A functional cosmology for the crisis of the Anthropocene
Caroline Smith

Abstract
As our world enters the human-induced Anthropocene epoch, we are faced with crises on a scale never witnessed before by humanity. Our desire for material goods through continued economic growth, exacerbated by an increasingly global neoliberal worldview, is fundamentally unsustainable and is wreaking devastation on Earth. A number of thinkers posit that we are in need of an ecospiritual relationship with Earth, while the great Catholic Geologian Thomas Berry believes that nothing less than framing a new story of our relationship with the universe itself is able to change our course into the future. Berry and others provide profound insights into understanding our situation, and offer a way forward through the conceptualising of a functional cosmology for our times through the appreciation of three moments of grace.

Key Words Anthropocene, sustainability, ecospirituality, functional cosmology,

The Anthropocene - an existential crisis

> "Without the soaring birds, the great forests, the sounds and coloration of the insects, the free-flowing streams, the flowering fields, the sight of the clouds by day and the stars at night, we become impoverished in all that makes us human"[1].

It is clear that the world is facing a tsunami of severe crises on a series of fronts. One of the most critical is the catastrophic climatic and environmental degradation that is now posing an existential threat to the future of humanity and the more-than-human world[2]. Earth[3] is indisputably in the midst of a global ecological crisis as the human species enters the Anthropocene, radically altering the conditions of Earth's great ecosystems, unravelling the web of life itself and presiding over the sixth great extinction of life[4].

Much of humanity is left bewildered, confused and fearful as the old certainties fall away. The future looks increasingly dark as we seem locked in a cascading planetary phase shift. These crises are emerging with the onset of the geological epoch known as the Anthropocene. Scientists now agree that Earth has left the relatively stable Holocene period and entered a new geological epoch where the impact of human actions has radically altered the biophysical systems of the planet. As Zalasiewicz et al. put it, natural and human forces have "become intertwined, so that the fate of one determines the fate of the other"[5].

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[1] Berry, T. *The dream of the earth*. San Francisco: Sierra Club. 1990.

[2] This term was first used by David Abram in his book "*The spell of the sensuous: Perception and language in a more-than-human world*" 1997, as a way of referring to Nature as greater than and encompassing humanity.

[3]The terms 'Nature' and 'Earth' are capitalised throughout to reflect their centrality and importance in considering a functional cosmology.

[4] Glikson, A. *The atmosphere and mass extinctions through time*. Paper delivered at the conference Imagining the real: Life on a greenhouse earth. Canberra: Manning Clark House, Australian National University, June, 2008.

McDonagh, S. *The death of life: the horror of extinction*. Dublin: The Columba Press. 2004.

[5] Zalasiewicz, J. et al. The new world of the Anthropocene. *Environmental Science and Technology*, 44(7), 2228–2231. 2010.

There is much debate over when the Anthropocene actually started. Some commentators argue that it was initiated by the increased burning of fossil fuels during the period of the Industrial Revolution**,** which saw increased carbon dioxide levels in the atmosphere, a major cause of climate change. Others**,** e.g. Turney et al.[6] identify the onset of the Anthropocene epoch as around 1965, coinciding with the 'great acceleration'[7] of resource and energy use and population increase after World War 2, mediated by accelerating advances in science, technology and medicine. To make matters worse, since the 1970s, the world has seen the further sharpening of modernity into the economic and political framing of neoliberalism. In this worldview, values such as consumption, efficiency, winning, freedom, productivity, competitiveness, risk taking and power over others through the mechanisms of a free market are the hallmarks of progress and success in late stage capitalism[8] in its rapacious global stage. Neoliberalism is now so entrenched globally that for many, it is almost impossible to envision a different world[9]. It has become, as George Monbiot puts it, "the prevailing common sense."[10] In its vision, as Bauman argues, growth is constructed as the central good, the organising goal and value that drives ethics and morality[11].

Writer and environmentalist Bill McKibben[12] now uses the term 'Eaarth' to indicate how profoundly Earth has changed. For McKibben, "Our old familiar globe is suddenly melting, drying, flooding and burning in ways that no human ever has seen. We've created, in very short order, a new planet, still recognizable but fundamentally different. We may as well call it Eaarth." (par 1).

Many of the changes to Earth's systems that characterise the Anthropocene are geologically long-lasting and irreversible in the short term, and a number of the biophysical boundaries that need to be maintained for sustainable planetary futures have already been breached. These include biochemical overflows into the environment through agriculture; dangerously low levels of genetic, species and ecosystem biodiversity (and hence reduced resilience) especially in food cropping systems; acceleration in the rates of soil erosion and sedimentation[13]; large-scale chemical perturbations in the carbon, nitrogen and phosphorus cycles (Galloway and Schlesinger[14]); significant disruption of the global climate; sea level

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[6] Turney et al. Global Peak in Atmospheric radiocarbon provides a potential definition for the onset of the Anthropocene epoch in 1965. *Scientific Reports* vol.8. DOI:10.1038/s41598-018-20970-5. 2018.

[7] Steffen et al. The trajectory of the Anthropocene: The great acceleration. *The Anthropocene Review 2*(1) 81–98. DOI: 10.1177/2053019614564785 anr.sagepub.com. 2015.

[8] Mandel, E. *Late capitalism*. London: Humanities Press. 1975.

[9] Smith, C. Education and society: The case for ecoliteracy. *Education and Society*, 25(1), 25-37. 2007.
Smith, C., & Watson, J. STEM and Education for Sustainability (EfS): Finding common ground for a flourishing future. In M. Baguley (Ed.), Proceedings of the Annual Conference of the Australian Association for Educational Research. Melbourne: AARE. http://www.aare.edu.au/data/2016_Conference/Full_papers/547_Caroline_Smith.pdf. 2016.

[10] Monbiot, G. Out of the wreckage – a new politics for an age of crisis. *The Gaia Foundation*. https://www.youtube.com/watch?v=uE63Y7srr_Y. 2017.

[11] Bauman, Z. *Postmodern ethics* (Vol. 195). Oxford: Blackwell. 1993.
Bauman, Z. *Life in fragments: Essays in postmodern morality*. New York: Wiley. 1995.

[12] McKibben, B. *Eaarth. Making a life on a tough new planet.* New York: Times Books/Henry Holt & Company. 2010.

[13] Nearing, M.A., Yun, X., Baoyuan, L., & Yu, Y. Natural and anthropogenic rates of soil erosion. *International Soil and Water Conservation Research*, 5(2), 77-84. 2017.

[14] Galloway J.N., & Schlesinger, W.H. *Biogeochemical cycles.* Washington, DC: National Climate Assessment. US Global Change Research Program. https://nca2014.globalchange.gov/report/sectors/biogeochemical-cycles. 2014

rise and ocean acidification (IPCC[15], 2014), as well as unprecedented levels of alien species invasions[16] and land clearing leading to biodiversity decline across the planet. Changes in land systems and accelerated climate change are an increasing risk, but there may still be a chance for reversal if appropriate steps are taken[17].

Clearly, science and technology have given some sections of humanity high standards of living and other benefits, particularly those living in the global North. Few would want to return to widespread poverty and lack of access to education, shelter and health care. However, the looming ecological crisis suggests that this may well become the case for everyone if urgent steps are not taken to repair the damage and seriously engage in a global transition to a sustainable future. The transition to sustainability will clearly need to include of appropriate uses of science and technology, but at the same time rejecting those that impact on the ability for life to flourish[18].

It is indeed ironic that, at the very moment we recognise the onset of the Anthropocene, we seem to have lost any coherent sense of what it means for humans to live within the ecological limits of the planet. Further, we have also lost a sense of our relationship with the more-than-human world[19]. Stein goes as far as believing that humanity is now not capable of fully understanding its place in the biosphere. As he puts it, "our identity crisis is coinciding with the climax of the Anthropocene", and that "it appears the Earth is in our hands, and we are not prepared for the responsibility." (par 3)[20]

In identifying the Anthropocene, we are now recognising that the worldview that has spawned it is built on shaky foundations. We are seeing a reduction of both optimal individual and collective wellbeing as well as the capacity for life-giving ecosystems to flourish. Eckersley argues that there is a clear trend towards decreasing individual wellbeing, noting that each generation experiences increased negative stress levels so that cumulative stress levels are increasing[21]. Modern Western culture is increasingly failing to meet the basic requirements expected of any culture, that is, to provide a sense of meaning, belonging and purpose through a sense of personal identity, worth and security; a measure of confidence or certainty about what the future holds and a framework of moral values to guide their conduct[22].

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[15] Intergovernmental Panel on Climate Change (IPCC). Climate change 2014: Synthesis report. Contribution of working groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. Geneva: Author. http://www.ipcc.ch/report/ar5/syr. 2014.

[16] This is somewhat ironic given that the biggest invading species is *Homo sapiens!*

[17] Regan, E. et al. Global threats from invasive alien species in the twenty-first century and national response capacities. *Nature Communications, 7,* Article number 12485. http://dx.doi.org/10.1038/ncomms12485. 2016.

[18] Smith, C. & Watson, J. STEM: Silver bullet for a viable future or just more flatland? *Journal of Futures Studies.* In Press.

[19] Morton, T. *Hyperobjects: Philosophy and ecology after the end of the world*. Minneapolis, MN: University of Minnesota Press. 2013.

[20] Stein, Z. *Education in the Anthropocene: Re-imagining schools in the midst of planetary transformation.* http://www.zakstein.org/education-in-the-anthropocene-re-imagining-schools-in-the-midst-of-planetary-transformation/. 2016.

[21] Eckersley, R. M. *Is the West really the best? Modernisation and the psychosocial dynamics of human progress and development,* Oxford: Oxford Development Studies. 2016.

[22] Eckersley, R. The challenge of post-materialism. *Australian Financial Review*, 24-28, March, 2005.
Krabbe, R. *Fostering social norms for sustainability: A comparison of two socioeconomic initiatives* Unpublished Thesis, University of Tasmania. 2016.

Many would leave the story here, lamenting the end of certainty and replacing it with a sense of ennui and hopelessness in the face of our multiple challenges in a dystopian future. Others see the opportunity afforded by the crisis of the Anthropocene to accelerate into a hyper-technical future, where a brave new world can be built on the foundations of the smart new technologies of artificial machine intelligence, robotics and quantum computing. For example, the concept of "Ecomodernism" advanced by the Breakthrough Institute claims that "a good Anthropocene demands that humans use their growing social, economic, and technological powers to make life better for people, stabilise the climate, and protect the natural world" [23]. While such hi-tech solutions appear attractive, critics believe this approach will alienate humans further from Nature[24]. Still others argue for a back-to-basics localism, where collectivism, cooperation and frugal living become the norm to reduce the human footprint on the environment, and to rekindle our sense of community[25].

These responses may not be enough to give us the deep sense of belonging that materialism has stripped away. In spite of our situation, questioning and yearning for meaning, connection and belonging are deeply spiritual human needs which even in the face of hyper-materialism, have not quite disappeared. Ecopsychologists Roszak, Gomes and Kanner contend that an empathetic orientation towards Nature is something humans are born with, and form the ground for the emergence of an ecospirituality[26]. This orientation explains why Nature is a common trigger for peak, inspirational insight experiences, and for many, an essential and absorbing part of childhood. Is it coincidence that Jesus went to the wilderness for deep contemplation? The healing power of the more-than-human is well known, such as the role of gardens and animals in speeding recovery rates in hospital. Recent research from groups such as the Scandinavian Forest Schools Initiative is now confirming what many educators have long believed – that positive experiences in Nature enhance human flourishing through physical, intellectual, psychological, social, emotional, moral and aesthetic development as well as providing spiritual nourishment and a sense of meaning, connectedness and belonging. Connection to Nature through outdoor play and communal activities enhances community values, deepens and strengthens relationships and provides stronger support networks. These same values and benefits are experienced in families if parents and children take the time to foster their connections through shared play and engagement with Nature.

The great Catholic Geologian Thomas Berry whose contribution is discussed below, puts it thus:

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[23] Asafu-Adjaye, J. et al. *An Ecomodernist manifesto.* Oaklands, CA: Breakthrough Institute. http://www.ecomodernism.org/manifesto-english/. 2015

[24] Hamilton, C. *The technofix is in: A critique of "An Ecomodernist Manifesto."* [Latest news] *Earth Island Journal*. http://clivehamilton.com/the-technofix-is-in-a-critique-of-an-ecomodernist-manifesto/ April 21, 2015.

[25] Holmgren, D. *RetroSuburbia: The downshifter's guide to a resilient future*. Hepburn, Aus: Melliodora. 2018.
Krabbe, *ibid*
Trainer, T. The Simpler Way perspective. http://www.resilience.org/wp-content/uploads/articles/General/2016/07_July/Sustainability%20The%20Simpler%20Way%20Perspective.pdf. 2016.

[26] Roszak, T., Gomes, M.E. & Kanner, A.D. *Ecopsychology*. San Francisco: Sierra Club Books. 1995.

> "We have an absolute need of the natural world for activation of our inner world … For it is from the stars, the planets and the moon in the heavens as well as from the flowers and birds and forests and woodland creatures of Earth that some of the more profound inner experiences take place in children." [27]

It becomes clear that deep, urgent and critical questions must be asked about the relationship between humanity and the natural world if there is any hope of reversing decline and forging a flourishing future. For Malafouris, our salvation lies in nothing less than the decentering of the sovereign human subject, in other words, a shift from anthropocentricism toward a more inclusive eco-centrism where the more-than-human-world that is our ultimate life support system is taken account of and nurtured rather than destroyed.[28]

How did we get here? I-It: The domination of Nature

As Morton suggests, without any clear point of reference between Nature and culture we lose the concept of our 'world', which for most people is that familiar, comfortable and predictable place where the questions of the present were able to be answered by the solutions of the past, sculpting our values and our history[29].

While it is clear that most humans have a long history of some exploitation of Nature for sustenance reasons (e.g. Diamond[30]), the pre-rational organic worldview and still the dominant worldview of many indigenous peoples today, was mediated as Martin Buber's I-Thou[31], a participatory ecological consciousness where Nature was sacred, humans and the other-than-human world were kin, and identity was found through active relationships with the land[32]. Buber himself talks of relating to Nature as I-Thou when he says, "but it can also happen, if will and grace are joined, that as I contemplate the tree I am drawn into a relation, and the tree ceases to be an It"[33]. Humans participated directly in the natural world; it was their spiritual source of knowledge, law and wisdom as well as sustenance and healing. It was, in Thomas Berry's words, "our native place".[34]

For the people of the West, this world began to unravel as the upheaval of the Enlightenment took hold, beginning in the 17th century. Now, accelerated by a powerful science and technology, the dominant worldview is one of increasingly materialistic and individualistic notions of desire, success and progress tied to continued economic growth. In order for this to succeed, catastrophic and accelerating exploitation of Nature needed to take place, which exacerbated the disconnection of humans from Nature. In this world, Nature has merely become the backdrop that provides for human needs and desires. As Berry observes:

> *"*We can break the mountains apart; we can drain the rivers and flood the valleys. We can turn the most luxuriant forests into throw-away paper products. We can tear apart the great grass cover of the western plains and pour toxic chemicals into the soil and

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[27] Berry 1990 *ibid*

[28] Malafouris, L. *How things shape the mind: A theory of material engagement.* Cambridge, MA: The MIT Press. 2013.

[29] Morton, T. *Hyperobjects: Philosophy and ecology after the end of the world.* Minneapolis, MN: University of Minnesota Press. 2013.

[30] Diamond, J. Collapse: How societies choose to fail or succeed. New York: Viking Press. 2005.

[31] Swanson, J. I-It vs. I-Thou Relationships. http://www.ecopsychology.org/journal/gatherings7/Treesjnhf.htm. 2008.

[32] Broomfield, J. *Other ways of knowing*. Vermont: Inner Traditions. 1997.

[33] Swanson ibid.

[34] Berry 1990 ibid.

> pesticides onto the fields until the soil is dead and blows away in the wind. We can pollute the air with acids, the rivers with sewage, the seas with oil - all this in a kind of intoxication with our power for devastation at an order of magnitude beyond all reckoning."[35]

For the people of the Western world, the past 300 years of the Enlightenment brought about a profound shift in worldview. This now clear understanding of the magnitude of the disruptions to natural ecosystems is recasting recent centuries of 'progress and advancement' as a consumer-obsessed world increasingly devoid of spirit. Human meaning, belief and action are no longer located in the cornerstone of a coherent view of the world that was available to previous eras. This is the legacy of the dualism of the philosopher Descartes (in his *Discourse on Method,* 1631), the radical idea (at that time) that mind and body are mutually exclusive. Mind became associated with the rational, with the very essence of being ('*cogito ergo sum*'). Zimmerman[36] argues that "Descartes' quest for absolutely clear and certain truths" arose from the high degree of uncertainty and insecurity of the times, as Europe emerged from another of its devastating plagues. The plague's awful and lingering legacy was that the physical body became associated with the seeming irrationality of Nature, which was required to be conquered. Such thinking gave permission for Nature to become 'disenchanted', in other words, no longer hold any spiritual significance. The way was cleared for Nature to be disconnected, to be seen merely as a resource rather than intimately connected with humanity.

This same impetus drove Francis Bacon (1571-1626) to develop the analytical/reductionist scientific method. Bacon determined that pervasive and rational methods needed to be applied to Nature to begin the understandings of how it might be controlled and manipulated. This was a radical, violent and reductionist recasting of humanity's relationship with Nature from I-Thou to the either-or dualism of I-It. Sheldrake quotes Bacon's approach to Nature which was to be:

> "bound into service' and made a 'slave'… she would be 'dissected', and by the mechanical arts and the hand of man, she could be 'forced out of her natural state and squeezed and moulded', so that 'human knowledge and human power meet as one."[37]

Descartes' powerful dualism coupled with Francis Bacon's development of the reductionist scientific method, later supported by Newton's determination of the mathematical basis of physical phenomena such as gravity (1666) and Kant's philosophy of reason (1788) among others, challenged the very worldview and mythical ground of pre-modern humanity. They provided the underpinning of the shift from an enchanted Nature to the powerful reductionist, mechanistic and deterministic worldview that has become the dominant epistemology for the last 300 years. Gradually, and with many detractors and critics, the rise of a scientific rationality, untempered by a spiritual dimension, has imposed the most profound impact on the world, leading directly to the development of the technologies and mindsets that have enabled massive exploitation of the world's ecosystems. This modernist metanarrative of the rise of human progress through the domination and exploitation of Nature by means of science and

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[35] Berry 1990 ibid.

[36] Zimmerman, M.E. *Contesting earth's future: Radical ecology and postmodernity.* Berkeley: University of California Press. 1994.

[37] Sheldrake, R. *The rebirth of nature*. London: Rider. 1990.

technology, remains the dominant worldview that has birthed the onset of the Anthropocene even as humanity enters the 21st century[38].

A number of writers have linked the impoverishment of Earth's ecosystems and the desacralisation of Nature to a concurrent impoverishment of the inner world of the human spirit. Humanity is of Earth, so Earth's decline becomes ours. Al Gore puts it thus in his lament: "the more deeply I search for the roots of the global environmental crisis, the more I am convinced that it is an outer manifestation of an inner crisis that is … spiritual".[39] Integral Theorist Ken Wilber argues that something has been profoundly lost in the process of objectification through the ascendancy of base materialism. Wilber calls our era 'Flatland', devoid of enchantment, interior depth and spirit.[40] In O'Sullivan's view, "the story of the modern epic … will be a story of progressive *disenchantment* from the natural world and all that this entails" [41] (author's italics). Or as the British philosopher Stephen Toulmin sees it, there is a loss of the view of the whole[42]. For Thomas Berry, the insights gained by delving into the natural world through the tools and procedures of reductionist science has led to a kind of autism, where humanity is no longer enchanted by Nature's magic. Indeed, the very idea of magic or enchantment belongs to a mediaeval age, of unenlightenment, of irrationality. As Berry poignantly tells us, the only interpretation of recent Western history now left is one of irony, where "our supposed progress towards an ever improving human situation is bringing us to wasteworld instead of wonderworld".[43] The splendour of Nature has been killed, replaced by instrumental utilitarianism. In Slaughter's summary, the legacy of the Enlightenment as the metaproblem of our time; a world characterised by the principles of the dominance of instrumental rationality, reductionism and the loss of the transcendent, the use of science and technology for irrational ends and the desacralisation or disenchantment of Nature.[44]

Nature and Christianity

The exploitation of the natural world for human ends, writ large through the Enlightenment period, has itself deeper underpinnings in the Abrahamic religious traditions. One dimension of this is that the divine is characterised by transcendence rather than immanence. Long argues that Abrahamic creation stories firmly place 'Man' at the centre of creation. Earth has received the created order from God that culminates in the emergence of the human, thus ending the creative process[45]. Within Christianity, the key I-Thou relationship is between the human and the divine, and, with some notable exceptions such as in the writings of Thomas

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[38] Smith, C. *Reconnecting with Earth: Ecospirituality as the missing dimension in spirituality and sustainability education*. Ch. 34. In M. de Souza et al. (eds). *International Handbook of Education for Spirituality, Care and Wellbeing*. 2 volumes. Dordrecht, The Netherlands: Springer Academic Publishers. 2010.

Smith, C., & Watson, J. STEM and Education for Sustainability (EfS): Finding common ground for a flourishing future. In M. Baguley (Ed.), Proceedings of the Annual Conference of the Australian Association for Educational Research. Melbourne: AARE. http://www.aare.edu.au/data/2016_Conference/Full_papers/547_Caroline_Smith.pdf. 2016.

[39] Gore, A. *An inconvenient truth*. New York: Rodale Books. 2016.

[40] Wilber, K. *A brief history of everything*. Boston & London: Shambhala. 1996.

[41] O'Sullivan, E. *Transformative learning: Educational Vision for the 21st century*. London: Zed Books. 2001.

[42] Toulmin, S. *The return to cosmology: Postmodern science and the theology of nature*. Berkeley CA: University of California press. 1985.

[43] Berry 1990.

[44] Slaughter, R. Mapping the infinite. *Futures*, 28 (8) 793-797. 1996.

[45] Long, P. *Re-awakening our connectedness: An earth-based spirituality for young people*. St. Thomas University, Miami, Florida. 1997.

Aquinas and Hildegard of Bingen, is profoundly anthropocentric and patriarchal. The duty of the human is to populate, subdue and conquer Earth. It is as if the material world of Nature, of the universe, is somehow part of humanity's earthly burden, only able to be transcended to Paradise at the end of the earthly journey, that is, through death. For Long, Paradise is outside of the earthly, material sphere. God is outside creation and the natural and divine are separated in different spheres.

This privileging of the human and the seeking for perfection through transcendence rests on a profound human/rest-of-creation dualism, and remains a foundational tenet of the Abrahamic religions. The other-than-human world i.e. Nature, is relegated to the instrumental, the backdrop that provides for human needs, but which is not sacred in its own right nor possesses any inherent rights. Descartes' philosophy of body/mind is entirely consistent with this view; indeed he notoriously declared animals to be no more than machines, possessed of no sentient feeling.

This I-It perspective was taken to task by the American historian Lynn White Jr in his famous address to the 1966 American Association for the Advancement of Science. There, White put the view that Christianity was uniquely responsible for the environmental crisis:

> "Christianity in absolute contrast to ancient paganism and Asia's religions (except, perhaps, Zorastrianism), not only established a dualism of man and Nature but also insisted that it is God's will that man exploit Nature for his proper ends … By destroying pagan animism, Christianity made it possible to exploit Nature in a mood of indifference to the feelings of natural objects."[46]

White's view has received some criticism and challenge (see for example Minteer and Manning[47]). However, his work remains important in that it foregrounded the debate about the relationship between science, religion, Nature and spirituality, and paved the way for the reworking of the I-Thou relationship with Nature within the Abrahamic religions and beyond, through the evolution of a post-Enlightenment ecospirituality.

Towards a new ecospirituality

As a relatively new perspective, ecospirituality is subject to many and various interpretations, and challenges. Some conservative Christians such as are deeply suspicious of ecospirituality, seeing it as a post-Christian heresy; a threat to traditional theocentric and anthropocentric understandings of the created order (see for example Sirico[48]). However deep debate continues about the position of humans in the scheme of things. For example, the eco-centric field of deep ecology sees humanity as but one species in the great web of life, no more important than a flea or a blade of grass. For deep ecologists, 'Spirit' resides in all aspects of the universe. In contrast, the anthropocentric Abrahamic religions see humanity as a special species of a God that was created in His image and, for Christians, who chose to be reincarnated in the human form.

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[46] White, L. Jr. The historical roots of our ecological crisis. *Science* 155, 1203-1207. 1967.

[47] Minteer, B. A., & Manning, R. E. An appraisal of the critique of anthropocentrism and three lesser known themes in Lynn White's "The Historical Roots of our Ecologic Crisis". *Organization & Environment, 8*, (2), 163-176. 2005.

[48] Sirico, R. A. *The new spirituality*. Acton Institute. http://www.acton.org/ppolicy/environment/ppolicy_environment_spirituality_index.php. 1997.

For others, including agnostics and some atheists, recasting humanity's relationship with Nature as a spiritual one brings a sense of renewal, an awakening as if from a dysfunctional slumber, a coming home, of a deep belonging and sense of meaning. Nature is re-enchanted, resacralised. Long[49] believes that this re-interpretation is both new and ancient, and may indeed mark the dawn of a post-religious phase. New, because it is post-Enlightenment, drawing on insights from rationalist modern cosmology and ecology which enable a new synthesis; and ancient, because it is pre- the monotheistic religions, harking back to the beginnings of humanity's evolution. As the Irish Ecotheologian Diarmid O'Murchu observes,

> "Our spiritual identity is inescapable … Religion is one aspect of our spiritual unfolding, but only one. Our spiritual evolution as a species took place for at least 70,000 years without formal religion and there are many indications that we are, once more, evolving spiritually into a nonreligious ambience."[50]

Even as some Christians see ecospirituality as heretical, others are increasingly embracing the need for reconciliation between Nature, science and God (see for example the work of the EarthSong project[51], Diarmid O'Murchu[48], Dennis Edwards[52], Evelyn Tucker[53], Miriam McGillis[54] and Berry himself. Edwards argues that from the Christian perspective, since humanity is made in the image and likeness of God, humans are mandated to act as God would act, that is, not to harm any part of the universe. Nature is God's creation and humans are to be its stewards. Tucker believes that religions have the power to transform themselves to take account of the global ecological crisis. Key avenues for these discussions have been the Harvard conferences 'Religions of the World and Ecology' which promoted interfaith dialogue to support the creation of a sustainable future, the Teheran Seminar on Environment, Culture and Religion held in 2001, and the continuing Yale forums on Religion and Ecology[55].

Within the Catholic tradition, the writings of both the late popes John Paul II and Benedict XVI as well the current pope Francis have called for a profound change in the way humans relate to Earth. John Paul II passionately articulated the need for an 'ecological conversion', a re-awakening of an appreciation of planet Earth as the gift of God, humanity's home and bountiful provider of all its needs:

> "We must therefore encourage and support the 'ecological conversion' which in recent decades has made humanity more sensitive to the catastrophe to which it has been heading. Man is no longer the Creator's 'steward', but an autonomous despot, who is finally beginning to understand that he must stop at the edge of the abyss."[56]

In his January 2007 message for the celebration of the World Day of Peace, Pope Benedict XVI clearly recognises the interdependence of human well-being and the well-being of Nature, and that this recognition forms the ground for a multifaceted ecology of peace:

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[49] Long, 1997
[50] O'Murchu, D. *Quantum theology.* New York: Crossroad Publications. 1997.
[51] Earthsong Project. www.earthsong.org.
[52] Edwards, D. *The God of evolution.* New York: Paulist Press. 1999.
[53] Tucker, M.E. Worldly wonder. Religions enter an ecological phase. The Environmental Magazine, Nov/Dec. 2002.
[54] McGillis, M. Genesis Farm Vision. http://www.genesisfarm.org/. 2008.
[55] Yale Forums on Religion and Ecology. http://fore.yale.edu/
[56] John Paul II. *World day of peace message, the ecological crisis: A common responsibility.* http://conservation.catholic.org/background.htm. 2002.

> "Alongside the ecology of nature, there exists what can be called a "human" ecology, which in turn demands a "social" ecology. All this means that humanity, if it truly desires peace, must be increasingly conscious of the links between natural ecology, or respect for nature, and human ecology. Experience shows that *disregard for the environment always harms human coexistence*, and vice versa. It becomes more and more evident that there is an inseparable link between peace with creation and peace among men"[57] (italics in original).

Perhaps the strongest message from the Catholic tradition is that of Pope Francis in his encyclical letter '*Laudato Si'*: On Care for Our Common Home'. Francis announces his "concern to bring the whole human family together to seek a sustainable and integral development" (#13); to do so he declares, "we urgently need a humanism capable of bringing together the different fields of knowledge, including economics, in the service of a more integral and integrating vision" (#141); then he proceeds to present his vision of an "integral ecology".[58]

A functional cosmology for the Anthropocene: The contribution of Thomas Berry

Thomas Berry, a Passionist Priest who describes himself as a cultural historian, ecotheologian, cosmologist and geologian, that is, a scholar of Earth, has brought uniquely profound insights and influence to the way humans see themselves in relation to the world. For Berry, an Earth-based ecospirituality is important but does not go far enough. Berry extends the concept to embrace not just Earth but the very universe itself in all its breadth, depth and deep time as home, as our place, in order to heal the great rift and re-orientate us towards a thriveable future. His major works - *The Dream of the Earth* (1990)[59], *The Universe Story* (with Brian Swimme)[60], *The Great Work: Our Way into the Future*[61] and *Evening Thoughts: Reflection on the Earth as Sacred Community*[62] as well as many other writings, have inspired what Berry has called 'the great work' – the transformation of humanity's priorities.

Berry's great contribution has been to reinterpret and reframe cosmology as an integration of science and spirit, manifested in a new creation story for our times. Thomas Berry's insight is that modern Western culture and increasingly other cultures, around the world, have been stripped of their deep cultural guiding stories, what Berry calls "a functional cosmology". It is this absence of a functional cosmology that has profoundly influenced the Western mindset in its relationship to and treatment of Nature, towards one of domination, disconnection,

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[57]Benedict XVI. Message for the celebration of the world day of peace. http://www.vatican.va/holy_father/benedict_xvi/messages/peace/documents/hf_ben-xvi_mes_20061208_xl-world-day-peace_en.html. 2007.

[58]Francis. *Laudato Si'* [Encyclical Letter On Care for Our Common Home]. http://w2.vatican.va/content/dam/francesco/pdf/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si_en.pdf. 2015.

[59] Berry, T. (1990) The dream of the earth. San Francisco: Sierra Club.

[60] Swimme, B. & Berry, T. The Universe Story: The Universe Story: From the Primordial Flaring Forth to the Ecozoic Era - A Celebration of the Unfolding of the Cosmos. San Franciso: HarperOne. 1992.

[61] Berry, T. The great work: Our way to the future. New York: Bell Tower. 1999.

[60] Berry. T. Evening thoughts: Reflection on the Earth as sacred community. M.E.Tucker (ed.). Berkeley: Counterpoint Press. 2015.

[61]Smith, C. Reconnecting with Earth: Ecospirituality as the missing dimension in spirituality.

distancing, and disenchantment (Smith[63]). Berry wants us to embrace a story where humanity is cast as profoundly at home in the universe. Seeing it not from outside as a disinterested observer, but as an imitate part of its creation and evolution, this new cosmology teaches that the universe story is humanity's story, that we are intimately intertwined with the substance, patterns, processes and splendour of the universe. In Berry's evocative words, "we are a communion of subjects, not a collection of objects"[64]. Interpreted and recast this way, science reveals the human as deeply embedded within the magnificent story of a numinous, participatory and interrelated universe. Berry coined the term 'the Ecozoic'(Swimme and Berry[65]), referring to what he hoped would be the new era for humanity as the new story became embedded in human consciousness, in contrast with the Anthropocene, a term that recognises the reality of where we have come to.

Physicist and cosmologist Brian Swimme[66] who has worked closely with Berry, places human consciousness not just within the evolution of life on Earth, but within the nearly fourteen billion year old cosmic creation process, in order to highlight the directions in which human consciousness is evolving today and into the future. For Swimme and Berry, human consciousness is the consciousness of the universe reflecting on itself. With this knowledge, humanity stands in wonder at its magnificence; it is a profound, awe-inspiring and deeply comforting thought. If re-imagined through the epic story of the universe, this cosmology is available to all, able to be interpreted through all faith traditions as well as those professing no faith. Indeed this is what self-styled arch-atheist Richard Dawkins means by his term 'the God of Einstein'. Einstein had said: "I don't try to imagine a personal God; it suffices to stand in awe at the structure of the world, insofar as it allows our inadequate senses to appreciate it".[67]

Berry's great contribution to the framing of a new functional cosmology for the Anthropocene is his notion of 'moments of grace'[68]. Moments of grace are those profound moments which have the power and potential to change radically the course of the future by compelling us see ourselves in an intensely different light. These moments are privileged moments, when the great transformations of the universe occur. They are no less than psychic 'mindquakes', upending all we think we know to be true and forcing us to drastically reframe ourselves in relation to our world. Galileo's insight that shifted our sense of ourselves from the centre of the universe to a mere speck orbiting the sun, was such a moment of grace, even if it caused severe angst to the Catholic church, let alone to Galileo himself.

Berry's three moments of grace provide the foundation for a new functional cosmology as a new consciousness of the human-Nature relationship as I-Thou, interconnected not only with the web of life, but into the very beginnings and evolution of the universe itself. This new

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[63]Smith, C. Reconnecting with Earth: Ecospirituality as the missing dimension in spirituality and sustainability education. Ch. 34. In de Souza, M., Francis, L., O'Higgins-Norman, J., Scott, D. (eds). International Handbook of Education for Spirituality, Care and Wellbeing. 2 volumes. Dordrecht, The Netherlands: Springer Academic Publishers. 2010.

[64] Berry 1990 ibid

[65] Swimme, B. & Berry, T. The Universe Story: The universe story: From the primordial flaring forth to the Ecozoic Era - A celebration of the unfolding of the cosmos. San Franciso: HarperOne. 1992.

[66] Swimme, B. (1999). The hidden heart of the cosmos. New York: Orbis Books

[67] Dawkins, R. The God delusion. London: Bantam Press. 2006.

[68] Berry, T. (2000). Moments of grace. Yes Magazine. www.yesmagazine.org/article.asp?ID=323 - 97

consciousness is now manifesting as a global ecospirituality, emerging in response to three deep realisations about humanity's relationship with universe.

Moments of grace

The first moment of grace emerges from learning across four centuries of cosmological science, which has opened up a deep and profound understanding of the origin and evolution of the universe and humanity's place within it. From the mechanistic Newtonian view of the universe as a collection of objects, merely following the dictates of the laws of classical physics, the 20th and 21st century sciences of quantum physics, cosmology, systems theory, chaos and complexity have changed the way in which the organisational principles of the universe are understood. This new view of the universe is one of an evolving, dynamic, ever-changing dance of destruction and creation, a cosmogenesis. This understanding is radically reshaping the human-Nature relationship towards an ecological worldview which sees humans as an intimate part of Nature, part of the narrative of cosmogenesis. As Tucker puts it, we are "not only part of humankind but of Earthkind; we are not simply human beings but universe beings".[69] Humanity is literally stardust, the child of the stars. No longer cold and mechanistic, this understanding of the universe is one of participation, of relationship, of adaptability and interconnectedness, where there is no such thing as an impartial or disinterested observer.

This recasting is critical to reframe the new cosmology of humanity's place in creation and its future. For Berry, "the future can exist only when we understand the universe as composed of subjects to be communed with, not as objects to be exploited".[70] Human consciousness is a manifestation of the very consciousness of the universe, and with this knowledge, humanity stands in awe and wonder at its magnificence; human consciousness is the universe reflecting on itself (Smith[71]). The realisation is that Nature and the human are one, the inner and outer dimensions of existence. Without it, human creativity, joy, wonder and imagining are nothing. As Berry reminds us,

> "We see quite clearly that what happens to the nonhuman happens to the human. What happens to the outer world happens to the inner world. If the outer world is diminished in its grandeur then the emotional, imaginative, intellectual, and spiritual life of the human is diminished or extinguished".[72]

The second moment of grace comes through the relational sciences of the 20th and 21st century - ecology, systems theory, evolution, quantum mechanics, cosmology, chaos and complexity theories and neuroscience, which together teach us that human health, well-being and very survival as a species are intimately entwined with the health, well-being and survival of Earth's dynamic ecosystems. The nature and quality of the relationship between objects in a system were as important as the objects themselves. Humanity's material evolutionary history and biological being mean that *Homo sapiens* is an integral part of the web of life, the same material as the plants, the other animals, Earth, the very universe itself

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[69] Tucker, M.E. (2002). Worldly wonder. Religions enter an ecological phase. The Environmental Magazine, Nov/Dec.

[70] Berry, T. (1999). The great work: Our way to the future. New York: Bell Tower.

[71] Smith, C. (2010). Reconnecting with Earth: Ecospirituality as the missing dimension in spirituality and sustainability education. Ch. 34. In M. de Souza et al. (eds). International Handbook of Education for Spirituality, Care and Wellbeing. 2 volumes. Dordrecht, The Netherlands: Springer Academic Publishers.

[72] Berry, T. (2000). Moments of grace. Yes Magazine. www.yesmagazine.org/article.asp?ID=323 - 97

(Capra[73]). The evolutionary and relational sciences of cosmology and ecology have given humans a great gift, the ability to see ourselves as part of the web of life, as ecological universe beings, born into a material bio-ecological world as much as into a social world. Scientists such as Ursula Goodenough[74] and Brian Swimme[75] teach that the relational sciences are critical to help us experience a deep appreciation of our place in the universe. These sciences reveal the intricate interconnected networks and patterns that give rise to galaxies, ecosystems and life itself, and it is through this understanding that we can renew our sense of the sacred.

This is the moment of grace that is part of the great shift in consciousness that is now occurring in the hearts and minds of many, towards a participatory rather than a dominator relationship with Nature, towards an ecological worldview. This shift signals a profound move from the exploitative, objectifying I-It relationship to Nature to an I-Thou spiritual relationship, that is, an ecospirituality.

The third moment, perhaps of crisis as well as grace, is the shock of the Anthropocene itself, of humanity's increasingly destructive and potentially all-life threatening impact on the very ecosystems on which it so profoundly depends and forms an intimate part.

These three profound moments of grace, enabled by the insights of science, situate the human deep within the magnificent story of a numinous, participatory and interrelated universe. Told this way, humanity is intensely at home in the universe. Seeing it not from outside as a disinterested observer, but as an imitate part of its evolution, this new story, this cosmology, teaches that the universe story is humanity's story, and the universe and especially Earth, are our primary teachers.

If we are to thrive or even survive into the future, if we are to mend our broken relationship with Earth and the more-than-human world, Thomas Berry's functional cosmology, informed by moments of grace, gives us a profound new story with which to reframe ourselves. It is through this that hope and action spring. The last words rest with Berry[76]:

The natural world is the larger sacred community to which we belong, and we are to be its stewards and custodians. To be alienated from this community is to become destitute in all that makes us human. To damage this community is to diminish our own existence.

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[75] Swimme, B. (1999). The hidden heart of the cosmos. New York: Orbis Books

[76] Berry, T. https://wordsforabetterworld.com/2015/07/26/thomas-berry-on-the-natural-world-as-our-sacred-community/. 2015.

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