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Nature's Artistic Narrative

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Many people have devoted their professional lives to translating and understanding the artistic narrative told by light, stones, bones, and blood. There is still much we do not understand about the epic saga told by nature about creativity and destruction, coherence and surprise, colors and lines, and so much else. But we can read in nature the major chapters of an improbable story about where we came from, how we got here, and what we are made of. The nature—the stories—from which we have emerged have led to our abilities to explicitly imagine, to create more complex and beautiful relationships, or to end our chapter.

Keywords: big history, cosmic history, deep past, journey of the universe, great story

Introduction

They were not the authors and artists we had expected. They have not shared their stories readily. So many people have had to dedicate their lives' work to getting them to share their narratives of creativity, inclusion, beauty, unpredictability, and coherence. But gradually, grudgingly, and partially, light, rocks, bones, and blood have told us about where we came from and what we are made of. They have told us how they became us, among other things, and now they wait for us to write the next part of the story.

We might go to our great textual traditions to read what other people before us have said about how we got here. These written accounts convey to us the wisdom of brilliant and thoughtful people who have lived over the past thousands of years—and who wondered about many of the same things that we do. 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 been dead for centuries and millennia to whisper their hopes, dreams, fears, loves, and truths to us. We see in the work of artists and architects also long gone profound truths that resonate with us today. We stand before and within their creations and experience some of what they too felt. We disparage them at our loss.

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 see from these understandings where many of our current ideas and attitudes originated. We use our imagination and creativity to consider what ancient texts and other sources teach us today. The effort is well worth it; a life seeking to master our national and textual/artistic/architectural traditions is a life worth living. For many years, learning about narratives of the past meant reading written texts and viewing artists' work.

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Surprising Narratives of Creativity

Some people started going to even more ancient texts with what were at first largely indecipherable writings. The rocks and light around us are even older than our primary written texts, but at first they seemed mute. Only gradually did we start to understand the answers they had been offering about where we came from and how we got here. What they said has been very hard to figure out. It took hundreds, more like thousands, of very bright people their lifetimes of disciplined work to learn how to translate the stories that these natural phenomena tell. Even now, they often whisper unintelligibly or maybe slightly suggest possible scenarios of what happened, but satisfying accounts of reality remain beyond our comprehension in many areas. Our sources do not give up their stories easily.

Beginning Creativity

Their story, surprisingly, begins with a beginning. For a long time, we thought maybe there was no beginning. Brilliant people, Fred Hoyle and Albert Einstein among them, argued for an eternal, static universe. What is, is pretty much what has always been; that was the generally accepted account. The dominant view had settled on an eternal, steady state, mostly, unchanging universe. The narrative was beginningless. But others argued for a start of the story. Alexander Friedmann, Georges Lemaître, Howard P. Robertson and Arthur Geoffrey Walker proposed in the 1920s and 30s a theory of what Lemaître called the primeval atom.

Ever since the ancient Greek philosopher, Democritus, some had looked for the ultimate building block of reality. If you cut up the things you saw around you, and kept cutting up the pieces, eventually you would get to what could be cut up no more. That thing would be the atom, the ultimate building block from which all the fabulous diversity of things around us are made. Some of the Greek philosophers wondered if there might be four basic substances from which everything was fashioned: earth, air, water, and fire were suggested. It was not until the 18th century that John Dalton argued for a view of the atom that still generally holds today. But even this atom eventually got cut up into smaller pieces. Lemaître’s primeval atom was something very different than Dalton’s, something very different from the sub-atomic particles like electrons and protons. Democritus and Dalton had never said that there was at first only one atom; they assumed there were many of them. They did not venture to guess where they all came from (Lederman & Teresi, 2006; Lederman & Hill, 2011; Singh, 2004; Tyson & Goldsmith, 2004).

How does the story begin? What existed at the beginning? How do we talk about it? 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 Einstein, Hoyle and others for rejecting it for years. No wonder Hoyle dismissed the theory with the pejorative, derisive term: “Big Bang.”

But then careful people began listening to light’s story. In the late nineteenth century, Henrietta Swan Leavitt figured out how to calculate distances between us and cepheid variable stars, which told us the distance between stars and galaxies, or groups of stars. This led at first to a surprising discovery: our Milky Way was not the only galaxy. At the time, it was usually assumed that our galaxy of stars and the universe were the same, with a few clouds, or nebulae, floating around our galaxy. But the new story became established that there were other galaxies. Eventually, the story became that there were at least a hundred billion other galaxies, each with an average of a hundred billion stars; with the possibility that there were actually many more. There are different types of galaxies: Spiral, elliptical, lenticular, and irregular. They have different numbers of stars, which vary greatly as well. Many are binary; two stars that are locked in a gravitational embrace. They vary in size. The structure of the universe had become exceedingly complex.

In the early twentieth century, Edwin Hubble calculated the red shifts that told us how fast galaxies were receding from each other. The universe was not static, it was in dramatic movement. And the further away from each other the galaxies were, the faster they were moving from each other. The furthest galaxies were moving away from us almost at the speed of light. If you played the movie backwards, you could see in your mind's eye all the galaxies approaching each other. They kept getting closer and closer in your imagination. Their matter became denser and denser; hotter and hotter. Until all the stars and planets and the entire known universe were inconceivably compressed into a primeval atom, with completely different properties than we see in currently known stuff. 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 suggested about an expanding universe.

Three other measurements of light—or radiation—came from the Cosmic Background Explorer (COBE), which operated from 1989 to 1993, the Wilkinson Microwave Anisotropy Probe (WMAP), which operated from 2001-2010, and a space observatory called the Planck operated by the European Space Agency from 2009 to 2013. Amazingly, these produced pictures of our universe as it existed just 380,000 years after the Big Bang. The pictures looked a bit like Jackson Pollack paintings; there were splotches of orange, yellow, and blues. No mountains. No planets. No people in miniature. No way from these that anyone could conceivably predict with certainly what would be the situation billions of years into the future. Just what looked like the noise on those TV screens that still used rabbit ears to pick up signals. These are pictures of the "event horizon." So far we cannot look directly back before that. Everything was so dense that radiation could not escape the plasma in order to travel to us today. But we can see today the slightly more dense, redder, and warmer collections of matter here; the slightly less dense, bluer, and cooler collections there. And all the subsequent stories of color and light and line depend on those very early blotches.

But we can peer into what conditions were like before this horizon. Experiments at super-colliders such as at CERN in Europe and Fermilab in Illinois can create conditions such as what existed a fraction of a second after the Big Bang. The carefully observed collisions of protons, and the numerical analyses of the results of these collisions, suggests what may well have happened right up to the Big Bang.

Still, a confident account about why there was a Big Bang remains tantalizingly out of reach. Why was there a Big Bang? Do we have a persuasive theory of the Big Bang? Do we know why our story began? Not really. We have a pretty good theory of just after the Big Bang, but not the beginning itself. Our story does not begin with In the Beginning. It starts with, there must have been a beginning, but our story begins just after that. We know a great deal about what probably happened almost immediately after it. We know about the emergence of four fundamental forces in the universe: the strong force, electromagnetism, the weak force, and gravity. We know about the emergence of matter, like quarks and then protons.

Mathematical calculations suggest that underlying matter is vibrating strings or loops (Greene, 2000). All of our stuff is not built from blocks or atoms, but from vibrations. There is something appealing for some about the idea that the most real stuff in the universe is not hard stuff, but vibrations—the music of the spheres. 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 evolved 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. We live for decades, not for billions of years or for nanoseconds. What works well for us in the middle would not help us if somehow we did live at the opposite ends of the size and time spectrum. We must transform our common sense when we learn from the astronomers and physicists about realities other than our own.

But immediately after the Big Bang, why ever that took place, there was what we recognize as energy and matter. These had not existed at least in our universe before. What do we call this? Creativity? Imagination? What had never existed before as far as we know now did. It is important to remember that nothing that we are familiar with existed then in miniature. No mountains. No oceans. No moon. No Earth. No stars. But there did appear plasma, an unimaginably hot soup of matter, and anti-matter. Little bits of matter spun in one direction. Little bits of anti-matter that spun in the other. For a billion bits of anti-matter that appeared, a billion and one of matter did. Why in that proportion? The story is not clear on that. When anti-matter and matter meet, they immediately turn back into energy. This chapter includes the great annihilation, with just enough matter remaining to eventually produce everything in our current universe. From our point of view, the creative destruction of the great annihilation was a good thing. It would have been way too crowded if all that original matter had survived.

From nothing, or a singularity, or something, we got normal, baryonic matter. Among the matter that appeared and continued to exist 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 relationship had taken place. The strong force formed a relationship among two up and one down quark, or two downs and an up. They did not form one undifferentiated blob. Each of the quarks kept their relatively long distance from each other, and never stopped moving rapidly, but they have survived from that time until our own and they just won't live alone. They are quite unlike the other four types of quarks, which evaporate back into energy almost immediately after they first appear.

The neutrons seemed to be quite disinterested in each other. Protons make an effort to avoid each other; those of a like (positive) charge just don't like each other's company. There had been enough density and enough time immediately after the big bang to force just under a quarter of the single protons together. So we quickly had what would become the nuclei of hydrogen and helium, with a smattering of deuterium nuclei.

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 (Greene, 2011). There may be persuasive analysis of evidence suggesting that our current universe is only the most recent one after previous ones (Steinhardt & Turok, 2007). But the evidence for our own, currently existing universe having a single beginning point 13.8 billion years ago is now the generally accepted standard narrative. Getting to another solar system is still a long shot. The nearest star is four light years away: 24,984,092,897,479 miles away. Voyager 1 was launched in 1977 to explore the outer reaches of our solar system. It is traveling at about 11 miles per second. It has just recently left our solar system. It would take it another 73,000 years to get to the nearest star. Getting to another star, much less than another universe, will be left to science fiction writers for the time being.

We are all from here

The universe may not be expanding into space; perhaps space itself is expanding from its original point. Maybe this space has within it that 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 China, 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? What meaning now can we draw from all this? It is a bit of a Rorschach test or looking at clouds in the sky. You can see pretty much whatever you want in the evidence. But maybe one meaning to draw from this account is that you and I and all of earth and our Milky Way and everything that exists have 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. We all belong no matter where we are.

From 2 to 115: Creating Elements

By 380,000 years after the big bang, the universe’s density and heat had decreased enough so that a new relationship could be formed by the electro-magnetic force between protons and electron. For the first time ever, we had atoms. Atoms that were each a complex set of relationships between quarks, protons, maybe neutrons, and electrons due to three of the four fundamental forces in the universe.

But from our current point of view, these atoms by themselves were not very promising. Not much can be built just out of hydrogen and helium, and that is virtually all that existed then. Enormous clouds of these atoms that stretched for millions of light years could have offered little hope at the time for mountain vistas, bubbling streams, or anything else.

Happily for us, there were slight irregularities in the distribution of these atoms. There was a slightly denser clump here, a slightly less clump there. The slight difference was just enough to permit gravity to attract other clumps. And dark matter, or unseen matter that exerted a gravitation effect on regular, baryonic matter seems to have had an effect too. Gravity has no effect on one proton to another; but at enough distance, the gravitational effect of a clump of protons can start pulling matter together. And the result was marvelous.

As gravity increased the matter and hence temperature of the protons, their resistance to each other was overcome and some started to combine or fuse. The hydrogen and helium nuclei that were formed soon after the big bang were then fused in stars by gravity into the rest of the elements, like oxygen, carbon, iron, and so on. When the most massive of these stars exploded in a supernova, the resulting heat was so intense that all the elements heavier than iron formed almost instantaneously. Some hydrogen and helium were transformed into 113 other elements, with relationships formed by the strong force between multiple numbers of protons and neutrons. Where there had never been gold 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.

As stars shot out the new elements, they sometimes connected. Sometimes atoms of the same element, like carbon, at the right distance from the heat of a star, combined with each other to form graphite or glistening diamonds in space. Sometimes different atoms, due to the needs of electron shells and the covalent bonds that permitted, connected to each other within chemicals like water with new and surprising properties like wetness. New connections, new relationships, all are from elements floating in space.

About two thirds of the time between the big bang and now, 4.56 billion years ago, our solar system, our sun, and our Earth were formed by gravity from the newly forged elements, mixed with the hydrogen and helium that had floated in space since the big bang. A process of accretion drew more and more bits and particles and meteors and comets and planetoids together into a new sphere: Earth. For millions of years, space particles smashed into Earth. Meanwhile, red hot, flowing magma flowed all over the surface of the Earth. Could there be a less promising place for life to eventually emerge? But the Earth was transformed by its surface cooling and water in comets raining down on the new planet. Hot, dense, heavy metals sank, and water started to settle on top of the lighter basalt floor of oceans. Earth became a beautiful blue marble in a dark sky. Even lighter granite and other minerals coalesced at the surface to form tectonic plates and continents. The spinning globe with a metallic center formed a magnetic shield that protected the young planet's atmosphere from solar winds.

Creating Life

On this new Earth, there was lots of water and land, all bathed in sunlight. The lifeless land was rocky and mostly in shades of brown. The water splashed lifelessly. Just looking at this, who could have imagined endless life forms swarming everywhere? But nevertheless, elements and chemicals that had formed in space long before continued to combine in even more complex relationships. New bonds among them formed. Some resulted in amino acids (maybe some amino acids had previously formed in space). They combined into proteins, and lipids surrounded them. And then an amazing new appearance came. The new complex combination produced for the first time a prokaryote cell with a membrane, the ability to metabolize energy and acquire nutrients, the ability to reproduce, and the ability to evolve in response to environmental changes. Never before on Earth had there been life, this incredible complexity is within one cell.

Exactly how did chemicals transform themselves into life? (Alvarez, 2014; Deamer, 2011; Hazen, 2005; Pross, 2012) 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 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 I. We are all descendants of the Last Universal Common Ancestor, LUCA.

How might we respond to this now? Again, 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.

The Story of Earth

The story of Earth did not stay constant after our planet was formed or after the first life appeared (Hazen, 2012). Earth has its own narrative. Many of those single cells soon learned how to produce their own food by mixing light, air, and water, releasing free oxygen into the atmosphere. The oxygen first connected to iron, causing it to rust and produce beautiful reds in layers of rock. Then, the oxygen started to build up in the atmosphere, making it possible for new, more complex cells to evolve the means to burn carbohydrates. Continents moved. Slow, inexorable rivers of magma from deep in the Earth dragged 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 have be a suburb of San Francisco. The Earth has been continually transforming itself for over four and a half billion years.

Chapters 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. Life keeps transforming itself over and over again. 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 men. 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 three pounds of brain in our skulls. This complex brain matter is what enables us to form ever more complex social units, from kinship groups, to multi kin villages, to populous cities, to nations and empires (Wilson, 1975, 2012). It has been said that hydrogen is an oderless, colorless gas that, given enough time, becomes us, among everything else. Perhaps we could also say that given enough time, vibrations and quarks become symphonies and the Louvre.

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.

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 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 Story of Human 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. (Oppenheimer, 2003) 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 likely mostly on foot or perhaps canoes. 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 sewed fur coats made from animals whose skins had previously evolved. 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. And the result was that from a small band tenuously holding onto survival in Africa, we spread out to populate the entire globe.

A New Story to Support Emerging Relationship or Complexity

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 Alvarez, Cynthia Brown, Barry Rodrigue, Craig Benjamin, and others put together this new account that was originally told by light, rocks, bones, and blood. (Brown, 2007; Chaisson, 2006; Christian, 2004; Christian, Brown, & Benjamin, 2014; Spier, 2015)

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 for a seminar organized by Walter Alvarez. 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 perhaps caused the extinction of non-avian dinosaurs 65 million years ago, opening the way for mammals to evolve.

The group was well aware of how important association, exchange, and communication networks had been in human development. There may have been a positive feedback loop between these behaviors 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. A quarter of a century before, David Christian had been a junior history professor who thought his university should offer a course about the past that began at the start of time. History in this course did not begin with the advent of writing a number of thousand years ago, but with the Big Bang billions of years ago. Historians 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, we needed to better understand and learn how to care for our common home if we are to survive. In a period of potentially civilization ending nuclear weapons and belching smokestacks, we 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, 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 new IBHA.[2] Another was to create a website at bighistory.org.[3] 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.[4]

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. Can relationship between North and South Korea be restored after decades of separation and hostility? Will some spark set off a devastating war between them, Japan, and the United States?

Can each of us find our place in this grand story that has been written for billions of years? Can we see ourselves as that part of the universe that can self-consciously consider itself? Can we see all of what the story has bequeathed us and now how we can write its next chapters together? Can we see the increasingly complex set of relationships that have developed over time, and now self-consciously imagine even more complex relationships that are sustainable?

The Earth and the universe will go on telling their own stories even if we fail to create a future that we want. If the picture that we paint is one of wars and the breakdown of our environment, then the earth and life will tell a different story than if we had done otherwise (Hamilton, Bonneuil, & Gemenne, 2015; Schwägerl, 2014; Vince, 2014). The universe will not end if—or when—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, we will have permitted future generations of 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, imagine how to transform themselves into an even more complex form of association than what we have experienced before, and tell their own story that is ever ancient and ever new.

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1 https://ibha.wildapricot.org/2018-Conference
2 https://bighistory.org/members/origins-bulletin/
3 https://bighistory.org/
4 https://journalofbighistory.org/index.php/jbh

Each of us knows that our individual stories will end. We know that at some point, the story of the human race will itself come to an end. We have existed only for two or maybe three hundred thousand years. There is no good reason to think we will be telling our story after another million or two, even if we are very fortunate. The story of all of life on Earth will end as the sun becomes a red giant and swallows up the Earth. Within about 5 billion years, the story of Earth will end. Our galaxy and indeed even our known universe will come to an end. I will admit that I rather hope that the idea of multiple or even infinite universes, or infinitely recurring universes, turn out to be true. When the story of our universe comes to an end, perhaps many more will just have begun. But whatever that case may be, I find it to be a marvel that I get to be conscious of the universe now. I am grateful that I can see light and color and line in a myriad of forms. I can understand some of the past from which I have come. I am proud and humbled to be part of such a magnificent story. And when I think of all of the virtually endless number of things that had to go as they did for 13.8 billion years in order for me to be able to share with you these thoughts in this article, I am profoundly grateful for the miracle of the narrative that has let us write and paint and sculpt and think and act creatively.

Conclusion

Nature tells us a narrative of creativity. Many people have exerted great skill and effort to learn how to understand what nature is saying about the often surprising events that have occurred since the big bang until now (Alvarez, 2017). This narrative covers 13.8 billion years; it is a great epic told by light, stones, bones, and blood. A story in which not only are things under the stars new, but the stars themselves have been new. Many are still being born. It often has been natural to move beyond what is found at any given time in nature. Nature is steady over long periods of time, but new relationships with new properties have frequently appeared. There have been many beginnings. The beginnings of the universe, of stars, then of planets, then of life, then of humans, of so many other things.

It is a story of inclusion. Everything you can see, every person, every rock, every star, has their origin in the same single point. Every living creature on Earth shares a common ancestor. Every human being alive today has the same ancestors who lived in Africa.

It is a narrative of diversity. Out of each origin developed great variety. There are many types and sizes of stars, galaxies, planets, and life forms.

It is a story about how, at least in certain pockets and at certain times, relationships among units become more and more complex. After almost 14 billion years, one result was a small part of the universe that could reflect self-consciously on itself. We are one result of the narratives who are now able to write our own story of increased complexity. We can build closer, more complex relationships—if we choose. Even though there often seems to be little reason now to expect greater political complexity, we may be surprised by our learning how to relate more fully. We may choose to return to simpler relationships too. It may be beyond us to forge sustainable global, human relationships out of more tribal and national ones.

It is a narrative of majesty and humility. Tonight, after you are done reading, go outside and look up. If the light pollution is not too bad, it is possible to see the star Cassiopeia without any telescope. What you see is the star as it was before the Roman Empire existed, before the pyramids, before the Great Wall of China was built. You see it as it was 16,308 years ago. With telescopes, you can look back in time long before that, as you look deeper into space. Look up at a black spot in the sky where it may be that a long-dead star exploded 5 billion years ago to produce the gold or silver that is in the ring on your finger. Look at yourself, and think of the time and generations it took to produce a shoulder that permits you to skim a rock across the surface of a quiet pond. Think of how long it took for 37 trillion cells to figure out how to work together so that your body can function. Look beneath your feet at an Earth that is almost 11,000 degrees Fahrenheit at its core. You stand on two feet under a magnificent sky, on an awesome planet. It is amazing what we are a part of. We are humbled by being such a small part of the story, and ennobled by being part of such a grand one.

The story will change. We will continue to understand better what nature is telling us. We may be misunderstanding important parts of it now. What we are being told—what we are telling—will change. Nature has not been rigidly set. It is often inventive and malleable; that is one of its legacies for us.

And the story will end. My story. The story of humanity. Of life. Of Earth. Of the universe. Nature tells us that everything dies. Creativity and destruction, life and death, beginnings and endings: they all go together. Galaxies and atoms may ultimately come apart. Just as there have been many beginnings over long periods of time, there will be many endings. Almost certainly, my ending will come long before humanity's will. And the Earth will end long after that.

We are in the middle of space time, between the big bang and the darkness, between quarks and super clusters of galaxies. For a time, we can help to write the next parts of our own story. We can marvel about how we were written into the narrative. We can care about—and care for—the nature that wrote us into its script. And for our brief shining moment, we can share nature's wonder.

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Narrative art is art that tells a story, either as a moment in an ongoing story or as a sequence of events unfolding over time. Some of the earliest evidence of human art suggests that people told stories with pictures. Although there are some common features to all narrative art, different cultures have developed idiosyncratic ways to discern narrative action from pictures. Natureâ€™s artistic narrative. 1373. an average of a hundred billion stars; with the possibility that there were actually many more.Â 1374 natureâ€™s artistic narrative. physics and relativity. The equations of each worked well to explain their own phenomena, but when put together, they had produced non-sense.