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# The Story Of Earth: The First 4.5 Billion Years, From Stardust To Living Planet



## THE STORY OF EARTH

THE FIRST 4.5 BILLION YEARS,  
FROM STARDUST TO LIVING PLANET



ROBERT M. HAZEN



## Synopsis

Earth evolves. From first atom to molecule, mineral to magma, granite crust to single cell to verdant living landscape, ours is a planet constantly in flux. In this radical new approach to Earth's biography, senior Carnegie Institution researcher and national best-selling author Robert M. Hazen reveals how the co-evolution of the geosphere and biosphere - of rocks and living matter - has shaped our planet into the only one of its kind in the Solar System, if not the entire cosmos. With an astrobiologist's imagination, a historian's perspective, and a naturalist's passion for the ground beneath our feet, Hazen explains how changes on an atomic level translate into dramatic shifts in Earth's makeup over its 4.567 billion year existence. He calls upon a flurry of recent discoveries to portray our planet's many iterations in vivid detail - from its fast-rotating infancy when the Sun rose every 5 hours and the Moon filled 250 times more sky than it does now, to its sea-bathed youth, before the first continents arose; from the Great Oxidation Event that turned the land red, to the globe-altering volcanism that may have been the true killer of the dinosaurs. Through Hazen's theory of "co-evolution," we learn how reactions between organic molecules and rock crystals may have generated Earth's first organisms, which in turn are responsible for more than two-thirds of the mineral varieties on the planet - thousands of different kinds of crystals that could not exist in a nonliving world. The Story of Earth is also the story of the pioneering men and women behind the sciences. Listeners will meet black-market meteorite hawkers of the Sahara Desert, the gun-toting Feds who guarded the Apollo missions' lunar dust, and the World War II Navy officer whose super-pressurized "bomb" - recycled from military hardware - first simulated the molten rock of Earth's mantle. As a mentor to a new generation of scientists, Hazen introduces the intrepid young explorers whose dispatches from Earth's harshest landscapes will revolutionize geology. Celebrated by The New York Times for writing "with wonderful clarity about science . . . that effortlessly teaches as it zips along," Hazen proves a brilliant and entertaining guide on this grand tour of our planet inside and out. Lucid, controversial, and intellectually bracing, The Story of Earth is popular science of the highest order.

## Book Information

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## Customer Reviews

In this excellent volume, Robert Hazen tells us the story of how earth came to be, a real story that is grander than any creation myth. He starts with the Big Bang and then leads us through the formation of stars, galaxies, the solar system and finally to the evolution of earth. Hazen is a geologist by training so he especially excels in recounting the the formation of the planet from minerals and elements and their subsequent differentiation into the core, magma and crust that define the structure of our planet. But this is where the story is just getting warmed up. The upheavals that earth faced during the next 4.5 billion years have been tremendous and Hazen documents them exceedingly well. Earth has seen huge transitions that crucially contributed to the evolution and extinction of life. These included massive tectonic shifts, the famous continental drifts, intense periodic cycles of thawing and freezing, the waxing and waning of oxygen levels in the atmosphere and the constant churning and renewing of earth's raw materials through volcanic, oceanic and tectonic activity. The magnitude of these events is illustrated for instance by the fact that at one point in time the Appalachians were submerged in the ocean. The movement of entire continents across thousands of miles, the rise and fall of imposing mountain ranges and the obliteration of thousands of species and landscapes by the impact of meteorites is almost impossible to imagine. But the evidence is incontrovertible. The real strength of the book is in describing the influence of this grand geological drama on the evolution of life, and how this evolution would have been impossible without the crucial interplay between geology and biology.

This has to be about the most coherent and readable book about the formation of our planet that I have read. It made the processes that formed Earth make sense in ways that no other book has (and I've read some good ones). But it also reads like a family album, or the biography of a beloved friend. For those reasons alone I recommend it. The bonus of the book (and the area most likely up for debate) is the fresh viewpoint that the author brings to the symbiotic connection between biological life and geology. We all understand that without the basic elements that were gathered

from the cosmos by the Earth, life could not have begun. But it also appears that it was life itself that then began to alter "lifeless" geology, mainly in the form of minerals that then became the further building blocks of ever-evolving life forms. Life exists in many forms and in many places on and in the earth. We tend to think of the things that live and crawl on the surface, or swim in the sea, but the roots of living plants facilitate chemical reactions in rocks and soil to a degree that their actions must be considered a significant shaper of landscape -- more so than erosion by wind and rain. It is a way to see our planet that has an elegant and fascinating complexity to it. Our life story is not one of life simply springing up on a watery planet that just happened to be the right distance from an energy-supplying sun, but of an interplay between chemistry, environment, time and chance that has played out over and over and over again through extinctions and near extinctions, changes in atmosphere and the chemical composition of the oceans as well as the surface of the planet to arrive at the biologically-rich world that we know today.

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