

A LEGACY OF TRANSFORMATION: THE INTERNATIONAL BIG HISTORY ASSOCIATION

Lowell Gustafson

Transforming Current Separations

India and Pakistan, neighbouring nations each with nuclear weapons, have tense strategic relations. Two of humanity's largest nations, China and India, have differing views of the Belt and Road Initiative. The current president of the United States, the nation that outspends the next ten nations combined on the military, seeks for his country to be great again as he confronts North Korea's ambitious nuclear weapons development. He keeps saying that he wants Mexico to pay for a wall separating it from the United States. In the meantime, the Earth's polar ice caps are melting from global warming.

We live in a time of global issues and competing national, ethnic, religious, and other identities. Humanity needs coordinated action if it is to face its common problems, yet conflicts and hostilities seem much more pronounced than recognition of these threats or coordinated action to address them. What can we do to encourage a transformation so that humans move in the direction of perceiving what unites us, so that we can take steps together to survive? How can those of us from many distinct national, ethnic and cultural heritages come to see that within our rich diversity, there is a deep unity that undergirds our common

good? How can we embrace our rich and different traditions as truly fellow humans who care about each other's well-being?

One step that may help us in this transformation of how we consider ourselves, the problems we face together, and the solutions that we need to pursue together is by asking some simple questions. Where did we come from? How did we get here? And who does that make us now? How should we go about answering these questions and how would those answers help us in our self-transformation?

We could begin by trying to answer our questions by going to our textual traditions, all of which indeed include the tremendous wisdom of brilliant and thoughtful people who lived over the past thousands of years. We are all fortunate to be able to draw from these intellectual and cultural springs. The magic of writing permits the insights of those who have now been dead for centuries and millennia to convey their hopes, dreams, fears, loves, and truths to us. We see in the work of artists and architects, also long gone, their equally profound truths that resonate with us today. We stand before and within their creations and experience some of what they too felt.

It requires a long time and diligent study to translate and understand the ancient languages in which these authors wrote, the meanings they had for the words they used, the significance of the designs and symbols they painted and sculpted. We need imagination and creativity to consider what their expressions mean to us today. The effort is well worth it; a life seeking to master these traditions is a life worth living.

Surprising Sources of Transformation

But do they answer our questions to our satisfaction? Do they tell us enough about where we came from and how we got here? And if not, where can we go to find these answers? Who can tell us the stories of our origins that resonate most within us? The story-tellers with the most persuasive accounts were often not the ones we expected. They were not bearded, wizened bards. They were light, rocks, bones, and blood.

What they said has been very hard to figure out. It took hundreds, more like thousands, of very bright people many lifetimes of disciplined work to learn how to translate their stories. Even now, there are unintelligible whispers that may suggest possible scenarios of what happened, but still

satisfying accounts of reality remain beyond our comprehension in many areas. Our sources do not give up their stories easily.

Beginning Transformation

Many people refer to a big bang theory, but, so far, our evidence from radiation speaks directly only of what the universe was like about 380,000 years after the big bang. The radiation and numerical analysis suggests what may well have happened before that, although a confident account about why there was a big bang remains tantalizingly out of reach. Maybe there was a singularity, a single point of infinite heat and density that took no space and had no mass from which everything in our universe – what became all hundred billion plus galaxies, each with an average of a hundred billion stars – emerged in a split second. The notion is so improbable, so fantastic, so unintelligible, that no one can blame Albert Einstein or Fred Hoyle or others for rejecting it for years. Alexander Friedmann, Georges Lemaître, Howard Robertson and Arthur Geoffrey Walker proposed a theory in the 1920s and 1930s of what Lemaître called the ‘primeval atom’. But the dominant view had settled on an eternal, steady-state, mostly unchanging universe.

After Henrietta Swan Leavitt figured out how to calculate distances between us and Cepheid variable stars, and Edwin Hubble calculated the red shifts that told us how fast galaxies were receding from each other, we had our first credible evidence that there had indeed been a starting point for our known universe. When shown the evidence, Einstein changed his mind and accepted what his own theories had earlier suggested about an expanding universe.

The mathematical calculations of some suggest that underlying everything are vibrating strings or loops. String or M theories are a way to integrate previous theories of the very small and the very large, of quantum physics and relativity. The equations of each worked well to explain their own phenomena, but, when put together, they had produced non-sense. The new theories synthesized them logically, but required the existence of vibrations in many more dimensions than the four of which we are familiar. But our common sense developed in our situation, which is between the very small and very large. In our everyday experience, we do not take strides between the stars. We do not navigate between protons. What works well for us in the middle

would not help us if somehow we did live at the opposite ends of the size spectrum. We must transform our sense of common sense when we learn from the astronomers and physicists.

Immediately after the big bang, a miniscule difference led to a great annihilation. For a billion bits of anti-matter that appeared, a billion and one of matter did. When anti-matter and matter meet, they immediately turn back into energy. The relatively tiny amount of matter that remained was enough to eventually produce everything in our current universe. Among the matter that appeared were up- and down-quarks, which self-organized in threesomes into protons and neutrons. None of these had existed before in the history of our universe. The first great natural transformation had taken place. From nothing, or a singularity, or something, we got normal, baryonic matter.

It may be that there are or have been other universes, maybe an infinite number of others, but for that we have only our own analyses, no measurable evidence. There may be persuasive analysis of evidence suggesting that our current universe is only the most recent one after previous ones. But the evidence for our own, currently existing universe having a single beginning point 13.8 billion years ago leads now to the generally accepted standard model.

The universe may not be expanding into space; perhaps space itself is expanding from its original point. Maybe this space has within it something we refer to as dark energy, which is pulling the galaxies out. With space, itself, expanding from the same point, when we ask where did the universe begin, we can say it began at every point that now exists. All of the universe began where India, the United States, Mars, the Andromeda galaxy and every other place is now. We cannot confidently explain why there was a big bang. We can determine no persuasive purpose behind it. But it seems clear now that there was a common origin for everything of which we know now.

Why does it matter? What difference to us now could this make? One meaning to draw from this account is that you and I and all of Earth and our Milky Way and everything that exists has a common origin. We all come from the same thing, whatever that was. We also all come from the same place. No matter where you are, you are where you came from. No matter where you are, that is the home into which you were

born. We all share a common origin and a common home. There is no one who is not from here.

From 2 to 115: Transforming Elements

The hydrogen and helium that were formed soon after the big bang were then fused in stars by gravity to become the rest of the elements: oxygen, carbon, iron and on up to the 113 known elements. Where there had never been iron or uranium before, now there was. Stars that died eons ago spread these elements out into space, where some of them eventually ended up in our solar system. These elements became the building blocks for everything of which we know. The hydrogen and helium that had been transformed into carbon became an essential building block for every known form of life on Earth. As Carl Sagan so memorably noted, we are all made of star dust.

About two thirds of the time between the big bang and now – 4.56 billion years ago, our solar system, sun, and the Earth formed from the newly forged elements, along with the hydrogen and helium that had floated in space since the big bang. Elements and chemicals continued to combine in even more complex ways. Amino acids and proteins and lipids merged for the first time in a prokaryote cell with a membrane and developed the ability to metabolize energy, acquire nutrients, reproduce and evolve in response to environmental changes.

Exactly how did chemicals transform themselves into life? It is another huge unanswered question. But we have some general ideas about it. It began with the elements and chemicals available in the seas and on the surface of the Earth. We are all Earthlings. We have evidence for it happening at least by 3.8 billion years ago. With the hostile conditions on early Earth, specific life forms no doubt suffered lethal fates, but eventually there existed a life form that would become the ancestor of all currently living things from amoebas to bananas to fish to you and me. We are all descendants of the Last Universal Common Ancestor, LUCA.

How do we respond to this now? There are many possible responses. One may be to recognize all of life as related. I know I need to consume plants and even some animals to live. I cannot find my nutrients and energy directly from inanimate chemicals or radiation.

But I can respect all life, nourish it where that is possible, be grateful and even regretful that other life must give itself for mine.

Earth History

The Earth did not stop changing after it was formed or after the first life appeared. It has its own history. Continents move. Slow, inexorable rivers of magma from deep in the Earth drag parts of Earth's surface slowly along. Supercontinents like Pangaea were formed. Then tectonic plates, sections of the Earth's surface like North and South America, were separated. The Indian tectonic plate gradually crashed into Asia, driving up the Himalayas and altering all of Earth's climate. In twenty million years, Los Angeles will be a suburb of San Francisco. The Earth is continually transforming itself.

From LUCA to Humans

When life reproduces itself, offspring are usually similar if not almost identical to their parents. But sometimes, there are mutations during reproduction. Call the outcome imperfections or mistakes, they are essential for survival in changing environments. Most of the time, the result is not helpful for the offspring. Once in a while, the result helps it adjust to some new condition, enabling it to produce more of its own offspring. The changes survive and we see a species evolving. Given enough time – and 3.8 billion years is a very long time with very many generations – a single celled organism can become a eukaryote cell, a jelly fish, flatworms, fish, amphibians, mammals and, in some cases, hominins. The process leads to all kinds of fabulously different forms of life. But we can't be blamed too much for being particularly grateful that it also led to our kind, humans, in East Africa about 200,000 years ago. And we can't be blamed too much for naming ourselves *Homo sapiens* – wise humans.

We had drawn so much on the emerging complexity of the universe. Quarks had combined into protons and neutrons. These combined with electrons to make atoms. Atoms had combined to make chemicals. Chemicals combined to make life. Life forms developed from single cells, to multicellular life forms, to life forms with ever more complex structures. In our case, a hundred billion neurons connected by a trillion synapses formed the most complex matter in the universe of which we are aware – the 1400 grams of brain in our skulls.

This complex brain matter is what enable us to form ever more complex social units, from kinship groups, to multi-kin villages, to populous cities, to nations and empires. At each stage of transition, few could have predicted with confidence that there would be a transformation that would lead to greater complexity. At each stage, few if any could have even imagined it. But with the development of consciousness and then self-consciousness, the ability to choose between options, develop symbolic thinking and memory, and the ability to imagine and intentionally create, an ability to transform ourselves emerged from previous natural transformations.

But this increasing complexity was by no means a steady progression. There were periods of destruction, catastrophes, extinctions, famines, and wars. But sometimes there was also social cohesion, empathy, and caring. And now we are faced with a new reality whose future is, in part, of our own choosing. We have sometimes been transformed into enormous national communities. Will we choose paths that will resist transformation or lead to increased simplicity, such as an exclusive commitment to kinship? Will we find ways to nurture increased complexity, of cultures and systems that will demonstrate that humans are indeed wise and not merely cleverly and selfishly calculating? Can we take pride in our common origins, that we are all descended from the same hardy group in Africa? We really are all family, however dysfunctionally we often behave.

The First Era of Globalization

As far as we know now, humans first evolved in Africa and then, about 70,000 years ago, began migrating out of that continent. *Homo erectus* had done so previously, but apparently like most other species, had gone extinct. The great migration of humans from Africa to Asia, Australia, Europe, and eventually the Americas is an amazing one. No maps existed. Transportation was mostly done on foot or perhaps with rafts. Our ancestors frequently encountered and had to adjust to new environmental conditions through developing new technologies. We did not wait to evolve thick fur to survive Siberia, we put on fur coats made from animals that had previously evolved them. We did not wait to evolve fins, we built boats. We did not wait to evolve fangs and claws, we fashioned stone points. This is a story of courage, innovation, perseverance, and self-transformation.

A New Story to Support Transformation

A few people started combining the evidence and analyses produced by generations of physicists, astronomers, chemists, geologists and biologists with disciplines that studied humans. Expertise in specific disciplines was transformed by synthesizing it. The written record of the human past was integrated with the natural record of the entire known past. An account that could not have been told even decades before was possible by the latter part of the twentieth century. For the first time in human history, an evidence-based account of the past from 13.8 billion years ago through various stages to the present was possible. David Christian, Fred Spier, Eric Chaisson, Walter Álvarez, Cynthia Brown, Barry Rodrigue, Craig Benjamin, and others put together this new account that was originally told by light, rocks, bones, and blood.

A group of people from Italy, the Netherlands, Australia and the United States, who shared a passion for this new synthesis, met in 2010 at the Coldigioco Geological Observatory, run by Alessandro Montanari and Paula Metallo, for a seminar organized by geologist Walter Álvarez. He brought the group to the location just outside the nearby Italian town of Gubbio, where he had first found evidence for a meteor that had contributed to the extinction of non-avian dinosaurs 65 million years ago, opening the way for mammals to evolve.



Image 1: Big historians at Bottaccione Gorge, Gubbio, Umbria (Italy), summer 2010. Left to right: David Christian, Walter Álvarez, Barry

Rodrigue, Cynthia Stokes Brown, Fred Spier, Louis Spier, Lowell Gustafson, and Craig Benjamin in the back. Photograph from the Coldigioco Geological Observatory.

The group was well aware of how important the networks of association, exchange and communication had been in human development. There may have been a positive feedback loop between these behaviours and the development of the human brain and then society. The natural result at Coldigioco was the decision to form an association devoted to the new synthesis. They called the group the International Big History Association.

Almost a quarter century before, various scholars, thought their universities should offer a course about the past that began at the start of time. One of them was historian David Christian, who was a member of our team in Italy. History, in his course, which he had first taught in 1989, did not begin with the advent of writing a number of thousand years ago, but with the big bang billions of years ago. Scholars could no longer restrict their research to primary written documents in archives. Big historians needed to interact and learn from the natural scientists who had so transformed our understanding of time.

The new synthesis was intellectually fascinating. It was also socially important. Humans needed to better understand how fully dependent they are – how much they had emerged from and were sustained by nature. As Earthlings, they needed to better understand and learn how to care for their common home if they were to survive. In a period of potentially civilization ending nuclear weapons and belching smokestacks, they needed to find support for the transformation of political and economic systems.

The international association needed ways to foster exchange and development of ideas and strategies for transformation. The group at Coldigioco included people who had been trained in geology, history, political science and other fields. We realized that many people who came from many intellectual backgrounds shared a passion for learning from each other to produce a fuller account of where we and the rest of our universe came from. Members of the IBHA from around the world share this value. Enjoying the personal association and learning from it, are the purposes of the bi-annual conferences that the IBHA has

sponsored in Michigan, California, the Netherlands, and Pennsylvania.¹ We hope to meet before long in India.

IBHA members who live in different countries around the world often have shared their views and initiatives in *Origins*, a regularly produced bulletin of the IBHA.² Another was to create a website at <bighistory.org>. To develop new knowledge aimed at answering some of the many still unanswered questions, an academically rigorous *Journal of Big History* has just been initiated.³

In all of these efforts, the IBHA recognizes the value of association, the exchange of ideas, the building of relationships, the uneven process of emergent complexity and the very real possibilities of decreasing complexity, and the need for self-transformations if humanity is to survive and thrive. The Earth and the universe will go on their own ways if we fail to transform ourselves and the practices that have added to the breakdown of our environmental supports. The universe will not end if we go extinct, as almost all other species have throughout the past. The loss will not be the universe's, it will be ours.

We so hope that in the future, there will still be humans who like us can delight in observing a sunset, who can relish discovering new parts of an amazing reality, find joy in the presence of new friends, and imagine how to transform themselves into an even more complex form of association than what we have experienced before.

Lowell Gustafson is a professor of political science at Villanova University, Villanova, Pennsylvania (USA). A scholar of Latin-American studies, his works include *Economic Development under Democratic Regimes: Neoliberalism in Latin America* (1994) and the co-authored monographs, *Ancient Maya Gender Identity and Relations* (2002) and *Economic Performance under Democratic Regimes in Latin America in the Twenty-First Century* (2003). Gustafson also is engaged in the study of how science helps to explain the origin and development of polity. He has served as secretary and vice-president of the International Big History Association and is now president. He may be contacted at <lowellgustafson@gmail.com>.

1 International Big History Association, Conferences, <<https://ibha.wildapricot.org/2018-Conference>>.

2 International Big History Association, Bulletin, <<https://bighistory.org/members/origins-bulletin/>>.

3 International Big History Association, Journal, <<https://journalofbighistory.org/index.php/jbh>>.