

Webb and Artemis: A Journey back to Source

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1. The Urge to Merge

Stars have captivated our imaginations and enchanted our hearts ever since we became capable of such feelings. It was their irresistible call that compelled Galileo to point the first telescope to the sky and inspired Goddard to launch the first rocket into space.

Our desire to see further into the sky and our longing to touch the heavens springs from a deep-rooted yearning in every atom of the universe. It is the urge to acknowledge and affirm the source from which all has emerged. Building telescopes that peek deeper into space and rockets that soar higher in the sky, is how this primordial instinct manifests itself in us humans. The James Webb Space Telescope and the Artemis Lunar Missions represent the latest triumphs of our age-old aspiration to know the place from where we have come.

2. Stirring up a Universe



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According to a Hindu creation myth, in the beginning there was an unlimited sea of milk. In looking for the elixir of immortality, the gods churned the sea and stirred up wavelets in the milk which formed the objects of our universe. Each form would henceforth be torn between loving its unique identity and wanting to disappear back into the safety and nourishment of its source. Evolution is a backdrop where the ongoing tension between these two primordial urges is played out.

Our lives are a microcosm of the cosmic evolution story. The milk in the Hindu myth signifies the big mama to which the infant clings after birth. As it learns to engage with other isolated forms it starts to see itself as disconnected. However, the memory of the whole cannot be erased. Our desire for union while retaining our independence gives us our life.

3. Advent of the Human

In the last century, science has increasingly confirmed what mystics have been saying for millennia - the universe emerged from a unified whole through a process of differentiation. During the big bang a few different types of matter particles, four fundamental forces, along with space and time splintered off from a single quantum field (Brian Swimme named it the all-nourishing abyss, ancient Hindus imagined it as a sea of milk). The expansion of space cooled the particles, enabling the forces to act as glue to bring them together as individual entities. The march of time allowed the cycles of differentiation, subjectivity, and communion to proceed forward. The unfolding of new layers of wholeness is called evolution.

Particles came together as atoms, which clumped into galaxies, that spawned stars, which made stardust, that formed planets. But this was only half the journey back to wholeness. At least one of the planets called Earth in a galaxy called Milky Way, assembled some of their atoms into living cells, which linked up to make complex organisms.

Eventually a species emerged with potential to give wings to Earth's primal yearning. It was the one that would call itself humans.

4. Call from the Cosmos



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The allure between a part and its whole is mutual. A sea of milk is always ready to absorb its wavelets back. A mother's arms are always open, waiting for her child to walk in. With humans Earth had grown a consciousness capable of recognizing the welcoming gaze of its source. Our ancestors looked up at the night sky and saw the outstretched arms of Milky Way holding Earth in a loose embrace beckoning its latest offshoot to step off the planet. This was the beginning of Earth's journey back to its galaxy (interestingly, galacto in Greek means milk)!

The desire for yonder that was awakened in the human mind did not go unnoticed by the heavens. Stars happily inserted themselves into our imagination as the mythical beasts and battling heroes of our stories. Their wanderings augured impending wars and looming famines. Their rhythms informed farmers on when to plant seed. Their patterns

helped sailors navigate the oceans. And in trying to understand their cycles, we discovered science. Science made possible the technology that eventually disclosed our deeper linkages to the cosmos.

Our telescopes, peering ever further into space, revealed to us the story of our origin. We woke up to the profundity of our connection to the stars and the depth of our belonging to the cosmos. Grandmother universe had labored for 9 billion years to give birth to Mother Earth who labored for another 5 billion to give birth to us. The knowledge of this grand heritage is now propelling us to reach out to our cosmic roots with expanded fervor.

We search the sky with powerful telescopes from Earth and from space. We scan the universe in every color using infrared, ultraviolet, X-ray, gamma ray, microwave, and radio wave detectors. We use gravitational waves to study black holes and neutron stars. The cosmos reciprocates our seeking by dazzling and seducing us with radiant nebulae, brilliant supernovae, star studded galaxies, and monstrous black holes cloaked in mystery. The beauty that we are beholding is none other than our own. It is really our own past we are looking at. Our source entices us onward by illuminating a star laced path through our deep time lineage. *We are heeding a call to reconnect with the place from where we came.*

5. Gems from Webb

Look at the images from the James Webb Telescope, stationed a million miles from Earth, and you cannot escape the feeling of being drawn in. Among the 10,000 galaxies visible in the first deep field view captured by Webb there is one with a time stamp of 180 million years after the bang, a mere 1.3% of our universe's age. Since stars started forming around a 100 million years after the beginning, we may already be looking at the very first stars gestating the very first atoms needed to make life. Webb is pushing our horizon to the first cosmic starlight.



The other Webb images are equally thrilling: Colliding galaxies sparking copious star bursts, pillars of sculpted gas and dust cloaking huge clusters of newborn stars, smoky cocoons around protostars hiding newly formed planets, shells of radiant gas surrounding a never-before-seen double star, a cartwheeling galaxy with shock waves rippling from its center, and exoplanets atmospheres with water vapor and carbon dioxide that could possibly harbor life. This partial list from just the first three months of published Webb images tells us how much more we can look forward to in the years to come.

Webb has already challenged our current theories of galaxy formation. The earliest galaxies revealed in its deep field image are brighter and larger in size than what long-standing and well-established theories of cosmology can accommodate. It is likely that what we are learning from the new observations will compel us to come up with better theories of our origin. Webb will enable us to write new chapters of our cosmic story. That is extremely thrilling for astronomers as well as those who hold the story as sacred scripture for a new spirituality.

6. The Promise of Artemis



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The success of the first Artemis mission that splashed down on Dec 11, 2022, is a huge step in our physical journey to the source. The Artemis program aims to establish our first permanent habitat on the Moon. It is hoped that a moon base would provide a gateway to establish human presence on Mars. The next generation of humans could start to dream of interstellar travel without referring to it as science fiction.

It is not enough for us to know the cosmos with our mind; we need to touch and feel it too. Space travel has been expanding the tangibility of our reach into the cosmos and might one day put us face to face with extra-terrestrial beings. That could herald a whole new level of coming together at an inter-planetary level, with consequences that lie beyond our current imaginations. *Could our planetary community, someday, evolve into a galactic one?*

The Hindu story of creation mentioned in the beginning ends with the gods finally acquiring the elixir of immortality from the sea of milk. The churning stops and the wavelets slowly disappear into the smooth texture of the milky ocean. Continuing expansion of space might lead to a similar ending for our universe with all matter disappearing into the all-nourishing abyss of the quantum field. But that is trillions of years in the future. For now, we need to align with the cosmic flow and stay in tune with our primordial urge pushing us outwards to assemble ever greater wholes. That will require recognizing and overcoming the distractions that are coming in our way of heeding the call of the universe to continue building on our deep time connection to our cosmic roots.