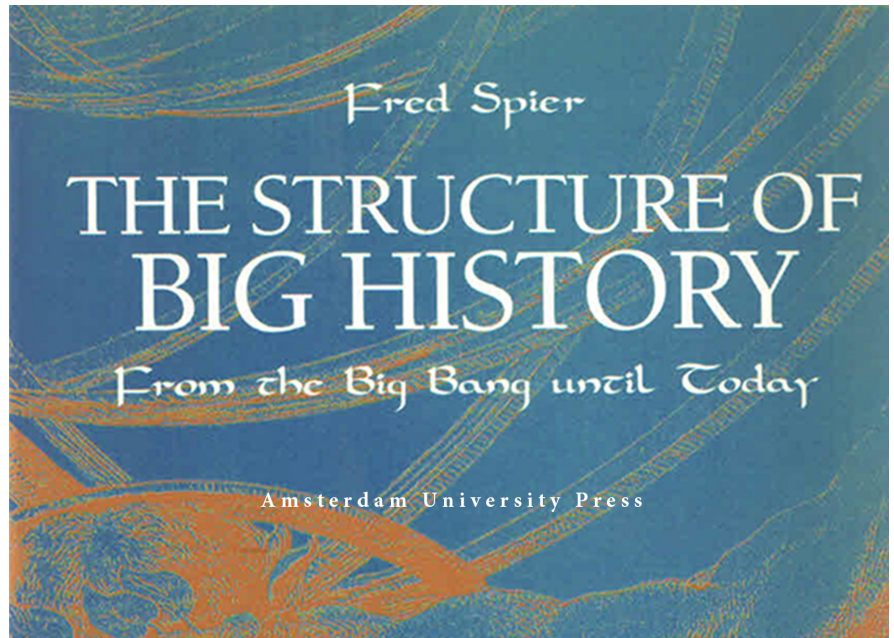
Sociologist Johan Goudsblom and biochemist/social historian Fred Spier first encountered big history upon reading David Christian’s “The Case for ‘Big History’” (1991). On a visit to Australia the next year, Goudsblom met Christian and brought back a copy of his syllabus. He and Fred Spier started a course

in big history at the University of Amsterdam two years later. Spier then produced *The Structure of Big History: From the Big Bang until Today* (1996), in which he outlined the parameters of the new field. He also introduced big history at several other universities, such as Eindhoven University of Technology and Amsterdam University College. These initiatives continue through the work of Esther Quaedackers, who herself contributed the important concepts of *little big history* and *local big history* to encapsulate focused studies in a big history context.³⁵ In this way, three generations of a dynamic academic lineage have given continuity to big history in the Netherlands and Europe.

Eric Chaisson’s works serve as a standard for physical scientists, as with *Cosmic Evolution: The Rise of Complexity in Nature* (2001). Akop Nazaretyan synthesized his principles in *Civilization Crises within the Context of Universal History: Self-organization, Psychology and Forecasts* (2001). David Christian developed his *Maps of Time: An Introduction to Big History* (2004), while Cynthia Stokes Brown produced *Big History: From the Big Bang to the Present* (2007), which she worked into a continuum of world history. Fred Spier produced his own overview in *Big History*



Image 12: Fred Spier (left) and Johan Goudsblom, 1995. Photograph by Witho Worms. Spier's text, *The Structure of Big History* (1996), was the first to codify the new field. Photograph from author's collection.



and the Future of Humanity (2010).³⁶ These and other works have been translated into world languages and appear in new editions; thus, a solid core of literature came into service of the field. These works also drew scholars whose works had already moved in these directions. Two of them were Tom Gehrels and Walter Alvarez.

A strong pragmatic and social foundation underlay the work of astrophysicist Tom Gehrels. He had founded the celebrated Space Science Series at the University of Arizona in 1974. His text, *Hazards Due to Comets and Asteroids* (1995), brought together concepts behind his Spacewatch Project (1980), an astronomical survey at the Kitt Peak National Observatory that hunted impact threats to Earth.³⁷ The diversity of his thinking and its applications appeared in his memoir, *On the Glassy Sea: An Astronomer's Journey* (1989).

Adapting new scientific strategies, geologist Walter Alvarez developed deep-time sequences in the Mediterranean region, described in *The Mountains of St. Francis* (2009). From this work, he and others developed a theory of how an asteroid impact contributed to the extinction of many lifeforms 65 million years ago, including the dinosaurs, as described in *T. Rex and the Crater of Doom* (1997). In addition, he began research on other extinction episodes in Earth's history.³⁸

Gehrels and Alvarez developed concerns about the survival of life on Earth and offered their visions of the field—Alvarez's *Big History: Cosmos, Earth, Life, Humanity at the University of California Berkeley* (2006) and Gehrels's *Universe, Humanity, Origins and Future at the University of Arizona* (2007). Both also established themselves at overseas centres where they offered their courses: Alvarez at the Coldigiocco Geological Observatory in Italy and Gehrels at the Physical Research Laboratory in Ahmedabad, Gujarat, India.³⁹

Visual timelines have existed since petroglyph sequences in the Palaeolithic, so it is no surprise that computer technology led to new materials that articulated deep time. Eric Chaisson and his colleagues visualized their evolutionary models in *Cosmic Origins: A Logarithmic Rendering of Look-Back Time* (2001) and *Arrow of Time: A Linear Rendering of Forward Time* (2007). Designer Roland Saekow and Walter Alvarez worked to develop their own highly interactive timeline, *Chronozoom* (2010), with Microsoft Research.⁴⁰ Both remain available on the Internet, and other such electronic aids have proliferated and supplemented the scholarship.

Big history received endorsement from a wide range of public figures, from Microsoft founder Bill Gates and Nixon White House counsel John Dean to



Image 13: Left – Tom Gehrels (centre) with students Luke Gizinski (left) and Dani Potvin (right) at a presentation on “Big History and the Multiverse,” Brunswick, Maine, 24 March 2010. Right – Walter Alvarez guiding big historians on a geological fieldtrip at Furlo Pass, La Marche, Italy, August 2010. Photographs by Barry Rodrigue.



American Vice President Al Gore. This led to new productions, as when Gates and David Christian developed a free, web-based secondary/continuing education curriculum, which emerged as the Big History Project in 2011. As an outgrowth of this initiative, the first college-level textbook, *Big History: Between Nothing and Everything*, came out two years later.⁴¹

The first world conference on big history took place at the International University of Nature, Society and Humanity in the Soviet-era science city of Dubna, Russia in November 2005 on the theme of *Big History and Synergetics*. As a result of this gathering, an edition of *Social Evolution & History* was devoted to big history that year and included many of the field’s innovators. In October 2009,

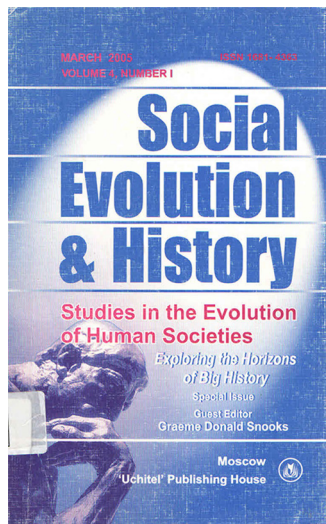


Image 14: First Big History conference, *Big History and Synergetics*, at the International University of Nature, Society & Humanity, Dubna, Russian Federation, November 2005. Left – Akop Nazaretyan, David Christian, and Fred Spier by the Volga River. Courtesy of Fred Spier. Right – Akop Nazaretyan entertaining on the piano with a singer before dinner. Courtesy of Fred Spier. Centre – *Social Evolution & History / Exploring the Horizons of Big History* (2005). From author’s collection.



Image 15: Left – Panel of big historians at the Historical Society conference, *Reflections on the Current State of Historical Inquiry*, Boothbay Harbor, Maine (USA), June 2004 / (from the left) John Mears, David Christian, Tom Gehrels, Eric Chaisson, and Fred Spier. Photograph by Kim Dionne and Barry Rodrigue; courtesy of Fred Spier. Right – David Blanks (centre) with students at the founding Conference of the African Network in Universal & Global History, University of Ilorin, Nigeria, December 2009. Photograph from David Blanks.

World History Connected devoted an entire edition to big history topics.⁴²

Other associations encouraged these developments, including the World History Association, the Historical Society (based in the US), and the African Network in Universal & Global History. In turn, big historians helped groups like the Network of Global & World History Organizations (headquartered in Leipzig, Germany). Senior historians like William McNeill provided advice and support, as did publishers like global historian Leonid Grinin at Uchitel Publishing in Russia and the Berkshire Publishing Group in the United States.⁴³

The Consolidation of a Movement

It is easy to look back now and see this trend, but as recently as 2009, the leading advocates for the field were unsure how widespread the big history movement was or would become. The question was discussed by the panel for Macroevolution: Hierarchy, Structure, Laws and Self-Organization at the Russian Academy of Sciences' Fifth Conference on *Hierarchy & Power in the History of Civilizations* in Moscow in 2009. Barry Rodrigue, with other big historians, began assembling a global directory and bibliography to see who was doing such macro-studies.⁴⁴

A shared belief was that there were only perhaps a handful of active scholars, but, to everyone's surprise, we found dozens of people teaching and researching different forms of big history. Most had independently developed their own perspective because 'it just made sense.' In other words, a global *conjuncture* had taken place over the previous fifty years.

As a result of discovering this ferment, Rodrigue proposed the formation of a global association of big history in August 2010, during a workshop at the Coldigioco Geological Observatory in the Apennine Mountains of Italy. Discussion of a professional society had gone on for years, but the documentation of big history practitioners made it apparent there was a critical mass to make it viable. The International Big History Association was launched at Coldigioco at that time.⁴⁵

The IBHA embarked on organizing itself, as well as bringing together those active in big history around the world. This was done through what amounted to an on-going '24/7' open-ended board meeting. The approach worked well, given its spread across the global landscape. Its administrative structure was put in place, and they adopted a working definition of big history:



Image 16: Left – Russian Academy of Sciences’ Fifth Conference on “Hierarchy & Power in the History of Civilizations,” Russian State University for the Humanities, Moscow, June 2009. On the left are Fred Spier and Esther Quaedackers with Akop Nazaretyan and Barry Rodrigue in front / on the right are Leonid Grinin and Andrey Korotayev in dark jackets. Right – Founding meeting of the IBHA, Coldigioco Geological Observatory, La Marche, Italy, 23 August 2010 / Fred Spier, Pamela Benjamin, Roland Saekow, Michael Dix, Walter Alvarez, David Shimabukuro, Barry Rodrigue, David Christian, Daron Greene, Lowell Gustafson, Penelope Markle. (from back left).

Big History seeks to understand the integrated history of the cosmos, Earth, life, and humanity, using the best available empirical evidence and scholarly methods.⁴⁶

The organization developed a website; a bulletin, *Origins*; a newsletter, *Emergence*; and the *Journal of Big History*. In 2011, the IBHA fielded six panels and two roundtables at the 20th World History Association conference in Beijing, where board member Craig Benjamin was a keynote speaker.⁴⁷ In February 2012, most of the board presented at the Global Futures 2045 conference in Moscow, which Akop Nazaretyan and Barry

Rodrigue co-organized with media executive Dimitry Itskov. The inaugural conference of the IBHA was held at Grand Valley State University in Michigan in 2012 on the theme of *Teaching and Researching Big History: Exploring a New Scholarly Field*.

Independent efforts sprang up and joined with big history associations, such as Wendy Curtis’s *The Biggest Picture: From the Formation of Atoms to the Emergence of Societies* (2013). Besides the IBHA, several independent regional centres formed, often with additional themes of action. In 2011, the Eurasian Center for Megahistory & System Forecasting came together in the Russian Academy of Sciences’ Oriental Institute.



Image 17: The IBHA’s first conference, *Teaching and Researching Big History: Exploring a New Scholarly Field*, at Grand Valley State University, Allendale, Michigan (USA), August 2012.

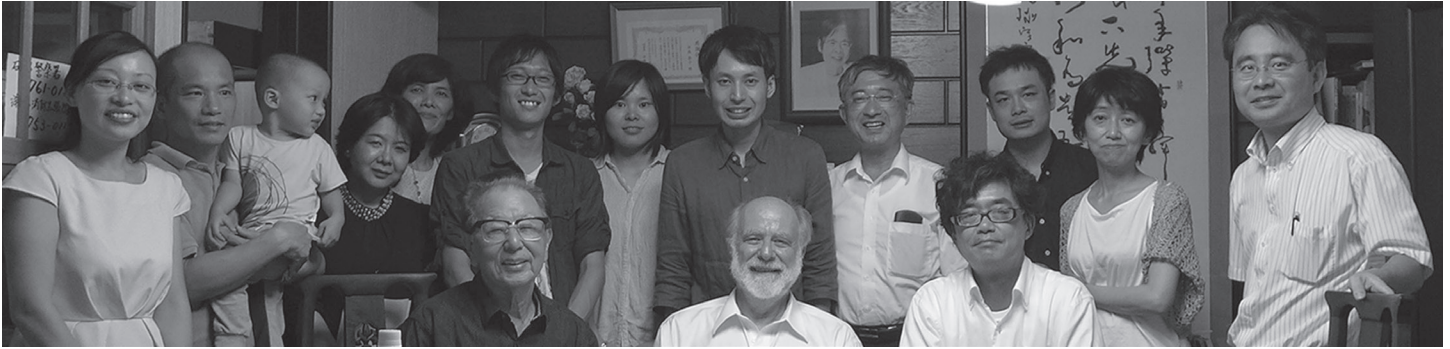


Image 18: Meeting of the Institute for Global & Cosmic Peace, 5 September 2015, Yokohama City, Kanagawa (Japan). At the centre are Osamu Nakanishi, Barry Rodrigue, Hirofumi Katayama, Nobuo Tsujimura (behind Rodrigue), and Hideki Iwaki (far right). Photograph by Kazuko Ohta.

They focused on the predictive potential of historical trends to understand human activity and avert crisis, and co-present conferences. Akop Nazaretyan, a scholar and advisor in conflict resolution, served as its first director. The Eurasian Center continued its study of macro-history with Uchitel Publishing, managed by Leonid Grinin and Andrey Korotayev. Their almanac, *Evolution*, is devoted to big history.⁴⁸

In Japan, big history first merged with the peace movement. The Institute for Global & Cosmic Peace (IGCP) had begun in 1986 during the Cold War's Space Race through the work of historian Osamu Nakanishi.

Philosopher Alexander Chumakov's holistic perspectives inspired Nakanishi, and, in 2005, his student, Nobuo Tsujimura, introduced concepts of big historian David Christian and planetary scientist Takafumi Matsui. The discussions led to a framework of 宇宙学 [universal studies]. The IGCP then engaged with Barry Rodrigue and Akop Nazaretyan, leading to a series of publications about the intersection of big history and peace studies.⁴⁹

In 2015, biochemist Martin Robert introduced big history concepts into his course on Life and Nature for international students at Tohoku University in



Image 19: Kenji Ichikawa and students at Aletheia Shonan High School, Chigasaki, Kanagawa (Japan). Courtesy of Kenji Ichikawa.

Sendai, Japan. Two years later, he and geologist Norihiro Nakamura developed a liberal arts course for Japanese students, based on big history, with archaeologist Mitsuru Haga and astrobiologist Yumiko Watanabe.⁵⁰

In 2016, environmental economist Hirofumi Kata-yama, astronomer Ryosuke Miyawaki, and their advisor, Nobuo Tsujimura, established the Big History Movement and a course at J. F. Oberlin University in Tokyo. That year, world history teacher Kenji Ichikawa introduced big history at Aletheia Shonan High School in Chigasaki, Kanagawa.⁵¹

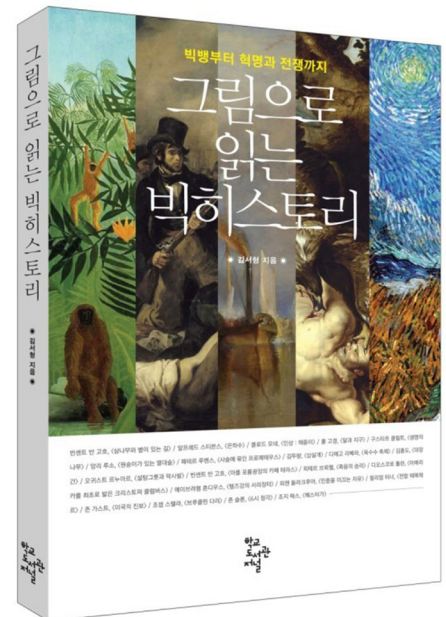
Big history arose in South Korea as part of a national program of *convergence education* between the

sciences and humanities in 2009. David Christian introduced it with world historians Ji-Hyung Cho and Seohyung Kim at Ewha Womans University in Seoul. Cho and Kim taught the first regular courses of big history, developed programs for secondary schools, and translated big history materials into Korean, including a twenty-book series on Korean big history for teens. In 2015, Kim founded the Cho Big History Academy.⁵²

China has multifaceted settings of big history. The Open Complex Giant System began to integrate scientific disciplines, while progressive world historians expanded historiography to include science and the



Image 20: Top left – Myung-Hyun Lee’s *How the World Began* (2013) in the Korean big history series for high schools. Top right – Seohyung Kim’s *Big History with Painting* (2018). Bottom – Seohyung Kim (right) and 9th grade students in a big history course in Seoul. Courtesy of Seohyung Kim.



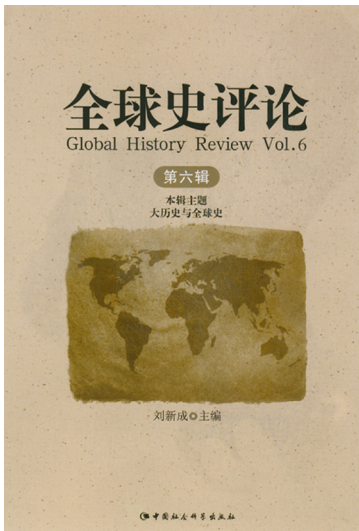


Image 21: Left – *Global History Review*, a themed issue on Big History and Global History edited by Liu Xincheng and Sun Yue in 2013. Right – Meeting of members of the Asian Big History Association and the Institute for Global & Cosmic Peace / Nobuo Tsujimura, Sun Yue and Hiroko Oh (right), Hirofumi Katayama and Osamu Nakanishi (left), Yokohama, Japan, 14 October 2017. Photo by Kazuko Ohta.

natural world. These trends continued. Women’s research physician Zhao Mei assembled her thoughts of *qi* [life energy] in a big history context and approached historian Zhu Weibin at Sun Yat-sen University in Guangzhou, who saw it as a natural extension of global history. This perspective had been earlier endorsed by officials of the Shanghai Communist Party, when David Christian’s book, *Maps of Time*, was vetted for publication in 2007. It was seen as compatible with Chinese historical paradigms.⁵³

The Asian Big History Association came together as a result of this work in China, Japan, and Korea. Its organizational meeting was held at the second IBHA conference in San Rafael, California with Sun, Tsujimura and Kim as organizers, along with Barry Rodrigue. Their initial work forged more solid links between its members. In 2014, Rodrigue accepted an offer as visiting scholar in big history at Shandong Normal University in Jinan, Shandong Province, China. This was arranged by Sun Yue with historian Qi Tao, who had advanced big history models twenty years earlier and had become deputy governor of Shandong Province. This assignment was in preparation for the International Congress of Historical Sciences, held the next year in Jinan.⁵⁴

In 2013, English translator and historian Sun Yue joined the IBHA board and, as editor of the *Global History Review*, produced, with his colleagues, the first issue of a journal on big history in China.⁵⁵ In Beijing, CITIC Press also began publishing a series of books on big history, which its editor, Ma Xiaoling, wrote “... gives us all a broader vision, more possibilities and more attention to our common human future.”⁵⁶

In August 2015, Rodrigue and Sun organized a panel on big history for the ICHS conference in Jinan, where they joined the board of the Network of Global & World History Organizations, along with Lowell Gustafson of the IBHA. Sun described his studies about the twin sides of humanity’s perplexing search for social stability: its need for harmony and creativity that exists alongside witch hunts and conflict. He sees its resolution as a central issue of big history.⁵⁷

Atmospheric scientist Alexis Lau 劉啟漢 taught at the Hong Kong University of Science & Technology for twenty years and served as director of its Institute for the Environment. He thought about cancelling their general education course on climate change because he saw how students became pessimistic after taking it. Then he heard about big history from his colleague, Robert Gibson, and, in 2015, merged it, along with



Image 22: Hong Kong University of Science & Technology's summer big history program, July 2019 Left – Secondary students from the Hong Kong Academy for Gifted Education. Right – Alexis Lau teaching about macroscopic sustainability. Photographs courtesy of Aidan W. H. Wong.

sustainability studies, into the climate change course. The result was dynamic. The next year, graduate student Aidan W. H. Wong 王瑋軒 joined him in this work and attended the third IBHA conference in Amsterdam. Their course, Big History, Sustainability and Climate Change, remains in the core curriculum. In 2017, they collaborated with the Hong Kong Academy for Gifted Education on a macro-sustainability course for secondary students. Two years later, Wong worked with Hong Kong scholars to publish a course book, *Big History: A Scientific Origin Story* (2019).⁵⁸

A public advocate in Taiwan, Gavin Lee first learned of big history in 2017 while he was writing a book on *The Maritime Silk Road and World Civilization*. He

found that big history provided a more holistic way to understand the world's interconnectedness. The next year, he started Worldviews Academy as a vehicle to encourage big history, beginning with a six-class sequence for the general public and for high school. After Taiwan's K-12 education reform in 2019, Ming Dao High School added this course as an official elective under the guidance of its principal, Albert Wang. Others followed.⁵⁹

Their team expanded course content with new media tools, such as virtual and augmented reality, along with classroom experiments and digital arts. They customized big history for different sectors, such as problem-solving scenarios for life-long learners. For



Image 23: Left – Augmented reality experience in how neurons form memory, Ming Dao High School, Taiwan, 22 September 2020 / Huai-Rui Zhang, Ke-Jie Lin, Shan-Ni Liu, Amy Lin, and Cheng-En Wu (from left). Photograph by Gavin Lee. Right – Big History Lecture at National Taiwan University, 5 May 2018. Photograph by Gina Hsiao.

business leaders, they adapted big history theories, like self-organizing and emergence concepts to guide organizational change in Executive MBA programs at the National Taiwan University and Tunghai University. By 2021, over 3000 people had participated in World-views Academy's activities, while three high schools and a university adopted its curriculum. The academy is presently curating an online series of articles about big history for the general public and designing a course for experiencing each complexity threshold with a featured board game.⁶⁰

Some of the seeds of the European Big History Network were also planted at the second IBHA conference in 2014, when Dutch big history student Maarten Oranje and Spanish geology professor Olga García-Moreno decided to reach out to scholars in Europe. García-Moreno worked with geologist Walter Alvarez, who had asked Esther Quaedackers to invite palaeontologist Jan Smit and social scientist Jesse Bos. During the Amsterdam Big History Conference (2016), the idea became concrete, and the next year, she organized the first EBHN assembly in Salas, Astur-

ias, followed by another in 2018, with twenty scientists and teachers. The third EBHN meeting was organised in Coldigioco in 2019.⁶¹

As a result of these meetings, several activities were initiated in secondary and university settings. Constance van Hall and Jesse Bos (Netherlands) and Adalberto Codetta (Italy) began an exchange between big history teachers from Spanish, Italian, and Dutch secondary schools with support from the EU Erasmus Program. Esther Quaedackers (Netherlands), Olga García-Moreno (Spain), Jacob Wamberg (Denmark), and Giovanni Grieco (Italy) also brought together their universities of Amsterdam, Oviedo, Aarhus, and Milan to work on a collaborative course in local big history. Funded by the Royal Netherlands Academy of Arts and Sciences, students from their universities worked together to analyse their local histories through a big history lens. In addition, students and teachers brought out an Italian newsletter with Adalberto Codetta on big history, while Giovanni Grieco in Italy advanced the role of geoparks and eco-museums for public education about big history.⁶²



Image 24: Left – Activists in the Local Big History Program in Italy – Stefano Masini, Chiara Codetta, and Tobia Galimberti. Photograph from the members. Right – *Notizie Big History* 2 (6) September 2019 [Big History News], Milan, Italy, ed. Adalberto Codetta. Courtesy of Adalberto Codetta.



Notizie Big History, anno 2, numero 6, Settembre 2019

2.6.1

Continua la raccolta delle considerazioni sul Simposio "Life in the Universe; Big History, SETI and the future of humankind" che si è tenuto a Milano dal 15 al 16 Luglio a Milano presso la sede del CNR. Tutti gli interventi del convegno sono stati [registrati in video e sono consultabili](#) così anche le [slide delle presentazioni](#). In questo numero le considerazioni di ricercatori SETI.

- Questo è stato il primo congresso al mondo inteso a portare in una stessa conferenza sia ricercatori SETI che BH. Il fatto che la partecipazione da tutto il mondo sia stata buona (32 conferenzieri per soli 2 giorni) conferma un'intuizione iniziata nel congresso Big History a San Rafael nel 2014, sviluppatosi ad Amsterdam nel 2016 e poi maturata a Villanova nel 2018. Il tempo farà maturare i frutti di questo simposio nelle ricerche SETI e BH. Stanno già maturando proposte per futuri congressi: una opportunità potrebbe realizzarsi nel 2021 in occasione del cinquantenario della famosa conferenza URSS-USA sui SETI svoltasi in Armenia a *Byurakan*. Due note scientifiche:
 - La fisica e la chimica sono le stesse in tutto l'universo, noi astronomi lo sappiamo dalle righe spettrali, che sono le stesse in tutto l'universo. E quindi anche la matematica, cioè la meccanica quantistica che ci permette di calcolare le righe spettrali, deve essere la stessa in tutto l'universo;
 - Contrariamente a quanto ritenuto da vari "troppo debolmente scienziati", anche l'evoluzione molecolare della vita deve essere stata all'incirca la stessa, solo che le differenze di milioni o miliardi di anni nella vita delle stelle può aver creato civiltà extraterrestri così evolute che noi NON siamo in grado di capire.

Claudio

-La partecipazione al Simposio testimonia quanto interessi l'argomento evoluzione sia a radioastronomi, sia a storici e sono convinto che:

- per portare frutti, un convegno come questo non debba rimanere isolato. E' bene che ne vengano organizzati altri, ora che Claudio ha dato il LA, perché non è sufficiente che ogni partecipante, o SETI o BH, ragioni su ciò che ha sentito. E' meglio se è continuamente stimolato ed è immerso in esperienze simili in cui ascolta ricerche al di fuori del suo campo. Magari biennale, così come è biennale il convegno IBHA;
- Il meccanismo con cui si è evoluta la vita molecolare sono convinto anche io sia lo stesso. Come si è evoluta la vita, invece, rimane ancora sconosciuto, avendo noi esperienza solo della nostra. Differenti condizioni in cui si è sviluppata vita aliena potrebbero aver stimolato una crescita differente, tale da adattarsi alle condizioni in cui si è sviluppata.

Nicolò

2.6.2



Image 25: The reincarnations of big history. Left – Cynthia Brown and Mojgan Behmand presenting on Dominican University’s big history core curriculum at the 20th World History Association conference in Beijing, July 2011. Photograph courtesy of Mojgan Behmand. Right – Students presenting their Little Big History Final Exam Projects at Holy Angel University, March 2018. The Holy Angel big history program was derived from the Dominican program (see text), so, despite the end of Dominican’s efforts, its big history initiatives continued. Photograph courtesy of Rubeth R. Hipolito.

In the midst of these successes, there were counter-trends. The first big history course had been added to a core curriculum at the University of Southern Maine (USA) in 2006 and was offered online three years later. Dominican University of California put big history into its core curriculum in 2009. In 2012, Macquarie University established its Big History Institute in Sydney (Australia), which, among other initiatives, developed an award-winning big history MOOC (massive open online course) and an elementary school level big history curriculum. Macquarie also graduated the first PhD students in big history.⁶³ Despite the popularity of such academic developments, especially among students, university administrators ended all three programs, reinforcing a vision of education as a profit-making business.⁶⁴ Nonetheless, new efforts continued to rise, in part, as a result of these closed programmes and their scholars.

In my own role as International Coordinator for the IBHA (2011-2021) and the Asian Big History Association (2014-2021), I engaged in a considerable amount of fieldwork and outreach, including a sabbatical at Shandong Normal University in Jinan (China) and dialogues in Beijing, Moscow, Lake Tahoe, Grozny, Boston, Hanoi, Montreal, Guangzhou, and Bombay.

It also involved the six-year production of an international, comprehensive anthology of big history, *From Big Bang to Galactic Civilizations*, which appeared as a three-volume series between 2015 and 2017. It involved one hundred contributors from twenty-five nations and many mother tongues.

As a result of the anthology, the Indian Association for Big History was founded at Symbiosis International University in Pune, Maharashtra (India) in 2016. There was fertile ground for it. Orla Hazra and Prashant Olelaker had promoted a New Story program (see below) in Bombay, while macro-history studies had begun for secondary students, such as at the Sri Adwayananda Public School in Kerala under stimulus from the Big History Project.

At this point, my home university in the United States was one of the institutions (described above) that shut down its successful world and big history courses in an ill-considered move to enhance profit margins. I was invited to join the faculty at the Symbiosis School for Liberal Arts to set up a core course in big history, the first such course in a South Asian university. This led to more dynamic activism in Asia, involving the Asian Big History Association and the IBHA. In 2018, Symbiosis began an annual symposium on Big History

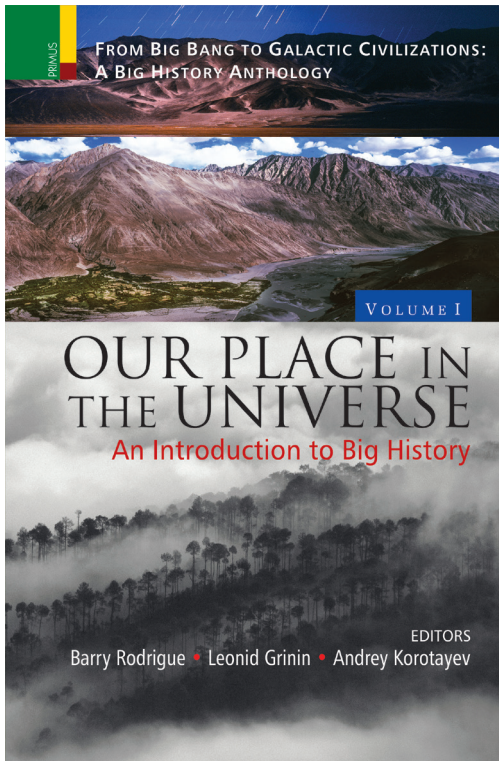


Image 26: Top-left – Front jacket of *Our Place in the Universe*, Vol. 1, *From Big Bang to Galactic Civilizations* (2015). Top-right – Editors and authors Leonid Grinin, Barry Rodrigue, and Andrey Korotayev at a Ukrainian tavern in Moscow, February 2012. Bottom – The first university class in big history, Symbiosis School for Liberal Arts, Pune, Maharashtra, (India), 2018. The course was set up by Shweta Deshpande, Afshan Majid, Priyadarshini Karve, and Barry Rodrigue (centre-front). Photograph from the Barry Rodrigue Collection.

and Interdisciplinarity with J. F. Oberlin University's Big History Movement and the ABHA. A series of webinars then began in 2020 with colleagues from Malaysia, Japan, and India that led into the 2021 Glob-

al Big History Conference (the Fifth IBHA Conference and the Third ABHA / SSLA symposium).⁶⁵

By necessity, this conference became innovative, since it took place during the COVID pandemic. Since

it was a global event, online, with participants from all around the world, we set it up as a rolling rendezvous that ran twenty-four hours a day for four days, so that each time zone would have activities during its prime times—eighty-four hours of continuous participation. It was an ambitious but highly successful program that set a new worldwide benchmark for including people who would not otherwise attend in person.

For the first time, as a result of this online ability, friends from the newly formed African Big History Association were able to attend our 2021 Global Big History Conference. They had come together in 2018 as a result of their work with Tan Chee Keong, a big historian from Malaysia who was with his family working in Yaoundé, Cameroon.⁶⁶

Creative, Ecumenical, and Tribal Expressions

Creative expressions have appeared inside and outside the academic community long before the field of big history was ever conceived as such. For example, geologist Alessandro Montanari is also a musician who teamed up with Gabriele Rossetti, a sound engineer, to convert geological data into music via a computer programme they designed. The resulting ‘geophonic’ compilation, *Balla con la Terra [Dances with the Earth]*, made in 2001, musically represents episodes of Earth’s stratigraphic history in the Umbria and Marche Apennines. They use this creativity to expand knowledge about our place in the world. The Coldigioco Geological Observatory, which Montanari and Paula Metallo co-founded with Walter and Milly Alvarez in 1992, serves as an incubator of creative arts,

CHANGING THE WORLD: *Community, Science & Engagement with Big History*



The International Big History Association’s Fifth Global Conference, in collaboration with the Symbiosis School for Liberal Arts, Symbiosis International University, the Asian Big History Association, and the Eurasian Center for Megahistory, will be held in the summer of 2021 in India.

How can universal ideas about our existence help us to overcome international problems - from the climate crisis, disease, war, exile and drought - while creating an innovative and inclusive humanity that respects life and promotes well-being for all?

1-5 August 2021

Interactive Global Conference = Virtual - Online

Image 27: The symbol for the 2021 Global Big History Conference embodies the four-fold aspects of Big History—Cosmos, Earth, Life, Humanity—as represented by the moon and sky, tree and leaves, animal tracks and earth in a yin/yang representation of nature/harmony. In the grooves of the tree bark are the Japanese kanji for *yasumu*, which means rest and joy—an ancient and complex imagery made up of 人 *hito* [humans] and 木 *ki* [tree]. The combined symbols show the people are supporting each other beneath a tree. It reminds us that to change the world, we must acknowledge that change comes from engagement, mutualization, and symbiosis with each other and with nature, around the world and in the multiverse. Appreciation to Yoshihiro Takishita 瀧下嘉弘 of Kamakura, Japan for the ideas and to our artist, Ishikha Jain, of the Symbiosis School for Liberal Arts, Pune, Maharashtra.



Image 28: A few of the founding members of the African Big History Association / Ngaingha Eric Ngong, Patrick Penka, Mesei Ndeise Florence, Nganfou Eric Goubissih, Juliana Jala, Sabastian Ngong Ateh, Ajih Joseph Mbah, and Cassian Kochi Ngong (from left). Yaoundé, Cameroon, January 2018. Photograph by Tan Chee Keong.

as it does for science.⁶⁷

Two big history PhD graduates from Macquarie University in Australia embarked on creative expression of their studies in 2014. David Baker wrote an eighteen-episode series on big history for *YouTube's Crash Course* and the Big History Project, with over 150,000 viewers, while Rich Blundell spun off his

“Shakespeare in the Cave: A Big History of Art.” As he describes it, “Our art is not only a product of cosmic creativity, but it is through our art that new drastic change can emerge.”⁶⁸

Nigel Hughes is a paleobiologist at the University of California in Riverside. He specializes in the study of trilobites and has worked in the Himalayas for

MAJORS	NOTES											
chromatic	C	C#	D	D#	E	F	F#	G	G#	A	A#	B
Major	C	D	E	F	G	A	B					
minor 1	C	D	D#	F	G	G#	A	B				
minor 2	C	D	D#	F	G	G#	A#					
minor 3	C	D	D#	F	G	A	B					
Major triadonic	C	D	E	G	A							
Minor triadonic	C	D#	F	G	A#							
Blues	C	D	D#	F	F#	G	G#	A#	B			
bebassy	C	D	E	F#	G#	A#						
ankovitch	C	D	D#	G	G#	A#						
rabian	C	C#	E	F#	G	G#						

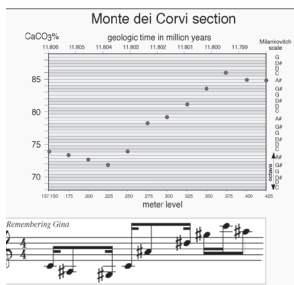


Image 29: Left – An example of the geophonic creative process from *Dances with the Earth*. Right – Paula Metallo’s collage *A Flowering Mind* on Alexander von Humboldt. Centre – Paula Metallo, Milly and Walter Alvarez and Sandro Montanari in Gubbio, Umbria, c. August 2010.

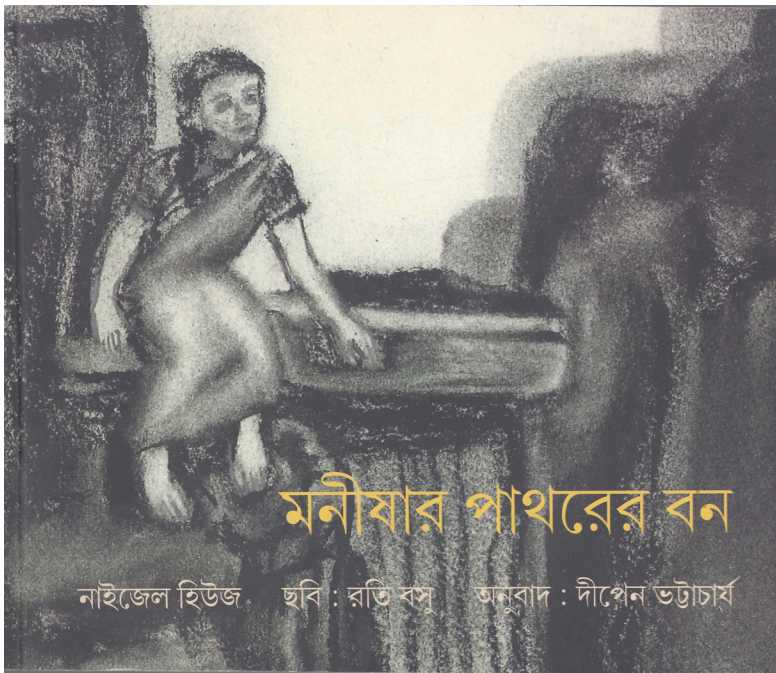


Image 30: Left – Jacket of Nigel Hughes’s children’s book, মনীষার পাথরের বন / *Monishar Pathorer Bon* [*Monisha’s Stone Forest*], about a Bengali girl’s search for answers about fossils and life. Right – Nigel Hughes in a Bengali classroom. Courtesy of Nigel Hughes.

much of his career. He also works on projects in South Asia promoting public education and Earth sciences. As part of this work, he wrote the children’s book, *Monishar Pathorer Bon / Monisha and the Stone Forest* (2012) in Bengali and English, which also appeared online as a multimedia event. It introduces basic principles of historical geology in a story about a curious village girl searching for a natural explanation for petrified wood, which is common throughout much of Bengal. The book sales support public education in India.⁶⁹

The creative arts have long held big history views, outside the academy, as in the bioregional, geopoetic, eco-feminist and eco-art movements. For example, Nobuo Tsujimura attributes a big history perspective to Osamu Tezuka’s manga, especially his life-work masterpiece, *Phoenix*. The “father” of Japanese animation, Tezuka’s series, *Phoenix*, appeared in twelve volumes between 1967 and 1988. As Tsujimura summarizes it, “Art is not just means to explain and spread Big History, but Big History itself is art to explain humanity in the whole universal history.”⁷⁰

Based on his life in Bombay in the 1980s, novelist

Greg Roberts independently assembled his vision of existence, which he called “Resolution Theory” in his novel, *Shantaram* (2003). He presciently asks, “Are we leaving a lamp of Earth Empathy in our literature, presentations or elsewhere for those who will one day see us and our conferences as history?”⁷¹

Shubhangi Swarup, also from Bombay, grounded the characters in her novel, *Latitudes of Longing* (2018), within the tectonics of Nature. As she wrote about her experience,

[o]ver time, novels have evolved into a myopic enterprise, centred around singular human actions, limited by political borders, identity politics, and, even worse, a plot. The cause and effect within a plot is restricted to its characters, devoid of the appreciation and continuations within a larger universe. In an increasingly polarised and isolating world, the human imagination has been trapped in rooms of its own creation. If the reader views life from just one window, then I, as a novelist, want to tear down all the windows and walls, and bring down the roof. I want to pull the entire

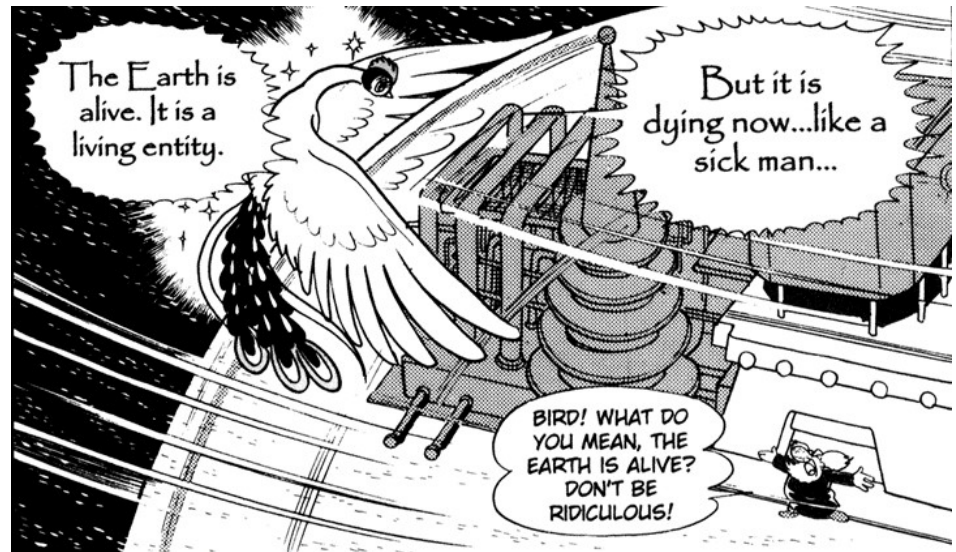
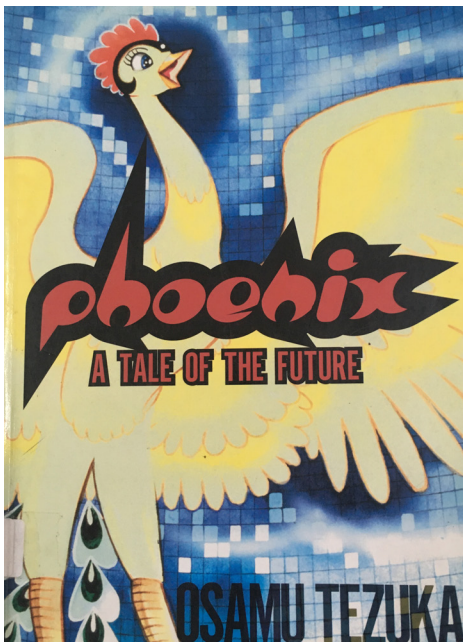


Image 31: Cover and panel in English translation of Osamu Tezuka's *Phoenix*, vol. 2, *Future*, c. 1968. Author's collection.

structure down till the reader is standing under an immense sky and looking at the infinity we call a horizon. For in that infinity, human history is only a tiny slice of the Earth's history, and the evolution of life doesn't begin with our ancestors leaving Africa but the birth of the first unicellular organism or perhaps the Big Bang. For only when we have grounded ourselves in this way can we appreciate the vastness of our own lives.⁷²

While this academic and creative movement spread, a growth of interfaith exchange with new scientific discoveries occurred. David Christian prominently described his big history model as a "modern creation myth," one that formed a basis for all humanity to share globally, outside the confines of a single tradition. His sensibility was reinforced by the classroom experiences of big historian Craig Benjamin, who saw this search for meaning as a central responsibility for students: "...[T]he lack of a modern creation myth is actually harmful to our species because without it we are left only with an overwhelming sense of disorientation and purposelessness that Emile Durkheim referred to as 'anomie.'⁷³

Before C. P. Snow's discourse about a growing di-

vide between science and the humanities, bridges were already being built. In 1954, the Institute on Religion in an Age of Science (IRAS) formed, which included astronomer Harlow Shapley, a founder of cosmography, which had led to studies in Cosmic Evolution at Harvard University. IRAS helped found *Zygon: Journal of Religion and Science* twelve years later, and its contributors included leading scholars and educators in macro-historical studies, like astrophysicist Eric Chaisson and biologist Ursula Goodenough.⁷⁴

Archbishop Lazar Puhalo of the Orthodox Church in America had been a dynamic and early advocate for science, rationalism, and faith. His book, *On the Neurobiology of Sin* (2010), served as a bridge between the two cultures. He joined the dialogue of big history, speaking, along with other big historians, at the *Global Futures 2045* conferences in Moscow (2012) and New York (2013). He raised important moral questions about issues like immortality and artificial intelligence and participated in the IBHA conferences.⁷⁵

Cosmologist Brian Swimme worked with Catholic philosopher Thomas Berry and began the Center for the Story of the Universe in 1989, which was affiliated with the California Institute of Integral Studies in San Francisco. This led them into deeper collaboration



Image 32: Left – Archbishop Lazar Puhalo at the fourth IBHA conference in Amsterdam, July 2016. Photograph by Barry Rodrigue. Right – Lazar Puhalo (back right) in dialogue with astrophysicist Stephen Hawking in Salt Lake City, Utah, in September 2016. Courtesy of Lazar Puhalo.

with religion scholars John Grimm and Mary Tucker, who founded the Forum on Religion and Ecology at Yale University in 2006. Their production of *The Journey of the Universe* (2011) was a multimedia synthesis of Berry's and others' views of spiritual meaning in the cosmos.⁷⁶ Parallel to this work, the Philadelphia Center for Religion and Science had grown into the Metanexus Institute by 1997 and, through its director, William Grassie, became a supporter of big history

Jennifer Morgan, a journalist and educator, also grew out of this tradition of the Universe Story. After participating in an Earth Literacy Program at Genesis Farm in Blairstown, New Jersey, she composed the *Universe Story Trilogy* for children between 2002 and 2006, consulting with noted scholars like astrophysicist

Neil deGrasse Tyson and anthropologist Jane Goodall. She then developed the *Deeptime Network* (2014) with a mission to unite all faith traditions with each other and with science.⁷⁷

Pope Francis's *Laudato Si', On Care for our Common Home* (2015) led to renewed actions by Catholics around the world to conserve the planet. Among them, in 2016, Prashant Olalekar and Orla Hazra merged these ideas with Thomas Berry's "New Story" and a big history paradigm to establish their course, *Awakening to Cosmic Compassion*, at the Department of Interreligious Studies, St. Xavier's College, Mumbai.⁷⁸

Educator Luis Calingo had served as Provost of Dominican University of California when it added big history to its core curriculum. In 2015, he became

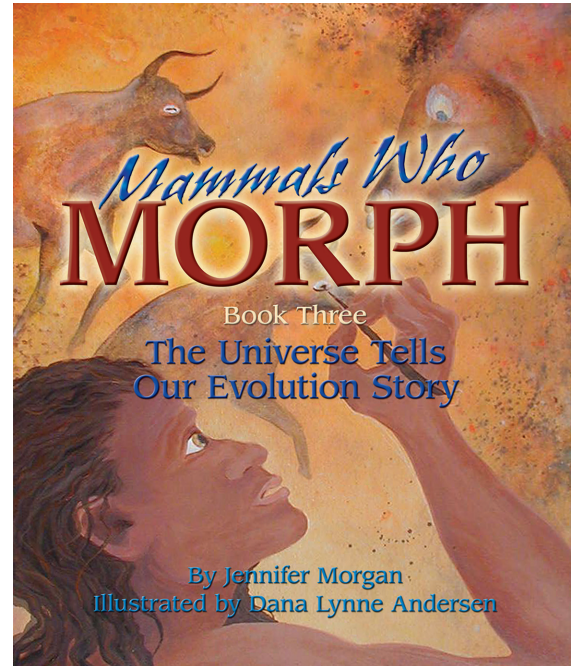


Image 33: Jennifer Morgan and her son, Morgan Martindell, on a Cosmic Walk in 1997. Courtesy of Jennifer Morgan. Cover of the *Universe Story*, Vol. III, *Mammals Who Morph* (2006). Dawn Publications. Logo of the *Deeptime Network*.

President of Holy Angel University, a major research institute in central Luzon, Philippines (his home area) and, two years later, sent professors to the Summer Institute in Big History at Dominican. Holy Angel then began a two-course big history sequence the following year. With the largest Roman Catholic population in Asia, but acknowledging the Philippines' Islamic and animistic traditions, Holy Angel promotes big history along with its many philosophical traditions.⁷⁹

While much of the overt and well-publicized efforts at rapprochement between science and religion exist in a western context, especially among Christians, that does not mean that such efforts do not exist elsewhere. Besides helping Malaysia's farmers adapt to changing land and climate, soil scientist Shamshuddin bin Jusop also had been active in guiding Muslims to see how Islam and modern science are bound together, as in his popular text, *The Earth Story: Lessons from the Quran and Science* (2006). Similarly, physician H. Sudarshan, a Vedic scholar living among the Soliga tribal people of South India for over forty years, adapted his worldviews and medical practices in a complex weave of science and community service, as delivered by his medical/educational NGOs, the Karuna Trust, and the Vivekananda Girijana Kalyana Kendra.⁸⁰

While big history discussions often centre on urban forms of education, it must be kept in mind that many tribal societies from which civilization grew maintain holistic and inclusive concepts of existence. It is acknowledged that their low-impact survival strategies could help correct the lifestyle of dominant societies. Far from being an exotic primitivism, or a return to nature, tribal experience encompasses Traditional Ecological Knowledge (TEK), while connecting with the scientific community, as in the 1994 founding of the Alaska Native Science Commission. Traditional societies have a major potential to re-envision our future in a big history context.⁸¹

Such bridges have already been opened, as in biologist Edward Wilson's *The Creation: An Appeal to Save Life on Earth* (2006) and recently led to the global anthology, *Science, Religion, and Deep Time* (2022), edited by big historians Lowell Gustafson, Barry Rodrigue, and David Blanks.

Broad Diversity and Context

If big history were just an obscure micro-discipline that a handful of specialists were advocating, it would not necessarily be of significance. Since the movement and its area of scholarship reflect a human trend

of wider, more inclusive awareness of natural phenomena, we see it as a co-operative, scientific, and scholarly endeavour that will continue to expand with exciting possibilities.

It was not the invention of one person or a small research community but instead an organic response by many independent thinkers all around the world, a global conjuncture. This is a testimony to the universal thinking of human beings to be able to arrive at similar ideas from many different backgrounds, an exercise in global intellectual ability. Big history fits within a wide variety of educational structures and is taught at many levels and in many departments and general education curriculums. Its popularity is dramatic: universities hold undergraduate classes accommodating hundreds of students and online courses draw students from around the planet.

Many scholars focus on complexity as a benchmark



of evolution. While this is an important concept, philosopher Wang Dongyue reminds us of the fragility of complexity: as things become more complex, instability increases.⁸² Other scholars identify other processes. Biologist E. O. Wilson refers to the cross-disciplinary unification of knowledge as *consilience*. Fred Spier breaks it down into a series of nested *regimes*, while David Christian focuses on *thresholds*. Barry Rodrigue centres his work on social implementation of universal studies, or *mutualization*. Big history also employs concepts like collective learning and concerns for the Anthropocene.⁸³ Being a young nexus of people and information, other new conceptualizations will appear.

This effort to understand our place in the Universe transcends big history in its institutional sense since these approaches and understandings appear elsewhere, outside the big history programmes described above. For example, geographers Georges Nicolas and Eric Waddell see a need for humanity to bridge a widening chasm between meaning and science. E. O. Wilson also addressed this concern in his book, *The Meaning of Human Existence* (2014):



Image 34: Left – Orla O'Reilly Hazra and Prashant Olalekar, Department of Interreligious Studies, St. Xavier's College, Bombay. Right – One of their symposiums on big history at Jnana Deepa Vidyapeeth (JDV), the Pontifical Athenaeum in Pune, Maharashtra, in 2016. Photographs by Barry Rodrigue.

Human beings are not wicked by nature. We have enough intelligence, goodwill, generosity, and enterprise to turn Earth into a paradise both for ourselves and for the biosphere that gave us birth. We can plausibly accomplish that goal, at least be well on the way, by the end of the present century. The problem holding everything up thus far is that *Homo sapiens* is an innately dysfunctional species.

Paleobiologists Neil Shubin and Ted Daeschler discuss these wider contexts in their disciplines, as in Shubin's book about our evolutionary lineage, *The Universe Within* (2013). Others have widely popularized such macro-concepts, as with biogeographer Jared Diamond and historian Yuval Harari.⁸⁴ So, whether big history succeeds as a field of study or morphs into something else is immaterial—the concept and the effort to comprehend our widest existence and our future (based on that understanding) is here to stay.

Existence and Survival

Questions about existence are still a serious strategy for human survival, as much as they were two million years ago at Olduvai Gorge, a process that led to our being the sole-surviving species of our lineage. We are today facing another life-changing crossroads, a crisis of our own making and of an even more rapid and intense nature. The present-day disruption of the ecosystem has been caused by our very own success.

Over-population has engulfed the planet along with stratification of resources. Entire species of life are vanishing, along with fresh water supplies. Non-renewable resources are being exhausted and resource wars are proliferating. Pollution makes swathes of the world uninhabitable. Climate change is impacting the entire planet, from the melting of the world's ice sheets and permafrost to the related rise in sea levels and greenhouse gas emissions, along with storm surges, disruption of ocean currents and wind patterns, and wildfires.

Local agriculture and business are destroyed by competition from mega-industry, resulting in the vast

concentration of people in urban areas, as more and more residents are dropped to the lowest rungs of society. Many think they can escape this devastation, but that is a false illusion. More than half the world's oxygen is generated by the ocean's phytoplankton, which is being severely impacted by global warming and pollution. A decline in microalgae will not just imbalance marine life; it will impact our ability to breathe ... all species, all individuals, everywhere.

In a moderate scenario, the scale of the present-day crisis could lead to the end of civilization as we have come to know it. In a worse case, it could lead to human extinction, along with the demise of many other species and biomes. Nonetheless, we have many things in our favour. Instead of having to develop new stone tools, our present problems largely involve ways of seeing the world and social transformations. One of the tools at our disposal is big history.⁸⁵

Perhaps the most powerful understanding to come from big history is not only to reinforce how all humans are one unified family but also how we are related to everything else, from inanimate matter to other life forms. This is not intuitive; nor is it a simple revealed process of having a general understanding and good intentions. There must be a willingness to act on this knowledge.

Society is a messy process. It began to be perfected as our species moved out of their forests. The start of the glacial age over two million years ago forced our ancestors onto the East African grasslands, where they were challenged to find new forms of sustenance by fluctuating periods of dry and wet climates. These implications will be discussed in Part Two of this essay—"The Children of Climate Change."

Acknowledgments

The author would like to thank the following people for reading this article and offering thoughtful and constructive comments: G. Siegfried Kutter, John Mears, Eric Chaisson, Sun Yue, David Christian, Fred Spier, Penelope Markle, Nobuo Tsujimura, Akop Nazaretyan, Sun Chao, Li Qingcheng, Zhao Beiping, and David Blanks.

Notes

1. My first awareness of such macro-ideas came when I was six years old and dug up what I thought to be a *Brontosaurus* femur (...in retrospect, it was probably just a cow's leg bone)! My parents and Jesuit educator Bernard Scully encouraged my learning about prehistoric life and science. In the 1970s, I studied with G. Siegfried Kutter, a founder of what later came to be called big history. My macro-consciousness intuitively manifested itself, while I did my PhD in geography at Université Laval in the 1990s, when I was assigned to write the opening chapters of a historical geography of south-central Québec. The National Institute for Scientific Research rejected my proposal to start the book with the Big Bang, but they did let it begin at Pangea! Courville and others 2003. In 2002, a colleague, Bob Schaible, told me of an article he read about big history, which began my purposeful affiliation with other big historians.

2. As an example of some of this research, see the following. Bönner and others 2021.

3. Rodrigue 2019: 109–112; idem 2022.

4. Tierney and others 2017. Brookfield 2010. Brooks 2010. Haas and Cramer 2006. Hassan 1988.

Barnard and Duistermaat 2012. Malville, Wendorf and Mazar 1998.

5. Hritz 2010. Kathayat and others 2017. Mostern 2021. Wu and others 2021. Haas and Creamer 2006.

6. Khaldun 1958: 481.

7. Dubova 2019. Gannon 2021.

8. For big history considerations of the Axial Age, see the following. Bondarenko and Baskin 2016.

Puhalo 2016.

9. UNESCO, World Heritage Centre 1966, 2009.

Vega 1609: 357–359. Christos 2010. *Encyclopædia Britannica* 2007. Broek 2018.

10. Rodrigue 2019: 112–115.

11. Miura 1789, 1982. Iwata 1989. Miura's work was hampered by foreign and domestic policies of Japan's Tokugawa shogunate and so it became lesser known than those of other scholars. Piovesana 1965. Mercer 1998. I am grateful to Nobuo Tsujimura for bringing Miura and Iwata to my attention. Christian 2010: 12. Spier 2010: 10. I am grateful to Fred Spier for bringing Alexander von Humboldt to my attention. Rodrigue 2019: 115, 122.

12. Daniel Smail, Cambridge, Massachusetts, e-mail to Barry Rodrigue, 4 August 2010. Darwin's book, *On the Origin of Species*, came out in 1859 and was part of a 'time revolution' in historical understanding, one mediated by geologists and archaeologists. Christian 2015.

13. Wallerstein 1991. Christian 2010: 13–15.

14. Waddell 2017.

15. Tagore 2006. Teilhard de Chardin 1955. Lemaître 1927. I am grateful to Alex Holowicki for his presentation on 'Big History and Big Anxieties in the Interwar Period: Rethinking Hiram Percy Maxim's *Life's Place in the Cosmos*' at the third IBHA conference in Amsterdam in 2016.

16. Montessori 1998: 15. Jos and Anne-Marie Werkhoven, Almere, Flevoland, Netherlands, private communication, 26 May 2015. Werkhoven 2016.

17. Matsuzawa and McGrew 2008. I would like to thank Nobuo Tsujimura for sharing his insights about Imanishi. Nobuo Tsujimura, personal communications (email), to Barry Rodrigue, 4 June 2017.

18. Duedahl 2011.

19. Nazaretyan 2005.

20. Eric Chaisson, 1975; idem 1977; idem 1982; idem, personal communications, to Barry Rodrigue, 29–30 June 2010; idem, to Barry Rodrigue, Joseph Voros and David Baker, 22 January 2015, 4 February 2015. Field and others 1978. Field 1980.

21. G. Siegfried Kutter 1987; idem, 2011: 102–103. As with so many other of these efforts, the course work and book came together from collaborative

efforts, notably with ecologist Burton Guttman and microbiologist Elizabeth Martin Kutter, who also wrote a synthesis of her work in relationship to big history. E. Kutter 2017.

22. Thomas Bania, personal communications to Barry Rodrigue, 12 February 2014, 31 March 2014.

Michael Rampino, entry in Rodrigue (with Stasko) 2009: 15–16.

23. Cadrin-Rossignol 2002.

24. Qian 1991. Qian, Yu, Dai 1990. Cao, Dai, Zhou 2009. Sun 2015. Lu 2004. I am grateful to Sun Yue for bringing the Open Complex Giant System to my attention.

25. Sulkin 2015.

26. It bears noting that Lynn Margulis and Carl Sagan had been married from 1957 to 1964. They evidently shared a passion for holistic views of existence, considering their subsequent work. Lovelock and Margulis 1974. Lovelock 1975. Lovelock and Epton 1975. Margulis and Sagan 1986. Margulis 1998.

27. KCET Studios and others 1980. *Wikipedia*, “Carl Sagan,” accessed 13 October 2021. L. Hawing 2016. McKie 2007.

28. One of the groups dedicated to Teilhard’s work is the Association des amis de Pierre Teilhard de Chardin. On some of the ongoing initiatives related to Berry’s work and its links to big history, see the following: Hazra 2016; Morgan 2017.

29. Frank 1978. Wallerstein 1984. Snooks 1998; idem, Institute of Global Dynamic Systems.

30. Mears 1986; idem, personal communication to Barry Rodrigue, Western History Association, Conference, Incline Village, Nevada, 14 October 2010; idem 2016.

31. David Christian, personal communication to G. Siegfried Kutter, 2011.

32. Christian 1991. Christian and McNeill 2008.

33. Huang Liuzhu’s proposal for uniting natural and human history at Northwest University was not adopted. Sun Yue, personal communications to Barry Rodrigue, 2013–2014. Sun Yue at Capitol Normal University in Beijing is a leading big historian in China and has been engaged in a study of Chinese

traditions of macro-history. Sun Chao at Shandong Normal University in Jinan was a student of Ma Shili. I appreciate their insights into the development of big history in East Asia. PhD students Li Qingcheng at Sun Yat-sen University and Zhao Beiping at Beijing Normal University also assisted me greatly.

34. Bondarenko, Grinin and Korotayev 2011. Grinin, Korotayev and Markov 2017. Panov 2017.

35. Spier 2005a: 1; idem, 2017. Quaedackers 2015.

36. Some of these efforts were challenging. Cynthia Stokes Brown had planned to write her book in the 1990s, but the sabbatical committee at Dominican University of California laughed at her and refused to allow such an ‘outlandish’ proposal, so she was forced to defer the project for a decade. Cynthia Stokes Brown, personal conversation with Barry Rodrigue, 6 August 2014.

37. The Spacewatch Program was begun by astronomer Tom Gehrels at the Kitt Peak National Observatory in Arizona (USA) in 1980. University of Arizona, Lunar and Planetary Laboratory, Spacewatch. Gehrels 2007: 183–202; idem, personal communication to Barry Rodrigue, 24 March 2010.

38. Other team members also published, such as Smit and Hertogen 1980.

39. Gehrel’s text was developed/updated with his students as *Survival through Evolution, from Multiverse to Modern Society* (2007).

40. Eric Chaisson’s timelines are maintained with additional materials at the Harvard University website, *Cosmic Evolution: An Interdisciplinary Approach* 2013. Saekow 2016. Duan 2013.

41. Gates and Rose 2009. Dean 2009. Gore 2013. Sorkin 2014. Christian, Brown, and Benjamin 2013. Sorkin 2014. The Big History Project focused on organizing courses and projects in schools in the US, Europe, and Australia. Some schools in non-Western countries developed big history independently by using the *BHP* website, as well as other sources. Bob Regan, e-mail to Barry Rodrigue, 11 July 2019.

42. A playful slogan for the 2005 Dubna conference was paraphrased from the *Communist Manifesto* —“The spectre of Big History is roaming the Earth.”

Spier 2005b. Akop Nazaretyan, personal conversations with Barry Rodrigue, Moscow, Russia, February 2012. *Social Evolution and History: Exploring the Horizons of Big History* 2005. *World History Connected* 2009. In this issue, a review of books by world-historian William Everdell provided an interesting overview of big history. Everdell 2009. Alexander Moddejonge also provided an early synthesis of big history in his MA thesis. Moddejonge 2012.

43. Christian and McNeill 2008.

44. Several versions of the directory and bibliography resulted, which explains variations in content and participants. They appeared online, but, as sites became defunct, some versions vanished. A few were as follow. Rodrigue with Stasko 2009; idem, 2010. Stasko and Rodrigue 2010a; idem 2010b. Rodrigue, Spier, Christian, and Chaisson 2011. Rodrigue and Sun 2017.

45. The big historians who met at Coldigioco and founded the International Big History Association on 20 August 2010 were David Christian of Macquarie University in Sydney (Australia), Walter Alvarez of the University of California at Berkeley (USA), Craig Benjamin of Grand Valley State University in Michigan (USA), Cynthia Stokes Brown of Dominican University in California (USA), Fred Spier of the University of Amsterdam (Netherlands), Lowell Gustafson of Villanova University in Pennsylvania (USA), and Barry Rodrigue of the University of Southern Maine (USA). Other participants who were instrumental at this session were Alessando Montanari and Paula Metallo (directors of the Coldigioco Geological Observatory), Milly Alvarez, Pamela Benjamin, Gina Giandomenico, Penelope Markle, Daron Green, and Michael Dix. Barry Rodrigue chaired this first meeting.

46. The IBHA statement was based on a definition of big history used by Walter Alvarez.

47. The big history panels and roundtables were organized by Barry Rodrigue and Craig Benjamin. Rodrigue 2013.

48. Barry Rodrigue began as Secretary for the IBHA, but, in 2011, he became International Coordinator. The IBHA discussed how to encourage such worldwide

growth at its first board meeting in Grand Rapids, Michigan in 2011. Part of Rodrigue's duties involved encouragement of local and regional initiatives, including that of the Eurasian Center, which he had proposed to Akop Nazaretyan and Andrey Korotayev. In 2015, he was appointed Research Professor in the Euarasian Center, Russian Academy of Sciences, Institute of Oriental Studies. Social Studies c. 2017.

49. Nakinishi and others 2014; idem, 2016; idem, 2017. Nakanishi and Tsujimura 2015; idem, 2016. Rodrigue 2013.

50. Martin Robert had learned of big history through David Christian's TED Talk and then consulted Big History Project materials. Martin Robert, Kyoto, e-mails to Barry Rodrigue, 20–22 December 2018. Christian 2011.

51. I appreciate the background details of these efforts in Japan from Nobuo Tsujimura, who participated in much of the formative work.

52 Kim 2015.

53. Zhao 2016. Zhu 2016. Christian 2007. Rodrigue 2013. News of the debate in Shanghai about David Christian's *Maps of Time* came from Osamu Nakanishi, who had learned of it from colleagues in the Chinese Communist Party. Nobuo Tsujimura, Tokyo, e-mail to Barry Rodrigue, 29 June 2015. Osamu Nakanishi, private conversation with Barry Rodrigue and others, Yokohama, 5 September 2015.

54. Rodrigue 2013.

55. Liu and Sun 2013.

56. Ma Xiaoling, Beijing, e-mail to Barry Rodrigue, 6 June 2017.

57. Network of Global & World History Organizations 2021.

58. Aidan Wong, Hong Kong, e-mails to Barry Rodrigue, 17–20 October 2021.

59. Lee Chiata, Taipei, e-mail to Barry Rodrigue, 16 October 2021.

60. Lee Chiata, Taipei, e-mail to Barry Rodrigue, 16–20 October 2021.

61. During the COVID pandemic, the European Big History Network met bi-monthly online. Esther Quaedackers, Amsterdam, e-mails to Barry Rodrigue,

20 October–24 November 2021. Jesse Bos, Amsterdam, e-mail to Barry Rodrigue, 28 October 2021.

62. The Italian newsletter editors are Adalberto Codetta, Giovanni Grieco, Renza Cambini, Silvia Morlotti, Davide Tonet. Jesse Bos, Amsterdam, e-mail to Barry Rodrigue, Pune, 28 October 2021. Adalberto Codetta, Milan, e-mails to Barry Rodrigue, 28 October–16 November 2021. Esther Quaedackers, Amsterdam, e-mails to Barry Rodrigue, 20 October–24 November 2021.

63. Rodrigue 2010. The students to first graduate with doctorates in big history were David Baker and Rich Blundell at Macquarie University. David Christian, Sydney, e-mail to Barry Rodrigue, 26 October 2021.

64. Likewise, some opposition arose from traditionalist academics who saw big history to be an attack against ‘human agency’ or religion. Furedi 2013.

65. The programme and the recording for the 2021 Global Big History Conference Symbiosis School for Liberal Arts and others 2021.

66. African Big History Association 2018. Nganfon Eric 2018. Tan 2019.

67. Rossetti and Montanari 2001. Paula Metallo is a creative artist and co-director of the Coldigioco Geological Observatory. Metallo 2016.

68. Baker 2014–2017. Blundell 2014.

69. Hughes 2012; idem, 2016. Hughes, Basu, Bipattaran, and Ensemble 2012.

70. Tsujimura 2014.

71. Roberts 2003: 705–709; idem, Geneva, emails to Barry Rodrigue, 4 April 2012, 23 January 2019; idem, Symbiosis School for Liberal Arts and others 2021, pp. 70–72. A version of the contents of second e-mail appeared in the programme of the 2021 Global Big History Conference for which it was sent. I would like to thank Michael Dix for noting this connection between Greg Roberts’s work and big history.

72. Shubhangi Swarup, Bombay, email to Barry Rodrigue and Oishika Neogi, 10 March 2020. A version of the contents of this e-mail appeared in the programme of the 2021 Global Big History Conference.

73. Christian 2004: Introduction. Benjamin 2009. Not everyone agreed with the characterization of big

history as a modern creation myth, including John Mears and Barry Rodrigue. A concern was the implied association of science with myth. Mears, conversation with Barry Rodrigue, Western History Association Conference, Incline Village, Nevada, 14 October 2010.

74. Institute on Religion in an Age of Science. Zygon: *Journal of Religion and Science*. Shapley 1966. Chaisson 1999. Goodenough 2003.

75. Puhalo 2010; idem 2016. Orthodoxy in Dialogue. Roderick 1977.

76. Brian Swimme 2016.

77. Morgan 2002; idem 2003; idem 2006; idem 2017.

78. Hazra 2016; idem 2017/2022. Olelaker 2017.

79. Espartinez, Maniago, and Gonzales 2018. Holy Angel University 2018a; idem, 2018b. Nobuo Tsujimura, Tokyo, email to Barry Rodrigue, 6 October 2021. Santa Cruz Sentinel 2021.

80. Jusop and Tan 2022. Sudarshan 2022. Shamshuddin, Tan and Sudarshan engage with big history to encompass their ideas of existence at global venues with the IBHA and ABHA.

81. Shtyrbul 2006. Rodrigue 2014.

82. Chaisson 2010; idem 2011. Bondarenko and Baskin 2016. Wang 2020. Bridge-Minds 2021.

83. Moddejonge 2012. Wilson 1998. Spier 1996. Christian, Brown, Benjamin 2013. Rodrigue 2017b. Baker 2016. Chaisson 2010; idem, 2011.

84. Nicolas 1989. Waddell 2017. Wilson 2014: 176. Diamond 1998. Harari 2015. Edward O. Wilson, Cambridge, emails to Barry Rodrigue, 4 May 2012.

85. Rodrigue 2021; idem 2017b.

Bibliography

- Author's note: Some difficult-to-access items appear on my web-portal, *Rodrigue Global* <<http://www.rodrigue-global.org/>>. The box is simply titled "Archive" or can be accessed via *Universal Studies—Big History Center II: Papers, Lectures, Tools and Links*: <<http://www.rodrigue-global.org/universal-studies--archives.html>>. —Barry Rodrigue
- African Big History Association. 2018. *Founding Members Profile, 21 January 2018*. A version of this document was published in the IBHA bulletin, *Origins* 8, no. 1 (January): 3–12.
- Alaska Native Science Commission. Accessed November 3, 2021. <http://www.nativescience.org/>.
- al-Qazwini, Zakariya. c.1280. *Marvels of Creatures and Strange Things Existing*, mss. edition. Baghdad: Ottoman Empire, c. 1400. نبا ءايركز / ين يوزقلا دم حم بئارغو تا قول خمل ا بئاجع باتك / ين يوزقلا دم حم [Arabic publication].
- Alvarez, Walter. 1997. *T. rex and the Crater of Doom*. Princeton: Princeton University Press.
- Alvarez, Walter. 2009. *The Mountains of Saint Francis*. New York: W. W. Norton & Company.
- Association des amis de Pierre Teilhard de Chardin. Accessed December 24, 2021. https://www.teilhard.fr/presentation_association.
- Baker, David. 2014–2017. Crash Course Big History, 18 episodes. YouTube and the Big History Project. Accessed October 30, 2021. <https://www.youtube.com/playlist?list=PL4e9AQVlcJTQdxGeeApugAEomCc02lchm>.
- Baker, David. 2016. "Collective Learning: A Potential Unifying Theme of Human History." In *From Big Bang to Galactic Civilizations: A Big History Anthology*. Vol. II, *Education and Understanding: Big History around the World*. Edited by Barry Rodrigue, Leonid Grinin, and Andrey Korotayev. Delhi: Primus Publishing, 93–117.
- Barnard, Hans, and Kim Duistermaat. 2012. *The History of the Peoples of the Eastern Desert*. Los Angeles: Cotsen Institute of Archaeology, University of California.
- Benjamin, Craig. 2009a. "The Convergence of Logic, Faith and Values in the Modern Creation Myth." *World History Connected* 6, no. 3 (October). Accessed December 22, 2021. <https://worldhistoryconnected.press.uillinois.edu/6.3/benjamin2.html>.
- Benjamin, Craig, guest ed. 2009b. *World History Connected: The E-Journal of Learning and Teaching* 6, no. 3 (October). Accessed October 15, 2021. <https://worldhistoryconnected.press.uillinois.edu/6.3/index.html>.
- Berry, Thomas. 1988. *Dream of the Earth: The Universe Story*. San Francisco: Sierra Club Books.
- Big History Project*. Accessed December 22, 2021. bighistoryproject.com.
- Blundell, Rich. 2014. "Shakespeare in the Cave: A Big History of Art." Second International Big History Association Conference. Dominican University, San Rafael, California, August 8. Accessed October 30, 2021. <https://www.youtube.com/watch?v=VoisuLgCDr0>.
- Blundell, Rich. 2016. "Experience and Big History." Full version of the essay cited below of the same title. Accessed October 30, 2021. http://www.rodrigue-global.org/uploads/1/1/3/3/11330998/chapter_24_rich_blundell.pdf.
- Blundell, Rich. 2017. "Experience and Big History." In *From Big Bang to Galactic Civilizations: A Big History Anthology*. Vol. III, *The Ways That Big History Works: Cosmos, Life, Society and Our Future*. Edited by Barry Rodrigue, Leonid Grinin, and Andrey Korotayev. Delhi: Primus Publishing, 261–275.
- Bondarenko, Dmitri, and Ken Baskin. 2016. "Big History, Complexity Theory, and Life in a Non-Linear World." In *From Big Bang to Galactic Civilizations: A Big History Anthology*. 2015. Vol. II, *Education and Understanding: Big History around the World*. Edited by Barry Rodrigue, Leonid Grinin, and Andrey Korotayev. Delhi: Primus Publishing, 183–196.

- Bondarenko, Dmitri, Leonid Grinin, and Andrey Korotayev. 2011. "Social Evolution: Alternatives and Variations (Introduction)." In *Evolution: A Big History Perspective*. Edited by Leonid Grinin, Andrey Korotayev, and Barry Rodrigue. Volgograd: Uchitel Publishing, 212–250.
- Bönner, Mick, William Gosling, and Henry Hooghiemstra. 2021. "Inside-of-Africa: How Landscape Openness Shaped *Homo sapiens* Evolution by Facilitating Dispersal and Gene-flow in Middle and Late Pleistocene Africa." In *Quaternary Vegetation Dynamics—The African Pollen Database*. Edited by Jürgen Runge, William Gosling, Anne-Marie, and Louis Scott. London: CRC Press, 373–396.
- Brass, Michael. 2017. "Early North African Cattle Domestication and Its Ecological Setting: A Reassessment." *Journal of World Prehistory* 31 (December): 81–115.
- Bridge-Minds. "Wang Dongyue." Accessed November 3, 2021. <https://www.bridgeminds.net/>.
- Broek, Marc van den. 2018. *Leonardo da Vincis Erfindungsgeister: Eine Spurensuche*. Oppenheim: Nünnerich-Asmus Verlag. [German publication].
- Brookfield, Michael. 2010. "The Desertification of the Egyptian Sahara during the Holocene (the Last 10,000 Years), and Its Influence on the Rise of Egyptian Civilization." In *Landscapes and Societies: Selected Cases*. Edited by Peter Martini and Ward Chesworth. Dordrecht: Springer, 91–108.
- Brooks, Nicholas. 2010. "Human Responses to Climatically-driven Landscape Change and Resource Scarcity: Learning from the Past and Planning for the Future." *Landscapes and Societies: Selected Cases*. Edited by Peter Martini and Ward Chesworth. Dordrecht: Springer, 43–68.
- Brown, Cynthia Stokes. 2007. *Big History: From the Big Bang to the Present*. New York: The New Press.
- Cadrin-Rossignol, Iolande. 2002. *Hubert Reeves, Star Teller*. Canadian National Film Board.
- Cao, Longbing, Ruwei Dai, and Mengchu Zhou. 2009. "Metasynthesis: M-space, M-interaction, and M-Computing for Open Complex Giant Systems." *IEEE Transactions on Systems, Man, and Cybernetics*. Part A: *Systems and Humans*. (September).
- Chaisson, Eric. 1975. "Syllabus: Astronomy 8, Cosmic Evolution." (Fall). Cambridge: Harvard University.
- Chaisson, Eric. 1977. "The Scenario of Cosmic Evolution." *Harvard Magazine* (November–December): 21–33.
- Chaisson, Eric. 1982. "The Broadest View of the Biggest Picture." *Harvard Magazine* (January–February): 21–25.
- Chaisson, Eric. 1999. "Ethical Evolution." *Zygon* 34, no. 2 (June): 265–271.
- Chaisson, Eric. 2001a. *Cosmic Evolution: The Rise of Complexity in Nature*. Cambridge: Harvard University.
- Chaisson, Eric. 2001b. *Cosmic Origins: A Logarithmic Rendering of Look-Back Time*. Lowell: Foundation for the Future, 2001. Accessed October 15, 2021. https://web.cfa.harvard.edu/~ejchaisson/cosmic_evolution/docs/splash.html.
- Chaisson, Eric. 2010. "Energy Rate Density as a Complexity Metric and Evolutionary Driver." *Complexity* 16 (3): 27–40.
- Chaisson, Eric. 2011. "Energy Rate Density II: Probing Further a New Complexity Metric." *Complexity* 17 (1): 44–63.
- Chaisson, Eric. 2013. *Cosmic Evolution: From Big Bang to Humankind*. Cambridge: Harvard University. Accessed October 15, 2021. [cfa.harvard.edu/~ejchaisson/cosmic_evolution/docs/splash.html](http://web.cfa.harvard.edu/~ejchaisson/cosmic_evolution/docs/splash.html).
- Chaisson, Eric. 2016. "Relating Big History to Cosmic Evolution." In *From Big Bang to Galactic Civilizations: A Big History Anthology*. Vol. II, *Education and Understanding: Big History around the World*. Edited by Barry Rodrigue, Leonid Grinin, and Andrey Korotayev. Delhi: Primus Books. 17–30.
- Chaisson, Eric, and Dana Berry. 2007. *Arrow of Time: A Linear Rendering of Forward Time*. Wright Center for Science Education / Harvard-Smithsonian Center for Astrophysics. Accessed October 15, 2021. [cfa.harvard.edu/~ejchaisson/cosmic_evolution/docs/fr_1/fr_1_intro_movies](http://web.cfa.harvard.edu/~ejchaisson/cosmic_evolution/docs/fr_1/fr_1_intro_movies).

- html.
- Cheng, Ming. 1994. "The Human-Nature Relationship from a Macro-history Perspective." *Academia Bimestris* 6: 18–23. 诚鸣: 《从“大历史观”看人与自然的关系》, 《学海》1994年第6期, 第18–23页。[Chinese publication].
- Christian, David. 1991. "The Case for 'Big History.'" *The Journal of World History* 2, no. 2 (Fall): 223–238.
- Christian, David. 2004. *Maps of Time: An Introduction to Big History*. Berkeley: University of California.
- Christian, David. 2007. *Maps of Time: An Introduction to Big History*. Shanghai: She Hui Ke Xue Yuan Chu Ban She. 大卫·克里斯蒂安: 《时间地图: 大历史导论》, 晏可佳等译, 上海: 上海社会科学院出版社, 2007年版。[Chinese publication].
- Christian, David. 2010. "The Return of Universal History." *History and Theory* 49 (4): 5–26.
- Christian, David. 2011. "The History of Our World in 18 Minutes." *TED: Ideas Worth Spreading*, March 2011. Accessed December 22, 2021. https://www.ted.com/talks/david_christian_the_history_of_our_world_in_18_minutes?language=en.
- Christian, David. 2015. "History and Time." In *From Big Bang to Galactic Civilizations: A Big History Anthology*. Vol. I, *Our Place in the Universe: An Introduction to Big History*. Edited by Barry Rodrigue, Leonid Grinin, and Andrey Korotayev. Delhi: Primus Books, 54–71.
- Christian, David, Cynthia Brown, and Craig Benjamin. 2013. *Big History: Between Nothing and Everything*. New York: McGraw-Hill.
- Christian, David, and William McNeill. 2008. "An Introduction to 'Big History.'" December 30, 2008. Accessed October 14, 2021. <http://www.youtube.com/watch?v=IBCvpIK7g8U>.
- Christos, Lauren. 2010. "圖書館事業與交流 / The Yongle Dadian: The Origin, Destruction, Dispersal and Reclamation of a Chinese Cultural Treasure." *Journal of Library and Information Science* 36, no. 1 (April): 82–91.
- Cloud, Preston. 1978. *Cosmos, Earth and Man: A Short History of the Universe*. New Haven: Yale University Press.
- Cosmos. 1980. Television series. KCET Studios and others.
- Courville, Serge, Pierre Poulin, and Barry Rodrigue. 2003. *Histoire régionale de Beauce-Etchemin-Amiante*. Québec: Institut national de la recherche scientifique.
- Curtis, Wendy. 2013. *The Biggest Picture: From the Formation of Atoms to the Emergence of Societies*. CreateSpace Independent Publishing.
- Dean, John. 2009. "Looking for Great 'Big History' Books." *FindLaw* (August 7). Accessed October 15, 2021. <https://supreme.findlaw.com/legal-commentary/looking-for-great-big-history-books.html>.
- Deeptime Network. Accessed October 30, 2021. <https://dtnetwork.org/>.
- Diamond, Jared, 1997. *Guns, Germs, and Steel: The Fates of Human Societies*. New York: W. W. Norton.
- Dong, Guangbi, and Tian Kunyu. 1996. *The Origin of Heaven and Earth—Natural Evolution and the Birth of Life*. Harbin: Northeast Forestry University. 董光璧、田昆玉: 《天地之初——自然的演进和生命的诞生》, 哈尔滨: 东北林业大学出版社, 1996年12月第一版。[Chinese publication].
- Duan, Huichuan. 2013. "ChronoZoom: New Thinking in Timelined Knowledge for History & Historical Sciences." *Origins* 3, no. 11 (December): 14–18.
- Dubova, Nadezhda. 2019. "Gonur Depe—City of Kings and Gods, and the Capital of Margush Country (Modern Turkmenistan)." In *Urban Cultures of Central Asia from the Bronze Age to the Karakhanids*. Edited by Christoph Baumer and Mirko Novák. Wiesbaden: Harrassowitz Verlag, 29–53.
- Duedahl, Poul. 2011. "Selling Mankind: UNESCO and the Invention of Global History, 1945–1976." *Journal of World History* 22, no. 1 (March): 101–133.
- Encyclopædia Britannica*. 2007. "Encyclopedias and Dictionaries." Vol. 18, 257–286.
- Espartinez, Alma, Edmond Maniago, and Aris

- Gonzales. 2018. *Big History—From Nothing to Something: Introduction to First Year Experience*. San Fernando: Quadtone Prints.
- European Big History Network. Accessed October 17, 2021. <https://bighistory.eu/>.
- Everdell, William. 2009. "A Short History of Big History." *World History Connected* 6, no. 3 (October). Accessed October 15, 2021. https://worldhistoryconnected.press.uiillinois.edu/6.3/br_everdell.html.
- Field, George. 1980. Interview by Richard Hirsh, Smithsonian Astrophysical Observatory, Cambridge, Massachusetts. July 14, 1980. Interview and transcript at the Center for the History of Physics, *American Institute of Physics*. Accessed December 4, 2014. www.aip.org/history/ohilist/4602_1.html.
- Field, George, Gerrit Verschuur, and Cyril Ponnampereuma. 1978. *Cosmic Evolution: An Introduction to Astronomy*. Boston: Houghton Mifflin.
- Francis, Pope (Jorge Bergoglio). 2015. *Encyclical Letter Laudato Si' of the Holy Father Francis on Care for our Common Home*. Vatican. May 24, 2015. Accessed November 13, 2021. https://www.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html.
- Frank, Andre Gunder. 1978. *World Accumulation, 1492–1789*. London: Macmillan Press.
- Furedi, Frank. 2013. "Big History: The Annihilation of Human Agency." *Spiked*. July 24, 2013. Accessed October 16, 2021. <https://www.spiked-online.com/2013/07/24/big-history-the-annihilation-of-human-agency/>.
- Gannon, Megan. 2021. "An Oasis Civilization Rediscovered." *Archaeology* 74, no. 1 (January): 40–47.
- Gates, Bill, and Charlie Rose. 2009. "Bill Gates about 'Big History' Course." April 22. Accessed October 15, 2021. [youtube.com/watch?v=lyQiS-QGRc8&feature=related](https://www.youtube.com/watch?v=lyQiS-QGRc8&feature=related).
- Gehrels, Tom. 1988. *On the Glassy Sea: An Astronomer's Journey*. New York: American Institute of Physics.
- Gehrels, Tom. 1995. *Hazards Due to Comets and Asteroids*. Tucson: University of Arizona Press.
- Gehrels, Tom. 2007. *Survival through Evolution, from Multiverse to Modern Society*. Charleston: BookSurge Publishing.
- Goodenough, Ursula. 2003. "Religious Naturalism and Naturalizing Morality." *Zygon* 38, no. 1 (February): 101–109.
- Gore, Albert. 2013. *The Future: Six Drivers of Global Change*. New York: Random House.
- Grinin, Leonid, Andrey Korotayev, and Alexander Markov. 2017. "Biological and Social Phases of Big History: Evolutionary Principles and Mechanisms." In *From Big Bang to Galactic Civilizations: A Big History Anthology*, Vol. III, *The Ways That Big History Works: Cosmos, Life, Society and Our Future*. Edited by Barry Rodrigue, Leonid Grinin, and Andrey Korotayev. Delhi: Primus Publishing, 141–174.
- Gustafson, Lowell, Barry Rodrigue, and David Blanks. Forthcoming. *Science, Religion, and Deep Time*. Delhi: Routledge.
- Haas, Jonathan, and Winifred Creamer. 2006. "Crucible of Andean Civilization: The Peruvian Coast from 3000 to 1800 BC." *Current Anthropology* 47, no. 5 (October): 745–775.
- Harari, Yuval. 2015. *Sapiens: A Brief History of Humankind*. London: Vintage Books.
- Hassan, Fekri. 1988. "The Predynastic of Egypt." *Journal of World Prehistory* 2, no. 2 (June): 135–185.
- Hazra, Orla. 2016. "Tarumitra: Friends of Trees, Understanding and Practicing an Integrated Cosmology." In *From Big Bang to Galactic Civilizations: A Big History Anthology*. Vol. II, *Education and Understanding: Big History around the World*. Edited by Barry Rodrigue, Leonid Grinin, and Andrey Korotayev. Delhi: Primus Publishing, 191–202.
- Hazra, Orla. 2017. "The Nature of Our Consciousness." *Big History and Universal*

- Consciousness*. Special edition edited by Barry Rodrigue, *The International Journal for the Transformation of Consciousness*. 3, no. 1 (June): 130–141. Also in *Science, Religion, and Deep Time*. Edited by Lowell Gustafson, Barry Rodrigue, and David Blanks, Delhi: Routledge, [forthcoming].
- Hawking, Lucy. 2016. “The Briefest History.” In *From Big Bang to Galactic Civilizations: A Big History Anthology*. Vol. II, *Education and Understanding: Big History around the World*. Edited by Barry Rodrigue, Leonid Grinin, and Andrey Korotayev. Delhi: Primus Publishing, 140–144.
- Hawking, Stephen. 1988. *A Brief History of Time*. New York: Bantam Books.
- Holy Angel University, School of Arts and Sciences, General Education Department. c. 2018a. Course Outline in Big History 1. Accessed November 2, 2021. https://www.hau.edu.ph/intra/courseoutline/pdf/sas-dogen/4FYE1_1162020.pdf.
- Holy Angel University, School of Arts and Sciences, General Education Department. c. 2018b. Course Outline in Big History 2. Accessed November 2, 2021. https://www.hau.edu.ph/intra/courseoutline/pdf/sas-dogen/4FYE2_1162020.pdf.
- Hritz, Carrie. 2010. “Tracing Settlement Patterns and Channel Systems in Southern Mesopotamia Using Remote Sensing *Journal of Field Archaeology*.” *Journal of Field Archaeology* 35, no. 2 (June): 184–203.
- Huang, Liuzhu. 1997. “On Sima Qian’s Ideas of ‘Big History.’” *Journal of Humane Studies* 3: 72–75. 黄留珠：《论司马迁的“大历史”史观》，《人文杂志》1997年第3期，第72-75页。[Chinese publication].
- Hughes, Nigel. 2012a. *Monisha and the Stone Forest*. With illustrations by Rati Basu. Kolkata: Geological Society of India.
- Hughes, Nigel. 2012b. *Monisha and the Stone Forest*. With illustrations by Rati Basu; music by Bipattaran & Ensemble. October 8, 2012. Accessed October 29, 2021. <https://www.youtube.com/watch?v=UDrRBwp9vds>.
- Hughes, Nigel. 2012c. মনীষার পাথরের বন / *Monishar Pathorer Bon [Monisha’s Stone Forest]*. With illustrations by Rati Basu. Kolkata: Monfakira Press.
- Hughes, Nigel. 2016. “The Cambrian Palaeontological History of the Indian Subcontinent.” *Earth-Science Reviews* 159 (August): 428–461.
- Humboldt, Alexander von. 1845. *Kosmos*. Vol. I, *Entwurf einer physischen Weltbeschreibung*. Stuttgart: J.G. Cotta.
- Humboldt, Alexander von. 1847. *Kosmos*. Vol. II, *Entwurf einer physischen Weltbeschreibung*. Stuttgart: J.G. Cotta.
- Humboldt, Alexander von. 1850. *Kosmos*. Vol. III, *Entwurf einer physischen Weltbeschreibung*. Stuttgart: J.G. Cotta.
- Humboldt, Alexander von. 1858. *Kosmos*. Vol. IV, *Entwurf einer physischen Weltbeschreibung*. Stuttgart: J.G. Cotta.
- Humboldt, Alexander von. 1862. *Kosmos*. Vol. V, *Entwurf einer physischen Weltbeschreibung*. Stuttgart: J.G. Cotta.
- Imanishi, Kinji. 1941. *The World of Living Things*. Tokyo: Kobundo Shobo. 今西錦司『生物の世界』弘文堂書房. [Japanese publication].
- Imanishi, Kinji. (1941) 2002. *A Japanese View of Nature: The World of Living Things*. Translated by Pamela Asquith, Heita Kawakatsu, Shusuke Yagi, and Hiroyuki Takasaki. London: Routledge.
- Imanishi, Kinji. 1983. “A Proposal for Shizengaku: The Conclusion to My Study of Evolutionary Theory.” *Anthropology Quarterly* 14 (3): 3–18. [Japanese publication].
- Imanishi, Kinji. 1984. “A Proposal for Shizengaku: The Conclusion to My Study of Evolutionary Theory.” Translated by Rick Davis. *Journal for Social and Biological Structures* 7, no. 4 (October): 351–368.
- Institute on Religion in an Age of Science*. Accessed 30 October 2021. <https://www.iras.org/>.
- Iwata, Keiji. 1989. “In Search for the Cosmos: Its Essence and Expression.” In *Asian Cosmic Perspectives*. Edited by Keiji Iwata and Kohei Sugiura. Tokyo: Kodansha, 8–39. 岩田慶治「

- コスモスの探求——その本質と表現」岩田慶治，杉浦康平編『アジアの宇宙観』講談社，1989: 8–39. [Japanese publication].
- Jantsch, Erich. 1980. *The Self-Organizing Universe: Scientific and Human Implications of the Emerging Paradigm of Evolution*. Oxford: Pergamon Press.
- Jusop, Shamshuddin bin. 2006. *The Earth Story: Lesson from the Quran and Science*. Serdang: Universiti Putra Malaysia Press.
- Jusop, Shamshuddin. and A. M. Nor Azlian. 2018. *The Earth Story: Lesson from the Quran and Science*. Serdang: Universiti Putra Malaysia Press.
- Jusop, Shamshuddin bin, and Tan Chee Keong. Forthcoming. “Deep Time from the Viewpoint of Islam.” In *Science, Religion and Deep Time*. New Delhi: Routledge.
- Kathayat, Gayatri, Hai Cheng, Ashish Sinha, Liang Yi, Xianglei Li, Haiwei Zhang, Hangying Li, Youfeng Ning, and R. Lawrence Edwards. 2017. “The Indian Monsoon Variability and Civilization Changes in the Indian Subcontinent.” *Science Advances* 3, no. 12 (December): e1701296.
- Khaldun, Abū Zayd Ibn. (1377) c. 1958. Introduction to *Muqaddimah*. Translated by Franz Rosenthal. Accessed December 23, 2021. https://asadullahali.files.wordpress.com/2012/10/ibn_khaldun-al_muqaddimah.pdf.
- Khaldun, Abū Zayd Ibn. c. 1406. *Book of Lessons*, mss. Cairo, Egypt. ربعلاباتك / Kitāb al-‘ibar. [Arabic publication].
- Kim, Seohyung. 2016. “Korean Education and Big History.” In *From Big Bang to Galactic Civilizations: A Big History Anthology*. Vol. II, *Education and Understanding: Big History around the World*. Edited by Barry Rodrigue, Leonid Grinin, and Andrey Korotayev. Delhi: Primus Books, 31–36.
- Kim, Seohyung. 2018. *Big History with Painting*. Seoul: School Library Journal. 김서형, <그림으로 읽는 빅히스토리>, 학교도서관저널. 2018. [Korean Publication].
- Krishnamurti, Jiddu. 1975. *Beginnings of Learning*. Worthing: Littlehampton Book Services.
- Kropotkin, Peter. 1902. *Mutual Aid: A Factor of Evolution*. London: Heinemann.
- Kutter, Elizabeth Martin. 2017. “Microcosmos: Phages and Life.” In *From Big Bang to Galactic Civilizations: A Big History Anthology*. Vol. III, *The Ways That Big History Works: Cosmos, Life, Society and Our Future*. Edited by Barry Rodrigue, Leonid Grinin, and Andrey Korotayev. Delhi: Primus Publishing, 71–83.
- Kutter, G. Siegfried. 1987. *Universe and Life: Origins and Evolution*. Boston: Jones & Bartlett.
- Kutter, G. Siegfried. 2011. “Big History: A Personal Perspective.” *Evolution: A Big History Perspective*. Edited by Leonid Grinin, Andrey Korotayev, and Barry Rodrigue. Volgograd: Uchitel Publishing, 101–120.
- Lee, Gavin, et al. 2018. *The Maritime Silk Road and World Civilization*. 4 vols. Taipei: Shang Zhou Publishing. 海上絲路與世界文明 (套書: 四冊) 出版社: 商周出版 出版日期 2018-08-09. [Chinese / English publication].
- Lee, Myung-hyun. 2013. *How the World Began*. Seoul: Y-School. 이명현, <세상은 어떻게 시작되었을까>, 와이스쿨, 2013. [Korean publication].
- Lemaître, Georges. 1927. “Un Univers homogène de masse constante et de rayon croissant rendant compte de la vitesse radiale des nébuleuses extragalactiques.” *Annales de la Société Scientifique de Bruxelles A47*: 49–59. [French publication].
- Li, Wu, Shuguang Lu, Cheng Zhu, Chunmei Ma, Xiaoling Sun, Xiaoxue Li, Chenchen Li, and Qingchun Guo. 2021. “Holocene Environmental Archaeology of the Yangtze River Valley in China: A Review.” *Land* 10, no. 3 (March): 302.
- Liu, Xincheng and Sun Yue. 2013. *Global History Review*. Theme Issue: *Big History and Global History*. Beijing: China Social Sciences Press. 刘新成主编:《全球史评论》(主题: 大历史与全球史). 北京: 中国社会科学出版社, 2013年12月第一版. [Chinese publication].
- Lovelock, James. 1975. “Inventing Pandora’s Box.” *New Scientist* 65, no. 935 (February 6): 307–309.
- Lovelock, James, and Sidney Epton. 1975. “The Quest

- for Gaia.” *New Scientist* 65, no. 935 (February): 304–306.
- Lovelock, James, and Lynn Margulis. 1974. “Atmospheric Homeostasis by and for the Biosphere: The Gaia Hypothesis.” *Tellus* 26, no. 1–2 (February): 2–10.
- Lu, Mingsen. 2004. “The Formation of the Concept ‘Open Complex Giant System.’” *Strategic Study of Chinese Academy of Engineering* 6, no. 5 (May): 17–23. 卢明森.“开放的复杂巨系统”概念的形成[J].中国工程科学, 2004, 6 (5): 17-23. [Chinese publication].
- Ma, Shili. 1999. *Outline of World History*, vols. 1–2. Shanghai: People’s Press. 马士力: 《世界史纲》(上、下册), 上海: 上海人民出版社, 1999年版。 [Chinese publication].
- Malville, J. McKim, Fred Wendorf, and Ali Mazar. 1998. “Megaliths and Neolithic Astronomy in Southern Egypt.” *Nature* 392, no. 6675 (April): 488–491.
- Margulis, Lynn. 1998. *Symbiotic Planet: A New Look at Evolution*. New York: Basic Books.
- Margulis, Lynn, and Dorion Sagan. 1986. *Microcosmos, Four Billion Years of Evolution from Our Microbial Ancestors*. New York: Summit Books.
- Matsuzawa, Tetsuro, and William McGrew. 2008. “Kinji Imanishi and 60 Years of Japanese Primatology.” *Current Biology* 18, no. 14 (July): 587–592.
- Maxim, Hiram Percy. 1933. *Life’s Place in the Cosmos*. New York: D. Appleton.
- McKie, Robin. 2007. “A Brief History of Stephen Hawking.” *Cosmos*. August 1, 2007. <https://cosmosmagazine.com/science/physics/a-brief-history-of-stephen-hawking/>.
- Mears, John. 1986. “Evolutionary Process: An Organizing Principle for General Education.” In *The Journal of General Education* 37 (4): 313–325.
- Mears, John. 2016. “The Meaning of Humankind’s Emergence: From the Largest Possible Perspective.” In *From Big Bang to Galactic Civilizations: A Big History Anthology*. Vol. II, *Education and Understanding: Big History around the World*. Edited by Barry Rodrigue, Leonid Grinin, and Andrey Korotayev. Delhi: Primus Books, 243–254.
- Metallo, Paula. 2016. “Brain Stretching: Art and Big History.” In *From Big Bang to Galactic Civilizations: A Big History Anthology*. Vol. II, *Education and Understanding: Big History around the World*. Edited by Barry Rodrigue, Leonid Grinin, and Andrey Korotayev. Delhi: Primus Books, 134–139.
- Miura, Baien. 1982. *Gengo*. In *The Japanese Thoughts Anthology*. Vol. 41, *Miura Baien*. Recensed and translated into modern Japanese by Kenji Shimada and Masaharu Taguchi. Tokyo: Iwanami Shoten. 三浦梅園「玄語」島田虔次, 田口正治 校訂・訳注『日本思想大系41 三浦梅園』岩波書店, 1982. [Japanese publication].
- Miura, Baien. 1991. “Gengo Honsō.” In *Deep Words: Miura Baien’s System of Natural Philosophy*. Translated by Rosemary Mercer. Leiden: Brill, 74–150.
- Moddejonge, Alex. 2012. “The Biggest Story Ever Told: A Comprehensive Analysis of the Historiographic Origins of Big History, 500 BCE to 2010 CE.” MA thesis. History Department, University of California at San Marcos.
- Montessori, Maria. (1948) 1998. *Onderwijs en het menselijk potentieel [To Educate the Human Potential]*. The Hague: Nederlandse Montessori Vereniging. [Dutch publication].
- Morgan, Jennifer. 2002. *Born with a Bang: The Universe Tells Our Cosmic Story*. Illustrated by Dana Lynne Andersen. Nevada City: Dawn Publications.
- Morgan, Jennifer. 2003. *From Lava to Life: The Universe Tells Our Earth Story*. Illustrated by Dana Lynne Andersen. Nevada City: Dawn Publications.
- Morgan, Jennifer. 2006. *Mammals Who Morph: The Universe Tells Our Evolution Story*. Illustrated by Dana Lynne Andersen. Nevada City: Dawn Publications.
- Morgan, Jennifer. 2017. “A Cosmology for Our

- Time.” In *From Big Bang to Galactic Civilizations: A Big History Anthology*. Vol. III, *The Ways That Big History Works: Cosmos, Life, Society and Our Future*. Edited by Barry Rodrigue, Leonid Grinin, and Andrey Korotayev. Delhi: Primus Publishing, 298–307.
- Mostern, Ruth. 2021. *The Yellow River: A Natural and Unnatural History*. New Haven: Yale University Press.
- Nakanishi, Osamu, et al. 2014. *An Introduction to Big History*. Yokohama: Institute for Global and Cosmic Peace. 地球宇宙平和研究所編『ビッグ・ヒストリー入門』地球宇宙平和研究所, 2014年. [Japanese publication].
- Nakanishi, Osamu, et al. 2016. *Applying Big History: Nature, War and Peace*. Yokohama: Institute for Global and Cosmic Peace. 中西治・責任編集『ビッグ・ヒストリーの実用:自然・戦争・平和』地球宇宙平和研究所, 2016. [Japanese publication].
- Nakanishi, Osamu, et al. 2017. *Universal Studies and the Modern World: Becoming Global and Cosmic Humanity*. Yokohama: Institute for Global and Cosmic Peace. 中西治・責任編集『宇宙学と現代世界:地球人・宇宙人に』地球宇宙平和研究所, 2017. [Japanese publication].
- Nakanishi, Osamu, and Nobuo Tsujimura. 2015. “Universal History in Japan: History for the Earth and Cosmos.” Full version of the essay cited below of the same title. Accessed October 16, 2020. http://www.rodrigue-global.org/uploads/1/1/3/3/11330998/osamu_nakanishi_and_nobuo_tsujimura_original_chapter.pdf.
- Nakanishi, Osamu, and Nobuo Tsujimura. 2016. “Universal History in Japan: History for the Earth and Cosmos.” In *From Big Bang to Galactic Civilizations: A Big History Anthology*. Vol. II, *Education and Understanding: Big History around the World*. Edited by Barry Rodrigue, Leonid Grinin, and Andrey Korotayev. Delhi: Primus Books, 289–294.
- Nazaretyan, Akop. 1991. *Intelligence in the Universe: Sources, Formation, and Prospects*. Moscow: Nedra Publishers. Назаретян А.П. Интеллект во Вселенной: истоки, становление, перспективы. М.: Недра, 1991. [Russian publication].
- Nazaretyan, Akop. 2001. *Civilizational Crises in a Big History Context*. Moscow: Per Se. Назаретян, А.П. Цивилизационные кризисы в контексте Универсальной истории. М.: Пер Сэ, 2001. [Russian publication].
- Nazaretyan, Akop. 2005. “Western and Russian Traditions of Big History: A Philosophical Insight.” *Journal for General Philosophy of Science* 36: 63–80.
- Network of Global & World History Organizations (NOGWHISTO). Accessed October 26, 2021. <https://research.uni-leipzig.de/~gwhisto/organization/bureau/>.
- Nicolas, Georges. 1989. “Humanisme—Cosmisme.” *Cahiers de Géographie du Québec* 33, no. 90 (December): 379–385.
- Nganfou, Eric. 2018. “Who is the African Child?” *Origins* 8, no. 2 (April 3).
- Olalekar, Prashant. 2017. “Playful Education in a Playful Universe.” *Big History and Universal Consciousness*. Special edition of *The International Journal for the Transformation of Consciousness* 3, no. 1 (June): 145–157. Edited by Barry Rodrigue.
- Orthodoxy in Dialogue Editors. 2018. “On the Neurobiology of Sin: An Interview with Archbishop Lazar (Puhalo).” *Orthodoxy in Dialogue*. July 7, 2018. Accessed November 1, 2021. <https://orthodoxyindialogue.com/2018/07/07/on-the-neurobiology-of-sin-an-interview-with-archbishop-lazar-puhalo/>.
- Panov, Alexander. 2017. “Singularity of Evolution and Post-Singular Development.” In *From Big Bang to Galactic Civilizations: A Big History Anthology*. Vol. III, *The Ways That Big History Works: Cosmos, Life, Society, and Our Future*. Delhi: Primus Books, 370–402.
- Piovesana, Gino. 1965. “Miura Baien, 1723–1789, and his Dialectic and Political Ideas.” *Monumenta Nipponica* 20 (3–4): 389–421.
- Puhalo, Lazar. 2010. *On the Neurobiology of Sin*. Dewdney: Synaxis Press.

- Puhalo, Lazar. 2016. "The Rise of Personhood: Development of Social Justice and Natural Rights in the Axial Eras." In *From Big Bang to Galactic Civilizations: A Big History Anthology*. Vol. II, *Education and Understanding: Big History around the World*. Edited by Barry Rodrigue, Leonid Grinin, and Andrey Korotayev. Delhi: Primus Publishing, 118–123.
- Qi, Tao. 1991. "A New Look at the Period of Yao, Shun and Yu." *Shandong Social Sciences* 1: 72–75. 齐涛: 《尧舜禹时代新论》, 《山东社会科学》1991年第1期, 第72–75, 104页。[Chinese publication].
- Qian, Xuesen. 1991. "The Open Complex Giant System." *Pattern Recognition and Artificial Intelligence* 1: 1–4. 钱学森: 《再谈开放的复杂巨系统》, 《模式识别与人工智能》1991年第1期, 第1–4页。[Chinese publication].
- Qian, Xuesen, Jingyuan Yu, and Ruwei Dai. 1990. "A New Discipline of Science—The Study of Open Complex Giant System and its Methodology." *Chinese Journal of Nature* 1: 3–10. 钱学森、于景元、戴汝为: 《一个科学新领域——开放的复杂巨系统及其方法论》, 《自然杂志》1990年第1期, 第3–10页。[Chinese publication].
- Quaedackers, Esther. 2015. "A Little Big History of Tiananmen." In *From Big Bang to Galactic Civilizations: A Big History Anthology*. Vol. I, *Our Place in the Universe: An Introduction to Big History*. Edited by Barry Rodrigue, Leonid Grinin, and Andrey Korotayev. Delhi: Primus Books, 263–274.
- Ravandi-Fadai, Lana, and Kevin McNeer. 2016. "Thousands of Years Human." In *From Big Bang to Galactic Civilizations: A Big History Anthology*. Vol. II, *Education and Understanding: Big History around the World*. Edited by Barry Rodrigue, Leonid Grinin, and Andrey Korotayev. Delhi: Primus Books, 181–190.
- Reeves, Hubert. 1981. *Patience dans l'Azur: l'évolution cosmique* [*Patience in the Azur: Cosmic Evolution*]. Paris: Éditions du Seuil. [French publication].
- Reeves, Hubert. 2011. *L'univers expliqué à mes petits-enfants*. Paris: Les Éditions du Seuil. [French publication].
- Reeves, Hubert, Joel De Rosnay, Yves Coppens, and Dominique Simonnet. 1996. *La plus belle histoire du monde—les secrets de nos origines* [*The Most Beautiful Story in the World—The Secrets of our Origins*]. Paris: Les Éditions du Seuil. [French publication].
- Reeves, Hubert, Joel De Rosnay, Yves Coppens, and Dominique Simonnet. 1998. *Origins: Cosmos, Earth, and Mankind*. New York: Arcade Publishing.
- Roberts, Gregory. 2003. *Shantaram*. New York: St. Martin's Press.
- Roberts, Gregory. 2021. "Thoughts on Big History." Programme: 2021 Global Big History Conference, 70–72. Accessed February 2, 2022. <https://www.ssla.edu.in/assets/pdf/Programme,%202021%20Global%20Big%20History%20Conference.pdf>.
- Roderick, Barry (Barry Rodrigue). 1977. "Father of the Mists." *Archipelago* 1, no. 6 (October): 1–3.
- Rodrigue, Barry. 2010. "Big History, Civilization and Human Survival." *Thought & Action* 26 (Fall): 139–146.
- Rodrigue, Barry. 2013. "Promoting Big History in East Asia in 2013." *Origins* 3, no. 6 (June): 1–10.
- Rodrigue, Barry. 2014. "Retrofitting the Future." In *Teaching and Researching Big History: Exploring a New Scholarly Field*. Edited by Leonid Grinin, David Baker, Esther Quaedackers, and Andrey Korotayev. Volgograd: Uchitel Publishing, 276–282.
- Rodrigue, Barry, guest editor. 2017a. *Big History and Universal Consciousness*. Special edition of *The International Journal for the Transformation of Consciousness* 3, no. 1 (June). Mathew Chandrankunnel, managing editor.
- Rodrigue, Barry. 2017b. "An Emergent Future: Evolving Global Revolution." Translated by Nobuo Tsujimura. In *Universal Studies and the Modern World: Becoming Global and Cosmic Humanity*. Edited by Osamu Nakanishi. Yokohama: Institute for Global and Cosmic Peace, 195–218.

- Rodrigue, Barry. 2019. "Our Place in the Multiverse: Anthropology, Civilization, and Big History." In *The Routledge Companion to Big History*. Edited by Craig Benjamin, Esther Quaedackers, and David Baker. Abingdon: Routledge, 109–155.
- Rodrigue, Barry. 2021. "Disasters' Offspring: Catastrophe, Narrative and Survival in Global History." *Journal of Globalization Studies* 12, no. 1 (May): 159–171.
- Rodrigue, Barry. Forthcoming. "The Children of Climate Change and Their Search for Meaning." In *Science, Religion and Deep Time*. New Delhi: Routledge.
- Rodrigue, Barry, Leonid Grinin, and Andrey Korotayev. 2015–2016. In *From Big Bang to Galactic Civilizations: A Big History Anthology*. Vol. I, *Our Place in the Universe: An Introduction to Big History*; Vol. II, *Education and Understanding: Big History around the World*; Vol. III, *The Ways That Big History Works: Cosmos, Life, Society, and our Future*. Delhi: Primus Books.
- Rodrigue, Barry, with Fred Spier, David Christian, and Eric Chaisson. 2011. "Big History: A Working Bibliography of References, Films and Internet Sites." Accessed October 15, 2011. http://www.rodrigue-global.org/uploads/1/1/3/3/11330998/big_history_bibliography_2011.pdf.
- Rodrigue, Barry, with Daniel Stasko. 2009. "A Big History Directory." *World History Connected* 6, no. 3 (October). Accessed October 15, 2021. <https://worldhistoryconnected.press.uillinois.edu/6.3/rodrigue.html>. Note: Daniel Stasko served as a proofreader for this report.
- Rodrigue, Barry, with Daniel Stasko. c. 2010a. *Big History: A Working Bibliography of References, Films and Internet Sites*. Accessed October 15, 2021. <https://content.ucpress.edu/ancillaries/9249001/BigHistoryDirectory2010bib.pdf>. Note: Daniel Stasko served as a proofreader for this report.
- Rodrigue, Barry, with Daniel Stasko. 2010b. "Changing the Future with the Past: Global Enlightenment through Big History." *Journal of Globalization Studies* 1, no. 2 (November): 128–146. Note: Daniel Stasko served as a proofreader for this report.
- Rodrigue, Barry, and Sun Yue. 2017. "Bibliography of Recent Materials about Big History, Cosmic Evolution, Mega-history, and Universal History." In *Bibliography of Global History*. Edited by Matthias Middell and Katja Naumann. Leipzig: The Network of Global and World History Organizations (NOGWHISTO) and the Leipzig University Press. Accessed October 15, 2021. https://research.uni-leipzig.de/~gwhisto/fileadmin/nogwhisto/documents/2017/Bibliography_Global_History_2017.pdf.
- Rossetti, Gabriele, and Alessandro Montanari. 2001. *Balla con la Terra: musica eofonica dalla stratigrafia dell'Appennino Umbro Marchigiano [Dances with the Earth: Geophonic Music of the Umbrian and Marche Apennine Stratigraphy]*. Book with audio CD. Ancona: Depositi Editoriali Paolo Fagnani. [Italian publication].
- Royal Belgian Institute of Natural Sciences. 2018. *Have You Heard of Ishango?* Brussels: Royal Belgian Institute of Natural Sciences / Association pour la Diffusion de l'Information archéologique. Accessed November 15, 2021. <https://www.naturalsciences.be/sites/default/files/Discover%20Ishango.pdf>.
- Saekow, Roland. 2016. "ChronoZoom Behind the Scenes: Developing a Zoomable Timeline for Visualizing and Teaching Big History." In *From Big Bang to Galactic Civilizations: A Big History Anthology*. Vol. II, *Education and Understanding: Big History around the World*. Edited by Barry Rodrigue, Leonid Grinin, and Andrey Korotayev. Delhi: Primus Books, 158–162.
- Saekow, Roland, and Walter Alvarez. 2014. *Chronozoom*. Berkeley: University of California. Accessed October 15, 2021. chronozoom.com.
- Santa Cruz Sentinel*. 2021. "Luis Maria Ragasa Calingo, 1955–2021." October 9, 2021. *Legacy*. Accessed November 2, 2021. <https://www.legacy.com/us/obituaries/santacruzsentinel/name/luis->

- calingo-obituary?id=24557429.
- Shapley, Harlow. 1966. "Life, Hope and Cosmic Evolution." *Zygon* 1, no. 3 (September 1): 275–285.
- Shklovsky, Josif. 1962. *Universe, Life, Intelligence*. Moscow: USSR Academy of Sciences.
- Шкловский, И.С. *Вселенная. Жизнь. Разум*. М.: Изд-во АН СССР, 1962. [Russian publication].
- Shklovsky, Josif, and Carl Sagan. 1966. *Intelligent Life in the Universe*. New York: Random House.
- Shtyrbul, Anatoliy. 2006. *Stateless Societies in the Era of the State (3d Millennium BC–2nd Millennium AD)*. Omsk: Omsk State Pedagogical University Press. Штырбул, А.А. Безгосударственные общества в эпоху государственности (III тыс. до н. э. – II тыс. н. э.). Омск: Изд-во Омского гос. пед. ун-та, 2006. [Russian publication].
- Shubin, Neil. 2013. *The Universe Within: The Deep History of the Human Body*. New York: Knopf Doubleday Publishing Group.
- Smit, Jan, and Jan Hertogen. 1980. "An Extraterrestrial Event at the Cretaceous-Tertiary Boundary." *Nature* 285: 198–200.
- Snooks, Graeme. 1998. *The Laws of History*. London: Routledge.
- Snooks, Graeme, guest editor. 2005. *Social Evolution and History: Exploring the Horizons of Big History* 4 (1). Volgograd: Uchitel Publishing.
- Snooks, Graeme. N.d. *Institute of Global Dynamic Systems*. Accessed October 14, 2021. sites.google.com/site/institutegds/.
- Snow, Charles (C. P.). 1959. *The Two Cultures*. London: Cambridge University Press.
- Social Studies*. 2021. Accessed October 16, 2021. <https://www.sociostudies.org/almanac/evolution/>.
- Sorkin, Andrew. 2014. "So Bill Gates Has This Idea for a History Class" *New York Times Magazine* (September 5).
- Spacewatch. Lunar and Planetary Laboratory. University of Arizona. Accessed May 19, 2018. <http://spacewatch.lpl.arizona.edu/>.
- Spier, Fred. 1996. *The Structure of Big History: From the Big Bang until Today*. Amsterdam: Amsterdam University Press.
- Spier, Fred. 2005a. "The Small History of the Big History Course at the University of Amsterdam." *World History Connected* 2 (2). Accessed December 24, 2021. worldhistoryconnected.press.illinois.edu/2.2/spier.html.
- Spier, Fred. 2005b. Review of "The Ghost of Big History is Roaming the Earth." *History and Theory* 44 (2): 253–264.
- Spier, Fred. 2008. "Big History: The Emergence of an Interdisciplinary Science?" *Interdisciplinary Science Reviews* 33 (2): 141–152. Also published in *World History Connected* 6, no. 3 (October 2009). Accessed November 11, 2021. <https://worldhistoryconnected.press.uillinois.edu/6.3/spier.html>.
- Spier, Fred. 2010, 2015. *Big History and the Future of Humanity*. Oxford: Wiley-Blackwell.
- Spier, Fred. 2017. "Roads towards Big History." In *From Big Bang to Galactic Civilizations: A Big History Anthology*. Vol. III, *The Ways That Big History Works: Cosmos, Life, Society and Our Future*. Edited by Barry Rodrigue, Leonid Grinin, and Andrey Korotayev. Delhi: Primus Publishing, 253–260.
- Stasko, Daniel, and Barry Rodrigue. 2010a. "A Preliminary Look at Big History Today: The Instructors, the Students, and the Courses." *Social Evolution and History* 9, no. 2 (Fall): 135–147.
- Stasko, Daniel, and Barry Rodrigue. 2010b. "Through the Past—to the Future: Courses of Big History in the Universities of the World." *Historical Psychology and Sociology* 3 (2): 79–91.
- Стаско, Д.Дж., Родриг Б.Х. Через прошлое – к будущему. Курсы Универсальной истории в университетах разных стран. *Историческая психология и социология истории* 3(2), 2010: 79–91. [Russian publication].
- Sudarshan H. Forthcoming. "The Vedas, Tribal Perspectives, and Big History." In *Science, Religion and Deep Time*. New Delhi: Routledge.
- Sulkin, Carlos Londoño. 2015. "Antonio Véllez: A Champion of Big History." In *From Big Bang to Galactic Civilizations: A Big History Anthology*.

- Vol. I, *Our Place in the Universe: An Introduction to Big History*. Edited by Barry Rodrigue, Leonid Grinin, and Andrey Korotayev. Delhi: Primus Books, 163–182.
- Sun, Yue. 2015. “The Tao of Big History: The Chinese Traditions.” In *From Big Bang to Galactic Civilizations: A Big History Anthology*. Vol. 1, *Our Place in the Universe: An Introduction to Big History*. Edited by Barry Rodrigue, Leonid Grinin, and Andrey Korotayev. Delhi: Primus Books, 235–246.
- Swarup, Shubhangi. 2018. *Latitudes of Longing*. Noida: HarperCollins.
- Symbiosis School for Liberal Arts (Symbiosis International University), International Big History Association, Asian Big History Association, Indian Association for Big History, and Eurasian Center for Megahistory & System Forecasting. 2021. Programme. 2021 Global Big History Conference. Accessed February 2, 2022. <https://www.ssla.edu.in/assets/pdf/Programme,%202021%20Global%20Big%20History%20Conference.pdf>.
- Tagore, Rabindranath. 1937. *वशित्व परचिय है [Our Universe]*. Calcutta: Visva-Bharati.
- Tagore, Rabindranath. 1969. *Our Universe*. Translated by Indu Dutt, Bombay: Jaico Publishing House.
- Tagore, Rabindranath. 2006. *Of Myself, Atmaparichay*. Translated by Deavadatta Joardar and Joe Winter. Anvil Press Poetry.
- Tan, Chee Keong. c. 2019. “My Big History Journey in Cameroon—A Malaysian Perspective. (Part One): ‘We Are All Africans.’” Kuala Lumpur. Unpublished.
- Teilhard de Chardin, Pierre. 1955. *Le phénomène humain*, Paris: Éditions du Seuil.
- Tierney, Jessica, Francesco Pausata, and Peter Demenoca. 2017. “Rainfall Regimes of the Green Sahara.” *Science Advances* 3, no. 1 (January).
- Tsujimura, Nobuo. 2014. *Osamu Tezuka’s Phoenix: The Big Attractive in Japan*. Power-Point Presentation. Second IBHA Conference. San Rafael, California. August 9.
- United Nations Educational, Scientific & Cultural Organization (UNESCO). 1966. *The History of Humanity—Scientific and Cultural Development*. UNESCO.
- United Nations Educational, Scientific & Cultural Organization (UNESCO). 2009. *History of Humanity—Scientific and Cultural Development*. UNESCO. General and Regional Histories. Accessed October 11, 2021. <https://en.unesco.org/themes/generalregionalhistories#humanity>.
- United Nations Educational, Scientific & Cultural Organization (UNESCO). N.d. “Archaeological Site of Nalanda Mahavihara at Nalanda, Bihar.” World Heritage Centre, List. Accessed October 10, 2021. <http://whc.unesco.org/en/list/1502>.
- Vega, Inca Garcilaso de la. 1609. *Comentarios Reales de los Incas*. Lisbon: Pedro Carsbeeck. Accessed December 24, 2021. <http://shemer.mslib.huji.ac.il/lib/W/ebooks/001531300.pdf>. [Spanish publication].
- Vélez, Antonio. 1994. *Del Big Bang al Homo sapiens*. Antioquia: University of Antioquia Press. [Spanish publication].
- Vélez, Antonio. 2006. *Homo Sapiens*. Bogotá: Villegas editores. [Spanish publication].
- Waddell, Eric. 2017. “I’m Not a Donkey and I don’t Have a Field.” In *From Big Bang to Galactic Civilizations: A Big History Anthology*. Vol. III, *The Ways That Big History Works: Cosmos, Life, Society and Our Future*. Edited by Barry Rodrigue, Leonid Grinin, and Andrey Korotayev. Delhi: Primus Publishing, 308–316.
- Wallace, Alfred. 1903. *Man’s Place in the Universe: A Study of the Results of Scientific Research in Relation to the Unity or Plurality of Worlds*. New York: McClure, Phillips & Company.
- Wallerstein, Immanuel. 1984. *The Politics of the World Economy: The States, the Movements and the Civilizations*. Cambridge: Cambridge University Press.
- Wallerstein, Immanuel. 1991. *Unthinking Social Science: The Limits of Nineteenth-Century Paradigms*. Cambridge: Polity Press.

- Wang, Dongyue. 2020. *A Unified Theory of Evolution: Natural, Mental, Social*. English translation. Bridgeminds.net.
- Wells, Herbert (H. G.). 1920. *The Outline of History*. New York: Garden City Publishing.
- Werkhoven, Jos. 2016. "Once upon a Time... There Was a Story to Be Told." In *From Big Bang to Galactic Civilizations: A Big History Anthology*. Vol. II, *Education and Understanding: Big History around the World*. Edited by Barry Rodrigue, Leonid Grinin, and Andrey Korotayev. Delhi: Primus Books, 58–72.
- Wilson, Edward (E. O.). 1998. *Consilience: The Unity of Knowledge*. New York: Knopf.
- Wilson, Edward (E. O.). 2006. *The Creation: An Appeal to Save Life on Earth*. New York: W. W. Norton.
- Wilson, Edward (E. O.). 2014. *The Meaning of Human Existence*. New York: Liveright Publishing.
- Wong, Aidan W. H. 王瑋軒. 2019. *Big History: A Scientific Origin Story*. Hong Kong: Hong Kong Scholars.
- Zhao, Mei. 2016. "The Universe Within." In *From Big Bang to Galactic Civilizations: A Big History Anthology*. Vol. II, *Education and Understanding: Big History around the World*. Edited by Barry Rodrigue, Leonid Grinin, and Andrey Korotayev. Delhi: Primus Books, 217–226.
- Zhu, Weibin. 2016. "Big History and World History in China's Colleges and Universities." In *From Big Bang to Galactic Civilizations: A Big History Anthology*. Vol. II, *Education and Understanding: Big History around the World*. Edited by Barry Rodrigue, Leonid Grinin, Andrey Korotayev. Delhi: Primus Books, 319–323.
- Zygon: *Journal of Religion and Science*. Accessed October 30, 2021. <http://www.zygonjournal.org/>.