Throughout history, humans have attempted to explain to our world and our position in it. A lot of people from various eras, races, and religions have told stories to describe, with magnificence and awe, the roots and existence of humans, animals, Earth, the stars and the world.

Globalization, as well as our extremely dynamic present knowledge economy, has disintegrated faith in traditional origin stories. However, the fact is that the present scientific understanding entails that humans have never been better placed to describe our roots and growth.

These chapters explain the grandest story possible. How, from nothing, our world, stars, and planets appeared. How the appropriate situations came together to allow the creation of life. How life-forms used the energy of the sun to make huge developments, and how after millions of years humans used energy from farming and fossil fuels to make developments again.

Chapter 1 – 13.8 billion years ago, the Big Bang formed the universe, the first of a range of important occurrences in our history.

The story of our origins is told through thresholds–major transition points when more difficult things emerged. These instances occur under what's called the goldilocks conditions – when things are not really hot or really cold; however, just right.

For the majority of the thresholds in our story, we can clarify those goldilocks conditions and the reason why the threshold was reached. However, what of the Big Bang?

We basically don't understand the conditions that enable our universe to occur. Maybe the best manner to explain what occurred is to make use of the words of science fiction author Terry Pratchett: "In the start, there was absolutely nothing, which exploded."

However, what we understand is that the Big Bang formed the universe 13.8 billion years ago – the first of a range of important occurrences in our history. Also, we can tell what occurred after, a fraction of a billionth of a second after that instant.

At that moment, the universe was even smaller than an atom. It's difficult for human brains to understand the size of things such as atoms; however, you could put a million of them in the dot of this "i" with ease.

To start with, we had energy only, which immediately divided into various forces, like gravity and electromagnetism. In a split second, the simple matter appeared and after it was complicated structures, while protons and neutrons – very tiny particles –combine to form nuclei. All this occurred within minutes; however, as the universe cooled things slowed down a bit. After 380,000 years, electrons were stuck in orbit around protons, drawn together by electromagnetic forces, and the first atoms of helium and hydrogen were created.

The universe started out as something unthinkably small, with every energy and matter that is in the universe presently packed into it, and it's been increasing since then.

Chapter 2 - The emergence of stars 12 billion years ago – and the method they die – were significant developments for the universe.

Viewing the night sky, it's very easy to consider stars as something that has always been there. However, stars just came into existence a hundred million years after the Big Bang, when gravity and matter offered the goldilocks conditions for stars to create.

At that moment, the universe was slightly like a mist with tiny pieces of matter. In some parts – you could consider them as mainly cloudy parts– the volume of the matter was denser than elsewhere. Here, gravity pulled atoms together, allowing them to collide and speed up, increasing the temperature. With time, these clouds of matter became denser and hotter.

When a cloud of matter's core gets to 10 million degrees, trillions of protons will combine with one another to make helium nuclei. In this combination, massive amounts of energy are emitted– the exact process that happens in a hydrogen bomb explosion. A furnace is formed, emitting huge energy that will burn provided that there are still protons to combine together. The form stabilizes and will remain for millions, and even billions of years. We get a star.

Truly, there are now a lot of stars, joined together in galaxies – sort of like star cities. Our galaxy, the Milky Way, has hundreds of billions of stars.

However, it's not only the emergence of a star; but their death as well that signified a significant development for our universe, and ultimately, for us.

After a big star dies, gravity crushes the star's core together with great force, and the star shatters with, for a moment, as much energy as a whole galaxy. In only a few minutes, this explosion creates the majority of the elements that can be seen in the periodic table and releases them flying out into space. The deaths of star fertilized and enhanced our universe, eventually allowing the creation of our earth in a way that would ultimately support life.

Chapter 3 - The earth was created by the buildup of debris-roughly 4.5 billion years ago.

We need to thank the sun for a lot of things; like heat, light, and energy for a start. Also, we need to thank it for the earth's formation.

The creation of planets is a chaotic outcome of star formation, which happens in parts of space rich in clouds of chemicals.

After the creation of the star in the middle of our solar system – our sun –a mass of debris that consists of gas, dust, and particles of ice were remaining, while lighter elements like hydrogen and helium were shattered away by fierce bursts from the sun. This is the reason why the outer planets in our solar system are made mostly from these elements. However, closer to the sun, where the creation of rocky planets such as Earth, Venus, and Mars took place, was a part rich in chemicals such as oxygen, aluminum, and iron.

Over time, particles of matter trapped together as they collided in orbit. Ultimately larger substances like meteors occurred, which were big enough that their gravity sucked up encompassing debris. Ultimately, this caused the creation of planets.

Presently, the indications of this process are still evident.

The little weird inclination of Uranus and its rings is probably the effect of a fierce collision with another form, while our moon was likely formed by a collision between Earth and a Mars-sized protoplanet (a type of early, pre-planet). That collision propelled huge sizes of matter into a circular orbit around Earth, just like the rings of Saturn, before finally coming together to create the moon.

Humans have acknowledged for a very long time just about our own solar system – the group of planets, moons, and debris orbiting the sun. However, in the past 30 years, we've understood that the majority of the stars have planets. There could be several billions of various types of planets in the universe. Eventually, various studies by astronomists will tell the number that could support life. However, what circumstances allow life on a planet? In the following chapter, we'll look at what permitted life to occur.

Chapter 4 - Earth had suitable conditions to let life to thrive.

What does life mean? Life is made from billions of minute molecular machines functioning inside secured bubbles, or cells. It can tap into the energy, get accustomed to its setting, reproduce and grow.

In suitable conditions, the molecules whereby life is made can appear unexpectedly.

Stanley Miller, from the University of Chicago, kept hydrogen, methane, water, and ammonia in a closed system in the year 1953. He heated and electrified it (think of volcanoes and electric storms), and within few days a slurry of amino acids – simple organic molecules that are the source for every protein – appeared. Now we understand that the early atmosphere wasn't methane and hydrogen; however, the findings still remain. Under suitable conditions, the basic building blocks of life can appear.

Also, the Earth had those conditions– the appropriate mixture of temperature and chemicals – to enable the appearance of life.

The temperature was essential for life's formation and also for its sustainability. Mild temperatures are important to life, and Earth has in-built systems that sustain them. However, how?

Rain comprises of carbon, which ultimately finds its way into the earth's mantle, where it's kept for millions of years. Volcanoes occasionally emit some of this carbon back to the atmosphere. Less carbon signifies less carbon dioxide and that signifies colder temperatures.

During the cold period, it rains less. Less rain signifies that less carbon is kept away. Carbon dioxide levels accumulate and things become warmer. And it gets really warm, it rains more, which signifies more carbon is kept away and things cool down over again.

This self-regulation provides incredible stability provided that the sun's warmth has been increasing for more than four billion years. Our earth has been able to withstand; however, the other planets haven't been able to withstand. For example, Venus has massive quantities of carbon dioxide and has a surface really hot that it could melt lead.

Earth was just accurate for life. Therefore, how did the earliest life-forms look like, and how did they grow?

Chapter 5 - Photosynthesis was an energy bonanza for early, single-celled life that assisted to trigger a biological innovation.

Early life-forms, called prokaryotes, are single-celled organisms formed in chemically rich volcanic outlets on the ocean floor.

Prokaryotes are minute – a punctuation mark could contain a few hundred thousand of them. However, they are still capable to notice information, like heat and react to it.

Therefore, how did we go from these slightly simple beings to complicated forms of life? The evolutionary revolution of photosynthesis indicated the first energy success in life history.

Photosynthesis is the translation of sunlight to biological energy. Unexpectedly, the energy was nearly infinite, and prokaryotes were able to spread and multiply. The quantity of life in the early oceans rose to nearly 10% of present levels.

Three billion years ago, a kind of photosynthesis developed that created oxygen, with severe effects on the atmosphere. The levels of atmospheric oxygen increased intensely two and a half billion years ago. Oxygen atoms started to create what is now called the ozone layer – guarding the earth's surface against solar radiation and allowing algae to begin growing on land for the first time ever. Up until that moment, the earth's surface had been very much sterile.

The fresh oxygenized atmosphere wasn't good news for the majority of prokaryotes since it is poisonous to them. An "oxygen holocaust" arose, and the prokaryotes that lived withdrew to the deep ocean. While, oxygen instigated lower temperatures, and for a hundred million years, Earth was surrounded in ice.

This doesn't seem like a good result. However, Earth's self-regulation kept things under control while receiving assistance from eukaryotes – new organisms that had the ability to suck up the oxygen out of the air – which assisted to increase and stabilize the atmospheric temperature.

Also, Eukaryotes were unique for other causes: sex. Till now, organisms had basically copied themselves; however, eukaryotes combined their genetic material with those of a "partner."

This was really essential since it signified that small genetic variations were certain for each generation. With more variation to occur, evolution unexpectedly had more choices. Quickly, things were moving fast.

Chapter 6 - Evolution and the annihilation of dinosaurs assisted the large forms of life to grow that would ultimately produce humanity.

With the appropriate circumstance and also gaining from the energy boost of photosynthesis and the capacity to cope with oxygen, single-celled organisms were capable to develop into much complicated, multi-celled creatures.

Plants, fungi and ultimately animals evolved and moved from the oceans onto land. The appearance of photosynthesizing plants on land – which used up huge quantities of carbon dioxide and emitted oxygen –formed the high-oxygen atmosphere that is basically what we live and breathe presently.

The appearance of life on land caused evolution. Gravity isn't an issue in water; however, it is an issue on land, plants required to be able to stand. They needed strong resources and internal plumbing systems to be able to move liquids against gravity through their bodies. In a related manner, animals developed pumps –just like our hearts – to move nutrients around.

Also, life developed to be slowly more intelligent due to evolution.

Natural selection increased information processing since information – just like identifying if another being is a threat, or if a plant is harmless to eat – is vital for success. An antelope that plays with a lion isn't going to live long enough to transfer its genes.

However, it wasn't only evolution that allowed key advancement for the development of the forms of life that would ultimately bring about humans; also, the annihilation of dinosaurs was good news for mammals.

66 million years ago, the time was finally up for dinosaurs in a situation of hours when, a big asteroid got to the Yucatán Peninsula, which is now called Mexico. The asteroid produced dust clouds that obstructed the sun, producing a nuclear winter and generating deadly acid rain.

50% of the entire plant and animal species died out, while bigger creatures like dinosaurs suffered more, maybe since they needed more energy to endure and that energy was now really difficult to get.

What is the reason why this is good news for mammals? Mammals are likely to be small, rodent-like creatures and different from big dinosaurs, they lived. With dinosaurs extinct, they had the ability to thrive.

A group of mammals that flourished was primates.

Chapter 7 - Humans grew from primates and had a key advancement with the development of language.

How old are we humans a species? By the criteria of the universe, we're really young.

In only the past six million years (know that the universe is 13.8 billion years old, and the first huge living organisms came 600 million years ago), we humans have made our own means, growing independently from primates.

Early humans walked on two legs and that is the first difference – a transformation from our knuckle-dragging primate ancestors that had various impacts on our growth. To be able to walk on two legs needed narrower hips, for instance, which signified that early humans frequently gave birth to babies not able to live by themselves. That stimulated parenting and sociability.

Also, early humans have progressively developed. Homo erectus learned how to utilize tools and control fire two million years ago. Cooking food signified less digestive effort. Our guts contracted, and we had more energy accessible for our brains.

However, the actually remarkable changes came with Homo sapiens, only a few hundred thousand years ago. What makes Homo sapiens –we– very different?

The answer is easy: language.

Definitely, other animals can talk to one another. In trials, chimps have learned a few hundred words. However, this communication is really inadequate – an animal may have the ability to caution another of threat in their surroundings; however, it can't caution of a lion pride five miles to the south.

Language allowed the difficulty and accuracy of information sharing that showed to be a game-changer since it allowed collective-learning – the buildup and transferring of knowledge from human to human and generation to generation. This caused a spread of new information, leading to a breakthrough in the effective use of energy, resources and advanced kinds of leisure.

The knowledge gathered through language allowed better usage of resources and as a result population growth. There were about 500,000 humans 30,000 years ago. And in the last 10,000 years, there were five to six million. That signifies a 12-fold increase in population and a 12-fold increase in total human energy usage.

By this time in our history, humans were moved across the world. From Siberia to Australia, small societies enjoyed different diets, appropriate health, storytelling, relaxing, dancing, and painting. We were close to transfer a new threshold in the story of our growth.

Chapter 8 – In the life of humans, farming was a transformative revolution.

We've understood that specific vast revolutions, like photosynthesis, have had a huge effect on the growth of life. Now we will move to the next revolution, farming, which developed in reaction to population densities.

Think of the Natufians – societies of humans who lived in villages of a few hundred people on the coasts of the eastern Mediterranean. They were originally foragers; however, population densities entailed that they required more resources. With a lot of neighboring villages around them, they couldn't make use of a bigger area of land. Rather, they had to make use of any methods they could to raise the efficiency of the land they already had.

Firstly, humans were hesitant farmers. Farming was a difficult task– the bones of Natufian women display wear from a lot of hours of movement while kneeling to grind grain. However, the requirement made them carry on, and gradually, farming began to transform human life, leading to a big advancement in humanity's mastery of energy and resources.

For instance, while a farmer himself can just make about 75 watts of energy, a horse can provide ten times that amount, signifying that the horse can work deeper and transport more goods than a human alone.

As the population kept increasing, fuelled by this new energy, human life started to transform.

As village societies turned out to be the standard way of life, communities had to make new rules and conducts, and humans started working together more. In what is currently modern-day Iraq, there was nearly no rainfall; however, there were two huge rivers: the Tigris and the Euphrates. Early farmers excavated for themselves small channels to use river water; however, over time, communities made difficult systems of canals, in some situations requiring thousands of workers and large coordination from their leaders.

There were 200 million humans Two thousand years ago, and they were living in ever-complicated societies. The transformation was beginning to increase a bit more.

Chapter 9 - As farming developed, it produced surpluses that allowed the growth of more difficult agrarian communities.

Presently, the majority of us take for granted that we don't need to use our time producing food. However, that's the effect of a huge change in humanity.

As the yield of farming developed over time, farmers started to produce major surpluses – more food and goods than they required for daily survival.

Surplus food from farming signified that there was a surplus of people with time on their hands since not everybody had to work the land. And when people don't have to use their entire time farming, they have time to, for instance, produce and sell pots.

This process can be traced through archaeology. The first pots from Mesopotamia – a historical area in what is now Iraq – were simple and different. However, beginning about 6,000 years ago, there is proof of specialized pottery workshops. Potters made standardized bowls and plates in huge amounts, which were sold everywhere.

As surpluses increase, specializations increased too. In Uruk, a city in Mesopotamia, 5,000 years ago a list of every standard profession was gathered. The list comprised kings and courtiers, and priests, tax collectors, silver workers, and also snake charmers.

As surpluses and populations grew, so did the size and interconnectivity of communities.

Rulers made roads to assist trade, for instance, the Royal Road from Persia to the Mediterranean. Constructed in the fifth century BC, the road was 2,700 km long and could be traveled in only seven days by couriers by a convey system of fresh horses – a massive improvement on the walking time of 90 days.

Humans were getting more and more familiar with moving, sharing, exchanging and trading with each other. Moving to a few centuries and this exchange would form our world intensely.

Chapter 10 - The exchange of concepts and the finding of fossil fuels hastened the improvement of human development.

Christopher Columbus turned out to be one of the first men to cross the Atlantic Ocean in 1492. Farming had used 10,000 years to extend across the globe.

Now, in only a few hundred years, humans had made huge advancements as information and concepts traveled across oceans and were exchanged more quickly than ever before.

In the seventeenth century, when Sir Isaac Newton created his theories of gravity, he was assisted by access to information –like a comparison of how pendulums swing – in Paris, the Americas, and Africa. Never before had scientists been capable to test concepts really widely.

This hastened the learning and development process, causing another important finding: fossil fuel energy.

Fossil fuels provided communities far more energy than it is offered by farming, and once again this transformed human life.

By 1700, the first country to gain from fossil fuels was England, obtaining half its energy from coal, rather than wood. In the 1770s, James Watt the engineer created the steam engine, allowing the efficient powering of the industry by steam locomotives. Also, steam engines permitted access to deeper mines; this signifies that the quantity of coal obtained increased by 55 times between 1800 and 1900.

Coal transformed the form of the world. For example, England's steam-powered gunships could unexpectedly conquer Chinese ships, winning them in charge of Chinese ports in 1842.

The finding of electricity and the skill to change coal into electricity-powered another surge of innovations by revolutionizing communication. During the beginning of the nineteenth century, the fastest method to communicate was through horse messenger. However, with the creation of the telegram in 1837, communication was as fast as the speed of light.

Chapter 11 - The earth has moved into a new era; that is, the era of humans.

For the first time ever in history, one species – humans – had turned to the leading force and transformed the earth's surroundings forever. Without being aware of what we're doing at the times, we see ourselves in the planetary powerful seat.

Since World War II, we've seen the extreme rise of economic growth in history, caused largely by the use of fossil fuels and technological advancement. This is the beginning of the Anthropocene – the age of humans.

Consider the agriculture industry. The usage of artificial, nitrogen-based fertilizers intensely increased the output of agriculture, making it achievable to feed additional numerous billion humans. When the author was still a child in 1950, the population of the world was two-and-a-half billion. During the course of his life, it has increased by an extra five billion people.

Economic growth signifies that the human experience is now totally different from the ones our ancestors had.

Activities that were common in human life for centuries –attending to crops, milking cows, or collecting fuel for fires – are mostly missing from our lives presently. A lot of us live in cities that are nearly completely shaped by humans instead of the natural environment.

Even though it came with great advantages, the Anthropocene has also caused some huge negatives.

One disadvantage to economic growth is huge inequality, proven most starkly in the fact that even presently; 45 million people live as slaves.

Also, the environmental effect of the Anthropocene has been enormous. Biodiversity is in freefall, with rates of extinction presently hundreds of times quicker than that of the past few million years. We've caused our closest relatives, primates, to the verge of extinction.

Maybe most disturbingly, we're intensely upsetting the processes that make our surroundings stable by producing vast amounts of carbon dioxide. Present scientific models estimate that in the next 20 years or thereabout, a warmer world triggered by greenhouse gas emissions will make coastal cities to drown, make agriculture more difficult, and drive severe weather patterns.

Chapter 12 - The future is for us to create.

What will ultimately occur to Earth? Actually, in the long term – several millions of years – Earth will become sterile and ultimately be consumed by the sun. On a more human timeline, the future is still up to us.

The story of humans is in big part a story of speed. Things are now occurring really quickly that our actions over the next decades will have massive repercussions for both us and Earth for thousands of years.

The Stockholm Resilience Centre has for several demonstrated “planetary boundaries” – lines which, if crossed, will put our future at risk. Both biodiversity and climate change, are mainly important for a sustainable planet. What is the bad news? According to researchers, they said we have already exceeded the boundary for biodiversity and are we are getting nearer to the climate change boundaries.

What does a better future seem like?

John Stuart Mill, the nineteenth-century economist chose the notion of a future without continuous development. He claimed that it would be a nice contrast to the hectic world of industrial innovation, a world where “the normal condition of human beings is that of striving to manage.” Rather, he proposed, it would be good to get to a state of balance where “no one wishes to be richer.”

Are we at the edge of a sustainable world? A world where humanity has reached a new level of difficulty and stability, that enables us to self-regulate like our earth self-regulates?

A lot of the conditions are here already. There is now an obvious scientific agreement and knowledge of humans’ effect on the planet, shown in documents such as the Paris climate accord. What is missing is determination. A lot are doubtful about the warning indications we see. Few governments possess the ability to think outside electoral cycles and short-term needs. Every government encounter pressure to prioritize their country over the needs of the world.

However, attaining a sustainable world is an aim worth targeting. It would signify that human communities can exist for thousands, perhaps hundreds of thousands of years to come.

And who can tell the next thing that what could occur?

Origin Story: A Big History of Everything by David Christian Book Review

At the core of our origin story is a story of increasing difficulty. For billions of years, increasingly difficult things, such as stars, life, humans, modernity, have appeared to form a universe that is, for the greatest part, cold, dark space. During the last few hundred years, the speed at which transformation has happened has been hastening quickly, and presently, we live in a society of such great difficulty that we are capable to transform the way of our earth's future.

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