

Life from the Oceans – An Advent sermon

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UCV

On this first Sunday of the Advent season, we are going down, as enjoined by our reading, “going down into the wave’s trough” and then “ride her swell until we can see beyond” to find ourselves. And where better to look than at the beginning, at the advent of all advents, that is the rise of organic life on this earth of ours? It’s difficult to imagine our planet without the tenaciousness and omnipresence of life. Wander a few meters away from a fresh lava field extruded by violent eruptions from the earth’s body and we’ll find spiders making their homes in crevices of barely cooled rock. In Antarctica, midge larvae dine on blooms of algae and race through their life cycle before the shallow pools of summer water in which they teem return to ice. In “odious sumps filled with crank case oil that lie beneath decrepit services stations” bacteria and even insects thrive. While 2500 meters below the ocean’s surface, great colonies of tube worms clustered at the mouths hydrothermal vents in water superheated to 300 degrees centigrade feed on bacteria that in turn feed on hydrogen sulfide—all thriving in an environment we would think unimaginably hostile to life. Absolute darkness, no oxygen, and bone crushing, steel smashing pressure.

Indeed, “life as we know it is assertive, demanding, and unstoppable”—driven by a compelling, evolutionary impulse that selectively carries life on from simple origins to greater and greater complexity and extensiveness in the living world over immense stretches of time. Though buried beyond the edge of oblivion, more than 4 billion years ago, life on this planet had a beginning. And this morning, we’re going in search for it in celebration of the advent season upon which we are beginning to embark. (on origins and examples, see Christopher Wills and Jeffrey Bada, *The Spark of Life: Darwin and the Primeval Soup*, Perseus Publishing, Cambridge, Mass., 2000, xi-xx, 96-8)

In the meditation I shared with you today, Thomas Berry, asserted that it’s all a question of story, and that we are “in between stories.” On the one hand we have mythic tales: poetic and compelling accounts of how the world came to be and how we fit into it. In the Babylonian creation story, a pantheon of gods quarrel amongst themselves before time began. An arrow shot from Marduk’s bow split the body of his grandmother Tiamut into two halves, creating the heavens and the earth. The Vedas and Upanishads present contradictory views about origins, crediting creation to the dynamic activity of Indra, to the self-sacrifice of Parusha, or suggesting that the source is “enclosed in nothing” and that no being can plumb its depths. I could go on at length and describe Western creation myths we still carry around cognitively and emotionally...and what to do with them, we barely know.

But for all of their beauty---their mysterious and spirit-filled grandeur issue forth from antiquated cosmologies that carry us far away from the stunning, awesome, evolving material complexity of the universe from which life has arisen and into which it ushers forth in reality. Myths abound in our world. I would not banish them. And yet, and yet...at the threshold of the 21 st century, far too many in the human family believe them to be literally true. Credulity flourishes. Walls rise up between the realms of science and faith and between neighbours and cultures. Semi-literates like myself wander about overwhelmed and benumbed by the sheer quantity of information churned out by the sciences. And still I yearn for reverent, and thoughtful communion with our ever-evolving cosmos. What I want is a bridge. A new story. One that I can learn and pass on to my children and grandchildren. I don’t want a “diminished sense of the sacred.” And I’ve found my way into this tradition of ours, in part, in order to freely participate with you to meaningfully “incorporate scientific discovery into the framework of spirituality and religious worship.” (Chet Raymo, *Skeptics and True Believers*, 164)

The moon that shone brilliantly and full last Thursday night and that coursed aloft through the star strewn, clear skies after days of rain and gloom reminded me of how I stood in this pulpit one year ago almost to the day to preach us into a new story. One celebrating the growing consensus emerging among those who have the wherewithal to speak both the language of science and myth. It is an epic tale of the coming into being of a self-transcending, self-realising, ever evolving cosmos within which we have emerged into consciousness and communion. That is the primordial intention of our unfolding universe. From simplicity and homogeneity to complexity and variety. From the brooding muteness of the void to extensive, expressive light, life and consciousness. And who would dream or strive to escape from such mystery, from that intimately interdependent creative process we call our home?

That day, one year ago, we walked with our mind's eye through a brief advent story. A tale of potentiality, birth, and new life. Of how 4.5 billion years ago our recently formed planet was seemingly toxic to the possibility of any life forms. Enveloped in noxious gases and seething with molten rock across its expanse, it wobbled in ungainly orbit around the sun. Until one day, in a cataclysmic event, an object the size of Mars crashed into the earth and wrenched from its body enough debris to form a companion sphere, the moon. At 1/4 th the diameter of its parent, that infant sphere was far larger than other moons in our system in relation to their companion planets. What a difference it made! For without this child's steadying influence, its steadfast circling around us, our earth would have wobbled on its axis like a dying top. And life as we know it, and we, would never have been. The moon's faithful gravitational pull keeps our earth spinning at the just the right speed and angle to provide the stability necessary for the long and successful development of life. (Bryson, *A Short History of Nearly Everything*, 39, 249)

And so there we spin, we and our companion moon, in a billions' year embrace. No life without the pain of birth. No growth without differentiation and distance. No being without communion. And we sail at arm's length, pulling, tugging, embracing each other in the great whirling dance of the unfolding cosmos.

Let's return to the epoch after that fateful collision and to the long ungainly birth of life from the chemically chaotic waters of the earth's ocean womb to the sorting out and creation of the building blocks of those elements essential for the ascent of existence and being. First, to set the stage, sorry, got to take a step back: to be sure, serious, wonderful debate currently rages in the scientific community over nailing down the precise scenario, timing, cast of pre-biological characters, and catalyzing forces that ignited the spark of life and fanned it into blooming conflagration. Bio-chemists, geneticists, and geo-physicists are racing in labs throughout the world to get this story straight, just as the builders of the Canadian Pacific, Canadian Northern, National and Grand Trunk Railways raced to lay tracks, link and thus coherently bind this far-flung nation together.

It's only been fifty years since Stanley Miller, a twenty three year old University of Chicago grad student, synthesized biological compounds after sending repeated electric sparks through a sealed flask containing a mixture of methane, ammonia, hydrogen and water vapour. By doing this, he plausibly suggested that "life" could have arisen from the severe conditions that prevailed on our infant planet. Building from this modest beginning, scientists are refining, testing, and advancing hypotheses, that they believe will yield a consensus theory of life's origins on earth within a decade or two. A "New Advent Story" as strong, rich, and aesthetically compelling as "The Big Bang" or the "Interdependent Web of Existence." (see Carl Zimmer, "What Came before DNA?", in *Discover*, June 2004, 34-41, and Wills and Bada, 40-58, and chs. 3&5)

NOW, let's go back 4plus billion years. The surface of the earth began to cool down after having been superheated for millions of years. Heated by innumerable asteroid and meteor impacts and the decay of radioactive elements deep within its interior. That heat had released water vapour sealed in

hydrated stone that formed the earth's crust. An atmosphere dense with water and chemical vapour hung in thick veils above the earth. And as that vapour condensed, it fell earthward and mingled with elements on the earth's surface and the waters flowing from primeval rivers to fill great basins and rifts between 4.2 and 3.6 billion years ago—and thus forming our first earth-spanning oceans. Oceans, not at all like those that circle the earth today and filled with complex organic life, we're talking about a primordial soup here, a thick, toxic brew of water, ammonia, formaldehyde, methane and hydrogen cyanide.

Now if you say "oceans," I think of beaches. And if I think of beaches, and I want to take a walk along the shore. There's our beach! (indicate "beach scroll" on the back wall) Would you join me for a stroll? But remember this is 4 billion years ago and we're entering a toxic, dangerous and utterly alien place. In order not to perish instantly, we have to don space suits, for there is no oxygen in the atmosphere. And the suits must be Teflon coated, because gases like hydrogen sulfide and vapours like sulphuric and hydrochloric acids fill the air and would certainly strike us dead very quickly by "eating through any protective suit made of ordinary material."

We can hardly make out our surroundings at all—the atmosphere is so smoggy that little or no light can penetrate the gloom even at high noon. Lightning flashes give us but brief lurid glimpses of the shoreline and the murky waters beyond. A vast ocean, covered by lumps of oily material, stretches away and out into the darkness. ("Waves" rise and fall on the "beach" with the following sentences) Great waves crash on boundless shores, waves "built up unimpeded to awesome size as they cross the vast stretches of ocean that girdle the planet. As they break, strong winds whip the sea up into a roiling mass of foam. While gusts of rain slash across the landscape. Winds and tide together have created the huge, sandy inter-tidal zone" across which we are walking. As we look more closely, we see "that the rocks and sands are encrusted with glistening layers of organic material of many colours that have been thrown up by the winds and tides." (Williams&Bada, 107-8) Those layers hardly have time to dry out before the next colossal tide sweeps back up the beach. ("waves" cease)

The tides are crucial—for they were the most important life-creating force acting on this world of 4 billion years ago. They were truly spectacular in size and formidable in their power. Remember that moon recently wrenched away from its parent planet? It was not the small slivery orb I saw in the heavens Thursday and again last night. At the time of its formation, it orbited a mere 25, 000 kms away, not at its present 400, 000! It was fifteen times as close to the earth as it is today, extended across a 20 th of the sky, and hurtled from east to west at great speed. (W&B, 70-1) Indeed, its coursing in the skies above was such a close shave, that the earth's crust rose and heaved an astonishing 60 meters each time the moon passed by.

The tides are key to our story because they have occurred twice a day for eons and once possessed enormous power to filter and sort out matter each time they swept up over the sands of the beaches of the earth. Remember! The oceans were a prebiotic soup, rich with the chemical building blocks of life. But how, and this has been the key question, how could "life" have arisen from a necessarily diluted, disorganised and inert state of a rich, but totally random chemical stew? Something had to sort out, concentrate and line up these building blocks in order for fruitful chemical interaction and reproduction to take place. Religious mythologies have told their stories for millennia. We're telling a new one today.

(wave action resumes) The answer is probably there, back on our beach, eons ago. Even a mountain desert man like me can see that on any beach, tides sort out matter. Look at the sands and you see lines of mussels shells, wood chips and leaves, ribbons of finer and coarser sand. A beach--powered by tides sweeping across it every day—filters, sorts and lines up matter. "It sorts molecules according to size and weight in a highly efficient manner." Our ancient beaches acted like great laboratories producing "a constantly sifted chemical array. When they reached certain levels in the sand, organic

chemicals would become concentrated"--like with like. Tides would remove some and fix others into an organic "chemical community": a community in the sands "constantly growing and changing, increasing in thickness and complexity." Until at some point, here and there across the globe, these chemical families acquired definite structures and the capacity for replication shaped by tidal action that ushered in the transition to a habitable world. (these quotes on the importance of tides taken from: Tim Flannery, "In the Primordial Soup," New York Review of Books, November 2, 2000, 56-7)

After our parent earth coalesced from matter seeded with latent life from exploding stars, from her flesh a child moon sprang forth and circled aloft. Lightening sparked in the gloom. Waters fell from the sky and blended with those rising from below forming the oceans, a vast chemical brew. Globe spanning seas rose and fell each day. Earth and waves heaved beneath the passing moon, a formidable sight. And there, long before we walked the earth, there, where sands, tide, time, and chance met life stepped forth from chemical arrays that festooned the beaches of the earth with ribbons of matter. From flotsam and jetsam. From the seas' stewy froth life bloomed and then raced away up twisting ladders into ever more complexity and down the corridors of time.

My story's told. It is a tale I find evocative of the wonder and numinous glory of our world, and what's more: it's on full display beneath our feet every time we walk along the sand. May we find a lesson here! And begin to put the adventure back into Advent. To teach each other and our children the extraordinary story of the natural world only a beach away. Doing this will foster neither credulity nor mere mental calculation. Rather we will rediscover with reverence and relish our true place in this vast world of time and space.