

Earth is a Good Place to Live, Partially Thanks to the Ferns

By Don Lubin

Earth is a good place to live. We don't have a lot of choice at this point, but it is.

We are an ideal distance from our sun. Some call this a "class M" planet, in the "Goldilocks" zone. We have a lot of surface water in liquid form, not all steam or all ice. It covers 71% of the earth's surface. (And a little more every day.)

And yet there remains a lot of solid ground, home to land plants and animals.

Earth is large enough, and dense enough, to provide substantial gravity. The surface water, the land plants and animals, and, crucially, the atmosphere are held down tightly enough. Nothing much heavier than helium is lost to space.

There is a spinning core of molten iron that produces a magnetic field strong enough to deflect the solar wind, or at least to divert it to the poles, where it sparks the aurora. Otherwise, this stream of charged particles could be deadly.

We have an unusually large moon in a stable, nearly circular orbit, which stabilizes the spin axis of the planet. Otherwise, our seasons would be erratic, and polar ice sheets would migrate around the surface.

Large outer planets, especially Jupiter, sweep most of the comets out of our orbit, reducing the risk of catastrophic collisions.

The top of the atmosphere contains sufficient ozone to block most harmful solar ultraviolet rays.

We are lucky. Perhaps that much luck is required for life as we know it to evolve.

And yet, despite all those advantages, earth has suffered five mass extinctions in which more than half of our species died out. (More than 90% for at least one of them.)

Actually, we're having the sixth mass extinction right now. And humans are mostly to blame. Species are going extinct at nearly 500 times the normal rate.

Much of the planet's surface has been cut over or burned and plowed, or paved over and built upon. Some species are transported away from their normal geographic range, but other species that keep them in check in their native ecology do not accompany them, so they multiply and spread out of balance with their new home. Chemicals that are bi-products of industrial processes are dumped into the ground, the water, the air.

Among these chemicals are gases that trap the sun's energy; especially atmospheric carbon dioxide and methane. The average temperature has been rising pretty steadily since the industrial revolution, at an accelerating pace. The oceans are becoming warmer and more acidic, a problem for coral reefs and shellfish.

Life is a tapestry. We are a thread of interconnectivity. If we tear holes, it will tatter and shred, with nothing much left to see.

Sixty six million years ago a meteor or something crashed into earth near the Yucatan Peninsula. The resulting devastation killed off the last of the dinosaurs along with most of everything else. No flowering plants survived here. But fern spores, persisting or blown in, did manage to rebuild the soil and atmosphere and eventually a thriving ecology. When Mt. St. Helens in Washington State exploded, most life was killed in a few hundred square miles. But, again, a "fern spike" was seen in which in-blown spores recreated a stable flora.

Ferns and related plants have created life on land as we know it, at least three times. If humans don't clean up their act, ferns may have to reboot life on earth again. ■



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