New Blackfriars

DOI:10.1111/nbfr.12716

Paying Attention to Biodiversity and Its Theological Significance

Celia Deane-Drummond

Abstract

This paper focuses on one scientific aspect of eco-theology, which I argue has not yet received sufficient attention either within public discussion or from theologians, namely, that of biodiversity. Given the entanglement between biodiversity loss, climate change, and poverty, understanding the biological context is significant ethically quite irrespective of the presuppositions of different philosophical approaches to eco-theology. After beginning with a more general argument for why it is important for theologians and theological ethicists to engage with and understand different aspects of the relevant science, I will then survey scientific accounts of current biodiversity loss, including arguments for its relevance to social justice questions. I then provide an outline of the first steps towards a theological ethic on biodiversity, drawing on the insights of Pope Francis' *Laudato Si'* and Thomas Aquinas' understanding of the ecologically relevant virtues of practical wisdom and mercy.

Keywords

Biodiversity, theology and science, conservation, eco-theology, practical wisdom, mercy

In this paper, rather than cover all that could be covered in the scientific aspects relevant to the development of eco-theology,[1] or theologians aligned to it, I am going to focus on one scientific strand that is often not given sufficient attention in public and theological discussion,

[1] Some of the scientific data discussed in this paper is dealt with in more detail in a report produced by the Laudato Si Research Institute, with lead researcher Oliver Putz, entitled 'The Wailing of God's Creatures: Catholic Social Teaching, Human Activity and the Collapse of Biological Diversity', published in April 2021. This is report is open access https://lsri.campion.ox.ac.uk/sites/default/files/inline-files/THE%20WAILING%20OF%20GOD%E2%80%99S%20CREATURES%205.pdf

https://doi.org/10.1111/nbfr.12716 Published online by Cambridge University Press

namely that of *biodiversity*.[2] Biodiversity, with its origin in conservation science, is of course value laden, and like the term 'nature', has multiple definitions, which may account for its social and political influence.[3] However, in comparison with climate change, biodiversity is more like a poor relation when considered publicly and theologically, even if with the upcoming Conference of Parties Convention on Biodiversity (COP 15) meeting in Kumning, China, in April 2022, it is not as far behind as it was fifteen years ago. Biodiversity points to something about the variety of life and its richness that scientists have identified as worthy of both scientific and socio-political focus. Biodiversity can be defined to mean richness within a species or variability and variety of species or ecosystem diversity, as I will allude to later. Before engaging with that science, it is necessary to articulate clearly and in a preliminary way why it is important for theologians to do this at all.

Why is Science Relevant to Eco-Theology?

Science appropriate to the topic of eco-theology potentially includes not just the natural sciences and environmental sciences, but also the human and evolutionary sciences as well. Some eco-theologians venture even further back than standard biological evolutionary sciences by including broad cosmological changes in the earth's history. The possible areas of scientific engagement are vast, and it is not surprising that many theologians are reluctant to engage in serious dialogue, preferring to keep to recognised boundaries and specialisms in theological expertise. Some theologians also resist using the term eco-theology entirely on the basis that all good theology needs to include a robust and well thought out theology of creation that draws on traditional metaphysical starting points, and then considers different domains of science in the light of that philosophy, rather than necessarily using a new term – eco-theology – which implies approaching theology in a new way.[4] I was particularly struck that many of the speakers at the joint 2021 CTA/ITA conference made a point of beginning their erudite papers by explicitly *denying* that they were eco-theologians. The interesting question is why this was deemed necessary.

[2] Carmody Grey is one of the few theologians who has dealt with this topic in Carmody Grey, 'In Defense of Biodiversity: Biodiversity in Ecology and Theology', in Celia Deane-Drummond and Rebecca Artinian Kaiser, eds., *Theology and Ecology Across the Disciplines: On Care for Our Common Home* (London: Bloomsbury, 2019); pp. 227-240.

[3] Don Delong, 'Defining Biodiversity', *Wildlife Studies Bulletin* 24 (1996); pp. 738-49.

[4] Carmody Grey, personal communication. See also, Carmody Grey, 'Philosophy, Theology and Agriculture: The Missing Link', Laudato Si Research Institute lecture, 8 March 2021.

https://doi.org/10.1111/nbfr.12716 Published online by Cambridge University Press

I hope that by the end of this paper I will have convinced at least some readers that we are *all* charged with the task of taking our current ecological and global climate scientific context seriously, whether, as theologians, we choose to use the language of eco-theology or not. I hope to do this by pointing to elements of the scientific discussion about biodiversity, which is just one relevant scientific aspect of the current debate. If this is done carefully, what emerges from that science is a strong sense of our human limitations in the face of complexity. This is not incongruent with that same sense arising from consideration of traditional theocentric concepts that Professor Peter Scherle has outlined, but for different reasons.[5] Further, if we are to use our reason as an aspect of the work of the Holy Spirit, as Ashley Beck helpfully suggested,[6] then it is imperative for us to understand, at least as far as we are able, what scientific consensus might be emerging on a given topic as integral, rather than as marginal, to the theological task. Going into the scientific aspects highlights a sense of humility rather than undercuts it.

I am also convinced that it behoves theologians to take this science seriously as part of their public reflection on the grounded context that we are in, while at the same time giving the respect that is due to scientific methodological autonomy. Scientists are not dystopic, that is, they do not assume that the world will end in apocalypse, but rather most try to show what the empirical data they have gleaned implies about the way the world is. Such scientific considerations are not alien to Catholic thinking, any more than are analyses of the political and social sciences, for this scientific research is an aspect of what is known about the world according to the signs of the times, and which often include suggestions for practical steps that can be taken to do something about it that are relevant for theological ethics. Theologians are justified in probing the methodological and philosophical presuppositions behind the science, but in situations of dire emergency, as in the current biodiversity and climate crises, finding common ground through informed dialogue in order to promote collective action is more salient.

Why is there such a common resistance to using the term or being labelled with the terminology of 'eco' in a way that has been rather less the case for other domains in theology such as, for example, feminist theology, or political theology? One reason might be because of the general sense among theologians that many, though not all, who call themselves eco-theologians do not make an adequate distinction between their work in theology and that in environmental ethics, or who seem to collapse theology into the scientific debate. Yet, with

[5] Peter Scherle, 'Creation as Promise: A Dogmatic Approach to Eco-Theology in the Anthropocene', *New Blackfriars*, 103 (2022); pp. 243-58.

[6] Ashley Beck, 'Another New Pentecost? The Holy Spirit and a Theology of Creation', *New Blackfriars*, 103 (2022); pp. 234-42.

https://doi.org/10.1111/nbfr.12716 Published online by Cambridge University Press

respect to the first point, theological ethics and moral theology have, in the Catholic tradition at least, often presupposed specific theological commitments. The early church refused to break up theology into various components of historical theology, biblical studies, moral theology, mystical theology, pastoral theology, systematic theology, and so on. The lack of a holistic approach to theology is part of the fundamental methodological issue that needs to be addressed by theologians and taken much more seriously. If we just confine ourselves to our sub-silos of specialisation, we are simply following a post-Enlightenment liberal epistemological tradition and not being faithful to the foundational traditions of Christian faith. While it is certainly true that eco-theologians have not always clarified their philosophical or theological starting points in systematic terms and have tended to collapse their thinking into discussions of practice and case studies, this is no less true of other important domains that need to concern *both* theologians and ethicists, such as medical bioethics or the emerging artificial technologies. Further, South African theologian, Ernst Conradie, is now leading a major research project to engage specifically with different systematic aspects of theology from the perspective of eco-theology so that it becomes much more informed by a range of systematic Christian traditions, while at the same time insisting on taking context seriously.[7] I am less hesitant myself about using the term eco-theology, as I think it reminds theologians to stress the grounded and contextual aspect of their work, even while supporting the case for retaining traditional theological concepts such as *creatio ex nihilo*.[8]

Ironically perhaps, just as eco-theologians have tended not to be sufficiently informed by systematic or philosophical analysis, they have also not always taken the details of the science seriously enough either, preferring very generalised politically informed ideas about ecology that imply a naïve stable state of harmony, or, drawing on evolution in very general and often historical terms,[9] rather than engaging

[7] This began with his five-year collaborative project that was eventually published in book form, Ernst Conradie, Sigurd Bergmann, Celia Deane-Drummond and Denis Edwards, *Christian Faith and the Earth: Current Paths and Emerging Horizons in Ecotheology* (London: Bloomsbury, 2014). Since then, there have been significant volumes either published or *in press*, including Ernst Conradie and Hilda Koster, eds, *T & T Clark Handbook in Eco-Theology* (London: Bloomsbury, 2020), Ernst Conradie and Lai Pan Chiu, eds., *Taking a Deep Breath for the Story to Begin.* Earthed Faith I (Oregon: Wipf and Stock, in press). This volume will be followed by eleven other volumes offering a constructive reinterpretation of core doctrines of Christian faith in a series entitled *An Earthed Faith: Telling the Story Amid the Anthropocene*.

[8] Celia Deane-Drummond, 'Creation', in *A Systematic Theology of Climate Change*. Editors Peter Scott and Michael Northcott (London: Routledge, 2014): pp. 69-89.

[9] Even the Catholic theologian, Elizabeth Johnson, whose theological work I admire in many respects, engages with Charles Darwin's *The Origin of Species* in relation to ecological theology without much awareness that among scientists at least, many aspects of his thinking has been superseded. Treating science as if it is a tradition source like theology does not

https://doi.org/10.1111/nbfr.12716 Published online by Cambridge University Press

specifically with current scientific debates or its philosophical presuppositions. Lisa Sideris has already pointed out some of the difficulties with this and her critique is still pertinent.[10] Eco-theology projects which remain popular and still influential that do attempt to engage with the science, such as the *Journey of the Universe* project, are crafted on such a broad canvas that the methodological distinctions between the different sciences and their respective insights get lost, and the result is, whatever its potential merits in energizing action, somewhat incoherent from a philosophy of science perspective, even while claiming scientific authority.[11]

This failure of theologians to engage adequately with research on ecology or the human sciences may, in addition to somewhat superficial synthetic attempts, also arise from a lingering suspicion that emerged in modernity that the methodology of theology and science are incompatible and that the details of the science should be left to the natural scientists or other experts. Carmody Grey is particularly suspicious of those theologians who take the science as a given and then add in theology, as 'a sort of icing on the scientific cake, extraneous to ecology itself'.[12] She is correct that theology is also, to an extent, a kind of scientific enterprise, in that it uses powers of critical reason. There are, I concur, some analogies between a traditional Thomistic theological conception of creaturely difference and the good in comparison with ecological thinking on biodiversity, which stress both distinctions and unity. Further, there may be implicit theological resonances in some ecological approaches that make sense to theologians and help to articulate the relevance of scientific areas of knowledge within theology. But her position, arising out of radical Orthodoxy, comes very close

really work, even if engaging with Darwin is of interest for other historical reasons given the subsequent influence that Darwin has had culturally and scientifically. Elisabeth Johnson, *Ask the Beasts: Darwin and the God of Love* (London: Bloomsbury, 2015).

[10] Lisa Sideris, *Environmental Ethics, Ecological Theology and Natural Selection* (New York: Columbia University Press, 2003).

[11] *The Journey of the Universe* project led by Yale scholars, Mary Evelyn Tucker and John Grim, in collaboration with physicist, Brian Swimme, is intended to be open to all sciences and all religions. It has had positive popular impact in energising some religious groups to engage in ecological activism. Since its launch there has been a degree of critical engagement, though this has been somewhat restrained. For the *Journey of the Universe* project, see Brian Swimme and Mary Evelyn Tucker, *Journey of the Universe* (New Haven: Yale University Press, 2014). This project is discussed in Willis Jenkins, Mary Evelyn Tucker and John Grim, *Routledge Handbook in Religion and Ecology* (London: Routledge, 2017). This book also corrects the very general scientific flow of the first volume by paying attention to specific sciences, including a chapter on biodiversity and conservation by the environmental scientist, Thomas Lovejoy. However, these tend to sit alongside the different theological analyses. For a philosophical critique of the *Journey of the Universe* and other related projects see Lisa Sideris, *Consecrating Science: Wonder, Knowledge and the Natural World* (San Francisco: University of California Press, 2017).

[12] C. Grey, 'In Defense of Biodiversity', p. 227.

https://doi.org/10.1111/nbfr.12716 Published online by Cambridge University Press

to that of Michael Hanby, who proposes that science is metaphysically somehow parasitic on theology, including the doctrine of *creatio ex nihilo*, because without belief in God there would be no world and because in his argument scientific reasoning presupposes theological metaphysics.[13]

Arguments such as these require a leap of theological imagination that articulates all knowledge entirely through a theological lens. While there is historical precedent for the claim that modern science emerged within the womb of Christianity, I think there is a risk that positions that claim its ongoing significance are credible within theological circles only, and thus set up an unfortunate tendency towards Christian triumphalism in relation to other areas of knowledge. It is crucial that we avoid what could be termed the 'veneer' approach to science and religion, given their entangled histories, but it is also crucial that scientific epistemology is permitted to be articulated in its own terms, even if historically it is technically correct that without belief in a creator it is doubtful that science would have emerged in the way it has. Further, if we credit scientific knowledge as having a very tight relationship with theology, it may provide some metaphysical coherence from a theological perspective, but it is then much more difficult to critique that science and take account of sin and evil. The alternative approach to philosophy of science and religion is to start not so much from theological metaphysics as from scientific naturalism, though now to make this more open to theistic knowledge. A more expansive form of philosophical naturalism that does not rule out conceptions of God is proposed by Fiona Ellis, for example.[14] In this case there are risks that theological insights will be minimised or reduced to the scientific account of transcendence. My own philosophical starting point is somewhere between these two alternatives, while aiming to stress both areas of unity and distinction between theology and ecological science.

Taking account of our interconnectedness with the natural world, which is presupposed in evolutionary anthropology and in ecological science, also does not necessarily undercut a clear sense of human distinctiveness, human responsibility, and the eschatological hope of the participation of all creation in God. The theological gift of both creation and specific powers of human reason are, as Aquinas points out, ways in which we can become moral agents who resonate more closely with God's intentions for creation, even while recognising the potential for sin and deception.[15]

[13] Michael Hanby, *No God, No Science: Theology, Cosmology, Biology* (Oxford: Wiley/Blackwell, 2016).

[14] Fiona Ellis, *God, Value, and Nature* (Oxford: Oxford University Press, 2014).

[15] For a discussion of a Thomistic notion of reason in the light of scientific perspectives on humanity see Celia Deane-Drummond, *The Wisdom of the Liminal: Evolution and Other Animals in Human Becoming* (Grand Rapids: Eerdmans, 2014): pp. For a discussion of decep-

https://doi.org/10.1111/nbfr.12716 Published online by Cambridge University Press

Engaging Science and Biodiversity

My own biography may help to situate why I approach theology the way I do with an acute awareness of the scientific context in which our Western culture is situated. I started my academic life in the 1980s as a natural scientist with a profound curiosity about how plants work which I believed mirrored something of the intentions of the Creator. I considered even then that, given that all life depends on plants, they were more fundamental as a priority for basic research than work on either other animals or even humans. What I didn't fully understand was that this perspective of giving priority to plant life wasn't necessarily all that common in the public or theological domains. As the genetically modified organism (GMO) revolution started to take a grip, botany once more became fashionable, though this time funding poured in from agribusiness and multinational companies. This was all coincident with the gradually dawning scientific realisation that the earth-system itself was under threat.

As a young scientist I began to be aware of global ethical aspects, while botanical research in the Thatcherite era seemed orientated towards making profits for large multinational companies rather than becoming more aware of the limitations of our knowledge. For example, GM soya contained modified genes for herbicide resistance along with that herbicide in a single package. Farmers were caught: fail to use herbicides and yields went down, and given the requirement for the full package they had no choice about where to get seeds. Many in Europe started to get worried about broader ethical aspects of such technological manipulations. GMOs grew largely unchecked in the USA and the poorest nations of the world with weak regulatory governance structures.

What has this got to do with biodiversity? Mass produced monocultures are known to reduce biodiversity, make plants more vulnerable to disease, and reduce insect populations. And it is our continued misuse of agricultural land that has contributed to the destruction of habitats. At the same time, the demand for cheap food drives such industrialisation of agriculture. Biodiversity loss is, it seems to me, a price far too high to pay.

It does not take theologians to point out that it is because of our continued abuse of our relationship with nature that the world is now under serious threat. This applies to the earth system as a whole, but also to specific aspects that are at risk of moving outside planetary stable habitable limits. In spite of the varied definitions of biodiversity, there is scientific consensus that biodiversity loss is a much more serious

tion, see Celia Deane-Drummond, *Shadow Sophia: Evolution of Wisdom II* (Oxford: Oxford University Press, 2021); pp. 158-186.

https://doi.org/10.1111/nbfr.12716 Published online by Cambridge University Press

planetary threat than climate change.[16] The IPCC *Code Red for Humanity* released in the summer of 2021[17] once more stresses that humanity as a whole has less time to make changes that will stabilize planetary conditions than had been previously thought, but understanding the interlaced interconnection between biodiversity loss, climate change and human survival is crucial scientifically, socially and politically, as well as theologically. As the scientists working in this field have said repeatedly, time is running out to make effective changes that are needed for survival, not just for human beings, but for all life systems on earth.[18]

While there has been plenty of attention to climate change in the media in the last decade, biodiversity loss seems almost to have escaped public attention. Even 'extinction rebellion' seems to be more often concerned politically about environmental injustices than concerns about the elimination of species other than our own.

The point is that both biodiversity loss and climate change are, like other social aspects of our lives, best thought of as *intersectional activities*; one feeds into the other, so an increase in biodiversity loss has positive feedback on climate change and climate change positive feedback on biodiversity loss. The opposite is also the case, so that ecological restoration absorbs carbon dioxide.[19] Some species will increase their geographical range due to climate change[20], but many do not, and a significant proportion have disappeared from the wild and will continue to go extinct, many before they have even been identified by scientists.[21]

[16] This concept was developed at the Stockholm Resilience Centre. J. Rockström, J., W. Steffen, K. Noone, Å. Persson, et.al. 'Planetary boundaries: Exploring the Safe Operating Space for Humanity', *Ecology and Society* 14(2) (2009) 32. Grey argues that the different definitions of biodiversity betray diverse underlying theologies. C. Grey, 'Biodiversity in Ecology', p. 230. I am less convinced by this argument. Biodiversity crystalises around a single concept, namely, the variability of life, and how it is measured and in what context will depend on the study under investigation. It is, therefore, not surprising that definitions of biodiversity vary between different wildlife studies as the purposes of these measurements are different.

[17] IPCC Working Group 1 contribution to the Sixth Assessment Report on the physical science basis published in August 2021, what has come to be known as 'code red' for humanity, noting that the current climate crisis is far worse than originally anticipated. For sources, see https://www.ipcc.ch/report/ar6/wg1/, accessed 31 August 2021.

[18] E.O. Wilson, *Half Earth: Our Planet's Fight for Life* (New York: Liveright, 2017).

[19] Thomas Lovejoy, for example, estimates that ecosystem restoration that is sufficient to recapture one-third of the atmospheric carbon that has contributed to destroying terrestrial ecosystems could reduce carbon load from 415-350 ppm. See Thomas Lovejoy, 'Biodiversity Conservation Targets: How to Allocate Resources', *One Earth* 2 (2020), May 22: pp. 415-416.

[20] See, for example, Emma Marris, *Rambunctious Garden: Saving Nature in a Post-Wild World* (New York: Bloomsbury, 2013).

[21] As E.O. Wilson has repeatedly pointed out *Half Earth* and also in *Every Species is a Masterpiece* (New York: Penguin, 2021).

https://doi.org/10.1111/nbfr.12716 Published online by Cambridge University Press

Historically climate change has been one of the main drivers behind five mass extinction events over the last 541 million years. In one such event 90% of all organisms were killed and life on earth almost came to an end.[22] All the signs are that anthropogenic climate change, which we are currently living through, could lead to an equally catastrophic loss.[23] Increases in storms, floods, droughts, loss of homes and livelihoods, along with an irreversible loss in species should act like a wake-up call for a humanity, which has become, as Pope Francis puts it in *Laudato Si'*, indifferent to suffering.[24] Humanity is driving species to extinction at around 100 to 1000 times the background rate, that is, the degree of loss independent of human activity.[25] This has come to be known by many biologists as the *sixth great mass extinction event*.[26] The difference is that this time it is being caused by the collective actions of humanity. At the same time, not all humans are equally responsible as is implied in the way that generalised global terminology such as the 'Anthropocene' is used.[27]

Humanity, especially those on the margins, but increasingly everyone, is suffering the bitter consequences of an eroding biodiversity: literally millions of people are losing their livelihoods, poverty is growing, food and water are becoming increasingly scarce resources, climate change is accelerating, and weather is becoming far less predictable.[28] Extreme and out of the ordinary heat waves and floods are becoming commonplace. And, as Pope Francis recognised in

[22] S.M. Stanley. 'Estimates of the magnitudes of major marine mass extinctions in earth history', *Proceedings of the National Academy of Sciences* 113, no. 42 (2016), E6325–E6334

[23] See the most recent IPCC report https://www.ipcc.ch/report/ar6/wg1/

[24] Pope Francis *Laudato Si*': *On Care for Our Common Home* (London: Catholic Truth Society, 2015), §91.

[25] Pimm, S.L., G.J. Russell, J.L. Gittleman, and T.M. Brooks. 'The future of biodiversity', *Science* 269, no. 5222 (1995), 347-350. Pimm, S.L., P. Raven, A. Peterson, Ç.H. Şekercioğlu, and P.R. Ehrlich. 'Human impacts on the rates of recent, present, and future bird extinctions', *Proceedings of the National Academy of Sciences USA* 103, no. 29 (2006), 10941-10946. Pimm, S.L., C.N. Jenkins, R. Abell, T.M. Brooks, J.L. Gittleman, L.N. Joppa, P.H. Raven, C.M. Roberts, and J.O. Sexton. 'The biodiversity of species and their rates of extinction, distribution, and protection', *Science* 344, no. 6187 (2014), 1246752.

[26] Barnosky, A.D., N. Matzke, S. Tomiya, G.O.U. Wogan, B. Swartz, T.B. Quental, C. Marshall, J.L. McGuire, E.L. Lindsey, K.C. Maguire, B. Mersey and E.A. Ferrer. 'Has the Earth's sixth mass extinction already arrived?' *Nature* 471 (2011); Barnorsky et al., 2011; Ceballos, G., P.R. Ehrlich, and P.H. Raven. 'Vertebrates on the brink as indicators of biological annihilation and the sixth mass extinction', *Proceedings of the National Academy of Sciences USA* 117, no. 24 (2020), 13596–13602.

[27] Celia Deane-Drummond, Sigurd Bergmann and Markus Vogt, eds., *Religion in the Anthropocene* (Eugene: Wipf and Stock, 2017).

[28] United Nations Development Programme, 'The Next Frontier: Human Development and the Anthropocene. The 2020 Human Development Report', http://hdr.undp.org/en/2020-report (accessed August 30, 2021)

https://doi.org/10.1111/nbfr.12716 Published online by Cambridge University Press

2015, it is the poorest of the poor who are bearing the brunt of this socio-ecological crisis.[29]

What are the different scientific elements of biodiversity?[30] *Genetic diversity* is about that genetic variation of life between individuals of a population and between populations. *Organismal diversity* refers to differences between individuals and between populations that make up sub-species and species, enlarging outwards to include genera, families, and phyla. Variations in habitats, ecosystems and so on comprise *ecological diversity*. The *living planet index*[31] (LPI) tracks global averages in populations of vertebrate species across different habitats. The LPI is an authoritative measure of overall biodiversity and has shown a 68% drop between 1970 and 2016 – all in my lifetime. Invertebrates comprise a far greater portion of the biosphere in both species number and biomass than the vertebrates reported in the LPI. They are important for the food chain, providing energy for a great variety of vertebrates, including birds, reptiles, amphibia, and fish.[32] Insects play a vital role as pollinators in plant life and agriculture. Over the past 50 years, their diversity has declined continuously, and in some parts of the world it has reached dramatic levels. About 40% of all insects may become extinct over the next few decades.[33]

The extremely rapid acceleration in biodiversity losses is most likely to be caused by a combination of habitat destruction, invasive species, and climate change.[34] Forests and their rich biological diversity are particularly susceptible to external pressures, and tropical forests have suffered the most. By June 2020, deforestation in Brazil alone had reached more than 11,000 square kilometres annually, an area the size of

[29] As discussed repeatedly in *Laudato Si'* and *Fratelli Tutti* (London: Catholic Truth Society, 2020).

[30] K.J. Gaston, 'Biodiversity', in *Conservation Biology for All*, edited by N.S. Sodhi and P.R. Ehrlich (Oxford: Oxford University Press, 2010), pp. 27-44.

[31] J. Loh, R.E. Green, T. Ricketts, J. Lamoreux, M. Jenkins, V. Kapos, and J. Randers. 'The Living Planet Index: using species population time series to track trends in biodiversity', *Phil. Trans. R. Soc. B 360* (2005), 289–295. World Wildlife Fund for Nature, 'Living Planet Report 2016. Risk and Resilience in a New Era', WWF, https://wwf.panda.org/wwf_news/?282370/Living-Planet-Report-2016.

[32] Forister, E.M. Pelton and S.H. Black, 'Declines in insect abundance and diversity: We know enough to act now', *Conservation Science and practice* 1 (2019), e80, https://doi.org/10.1111/csp2.80.

[33] F. Sánchez-Bayoa and K.A.G. Wyckhuysb, 'Worldwide decline of the entomofauna: A review of its drivers', *Biological Conservation* 232 (2019), pp. 8-27.

[34] For a discussion of these contributing factors, see most recent *Living Planet Report*. The relationship between population growth and habitat destruction is complex, but cannot be ignored. The intergovernmental Convention on Biodiversity (CBD) analyses extinction drivers.

https://doi.org/10.1111/nbfr.12716 Published online by Cambridge University Press

Jamaica.[35] The *Living Planet Report*[36] shows geographical variation in reasons for population and species loss, and in all major geographic regions the main driver is *land use change* for residential, agricultural, and commercial reasons. The point is that climate change and biodiversity loss intersect. Agricultural land use, which relies on monocultures and industrialised forms of farming, for example, destroys the ability of the living soil to absorb carbon.

Enric Sala,[37] a marine biologist by training, but now a leading voice at National Geographic, argued in a lecture he delivered for the Laudato Si Research Institute at Campion Hall, University of Oxford, that the origin of Covid was directly related to our disruption of natural systems of biodiversity:

> As we humans venture deeper and deeper into what was once wild we not only disrupt ecosystems but also come into contact with stressed animals shedding viruses. Farms intrude upon forests, and loggers and miners push into pristine ecosystems. That increases our chances of being exposed to new diseases for which we have no immunity.
>
> Today, 96% of the mass of mammals on our planet are us and our domesticated livestock…70% of all birds are now domesticated poultry, mostly chickens…90% of the large fish in the ocean have been extracted by fishing. Yet only 7% of the ocean is now designated or planned as protected area…. And that means ecosystems across the world are under threat'.[38]

But he also elaborates how the forest itself generates its own healthy ecosystem: 'the Congo Basin forest in West Africa, [is] one of the richest and most valuable ecosystems on the planet. One reason the Congo Basin ecosystem is so rich is that it gets such heavy rain. And here's something fascinating about that rain: the forest itself creates it'. The consequences of cutting down the forest according to Sala's calculations is that it will literally dry up the water supplies for millions of people:

[35] C.H.L. Silva Junior, A.C.M. Pessôa, N.S. Carvalho, J.B.C. Reis, L.O. Anderson and L.E.O.C. Aragão, 'The Brazilian Amazon deforestation rate in 2020 is the greatest of the decade', *Nature Ecology & Evolution* (2020), https://doi.org/10.1038/s41559-020-01368-x.

[36] World Wildlife Fund for Nature, 'Living Planet Report 2020. Bending the Curve of Biodiversity Loss', WWF, https://livingplanet.panda.org/en-us/ (accessed 18 December 2021).

[37] See his most recent book: Enric Sala, *The Nature of Nature: Why We Need the Wild* (Washington: National Geographic, 2020).

[38] Enric Sala, 'The Nature of Nature: Why We Need the Wild', Virtual lecture delivered as part of a hybrid event held at Pembroke College hosted by the *Laudato Si* Research Institute, Campion Hall, University of Oxford. See entitled *Realistic Hope: Theological Ethics and Conservation Practice* 23 June 2021, for recording of full event, see https://lsri.campion.ox.ac.uk/events/lsri-celebration, accessed 20 September 2021. See also Sala, *The Nature of Nature*, pp. 228-229.

https://doi.org/10.1111/nbfr.12716 Published online by Cambridge University Press

> If we cut down that forest, that cycle will break. The rain will no longer fall in such abundance. That means no more water—or food—in Ethiopia. That's 125 million people now, probably double that by 2050. And the Ethiopian highlands provide the water for most of the Nile. Enter Sudan and Egypt, with an additional 138 million people, and growing.

These examples make absolutely clear what Pope Francis indicated time and again in *Laudato Si:* the earth and its peoples are deeply interconnected; if we destroy the earth, then it is the poorest people who will suffer. It is not just a matter of paying attention *either* to conservation or poverty – the two are bound up together. Healthy forests and ecosystems rich in biodiversity harbour less disease and shed fewer viruses. Most importantly, 'A healthy natural world is our best vaccine. But our broken relationship with nature is costing the world too much unnecessary loss of human life, plus trillions of dollars in economic losses'.[39]

This language of a broken relationship is, I suggest, *an implicit theology*.[40] It is as if scientists are naming what theologians have themselves failed adequately to do, namely, to recognise that it is our broken relationship with the natural world that amounts to what Aquinas would term a mortal rather than a venial sin,[41] for it takes humanity away from the Creator of Life.

Wild places rich in natural biodiversity are, as Sala suggests, like humanity's 'life support system',[42] they generate the air we breathe, they produce the food we need and clean the water we drink; they are also capable of absorbing half of the carbon dioxide we put into the atmosphere. It seems obvious that humanity needs to care for creation, and yet there is still a reluctance to do it.

Philosophical and Theological Foundations. An Integral Approach

There are, of course, additional philosophically informed ethical arguments against destroying the natural world in its variety for its own sake, in so far as it bears *intrinsic value*. I do not object to using this

[39] Sala, 'The Nature of Nature', Lecture at LSRI.

[40] I am therefore happy to point to the way scientists do, on occasions, reach towards concepts which have theological resonance, but to claim that they thereby are *inherently theological*, since theology encompasses all life, mistakes the inclusive approach of a theologian with the naturalistic methods of a scientist. It is impossible to go back to pre-Enlightenment perspectives on the unity of knowledge, even if early Christian insights give theologians important clues about how to think in a counter-cultural manner.

[41] Distinctions between mortal and venial sin in Aquinas' thought are covered in Question 88 of the *Prima Secundae* of the *Summa*. Thomas Aquinas, *Summa Theologiae*, Prima Secundae, 71-114, Volume 16, translated by Lawrence Shapcote. Edited by John Mortensen and Enrique Alarcón (Lander: Aquinas Institute, 2012).

[42] E. Sala, 'The Nature of Nature' lecture.

https://doi.org/10.1111/nbfr.12716 Published online by Cambridge University Press

term on the basis that it could imply that specific life forms have a unique dignity that is somehow in contradistinction from human life. In my way of thinking intrinsic value is an *inclusive* term and so includes humans along with other creatures and ecosystems. It gains its definition from its Kantian origin defined as *good in itself,* in contradistinction from instrumental value, where other things are good because they are for human use, rather than valued for their own sake. Carmody Grey notes that *Gaudium et Spes* appeared to deny intrinsic value to other creatures, and she asks how far *Laudato Si'* has really moved away from the traditional anthropocentrism expressed in such documents. She suggests that pitching anthropocentrism as somehow against intrinsic value is a mistaken dichotomy. She is correct in her analysis that *Laudato Si*'s use of the term 'intrinsic value' suggests that creatures have no value that is independent of humanity. This implies that Pope Francis has collapsed intrinsic value into the term that is normally used by philosophers to describe the value attributed to beings by humanity, namely, *inherent value*, but now given richer theological content in Pope Francis' interpretation. More accurately, therefore, Pope Francis, by putting emphasis on the interconnectedness of all life, uses 'intrinsic' value to establish an eschatological orientation for all God's creatures.[43] The point he is making is that the serious threat to biodiversity is not simply about what happens to other creatures, since our lives are entangled with theirs.

Although environmental ethicists and philosophers have argued for some time that intrinsic value is to be preferred to instrumental value as a basis for protection of the natural world, the current situation with respect to both climate change and biodiversity loss is now so extreme that there are emergency problems to address quite regardless of different philosophical starting points. I am not saying that these philosophical distinctions are unimportant or need to be ignored, but that common ground can be reached across different philosophical traditions in terms of pragmatic approaches to ethics. Hence, if an 'instrumental' approach to ecology is taken, aside from food and shelter, humanity depends heavily on ecosystems to provide them with, among other necessities, energy, climate regulation, purification of air and water, flood protection, medicine, as well as cultural, recreational, aesthetic, and spiritual 'services'.[44] I do not believe that an instrumentalist view is an adequate ethical basis for caring, nor is stewardship, in so far as it implies a managerial approach to the problems at hand, but it shows that even from this anthropocentric perspective, rather than an biocentric or

[43] C. Grey, '"The Only Creature Willed for Its Own Sake": Anthropocentrism in Laudato Si' and Gaudium et Spes', *Modern Theology* 36.4 (2020), pp. 886-883.

[44] The use of the term ecosystem 'services' is common in the conservation literature as an attempt to gain political influence. Convention on Biological Diversity, 'Global Biodiversity Outlook 5', https://www.cbd.int/gbo5 (accessed 2 September 2021).

https://doi.org/10.1111/nbfr.12716 Published online by Cambridge University Press

an eco-centric one, biodiversity needs to be protected. That should allow rather more theologians of different philosophical commitments to become invested in recognising the importance of biodiversity.

The point is that when ecosystem health is compromised due to the extensive loss of biodiversity, *all life,* including human life, is at risk of losing the very foundation of survival. This is one reason why the 15th Conference of Parties on Biodiversity in Kunming promises a new deal for nature *and people*.[45] The difference between this approach and that of Pope Francis is that he provides a theological reason for such an integrated perspective.

Pope Francis argued that ecology needs to be integrated into our social and economic institutions and frameworks. Integral ecology is, however, not just about a different way of approaching ecology and social issues but rather is a fundamentally different paradigm or way of thinking about the world that is grounded in theological beliefs in God as Creator and the work of the Holy Spirit. Eco-theologians of all persuasions have been saying for well over half a century that the devastation of our planetary home arises from the human will bent on domination through a technological mindset that has lost the ability to find connectivity with God, with each other and with creation.[46] *Laudato Si'* abounds with references to integral ecology as the openness to our God-given place in creation that is required in order to restore our rightful relationship with creation.[47] Whereas the technocratic paradigm has at its core the desire for the maximization of individual power and wealth, often through technical means, the integral paradigm revolves around a fraternal sense of care and responsibility for all.[48]

This perspective does not mean rejecting all technology but *putting it in its place and recognising its limitations*. Integral ecology presupposes a theocentric approach, but one that also incorporates a qualified and humbled anthropocentrism. Pope Francis' understanding of integral ecology has a depth that other secular interpretations lack because he spells out the dimension of transcendence that is at the heart of our human identity.[49] As Karl Rahner has argued, humanity's desire for God is ingrained in our nature, coming as a gratuitous, divine gift that he calls supernatural existential.[50] What is required, therefore, is

[45] World Wildlife Fund for Nature, 'Nature Positive by 2030: Kunming Plan For nature and People 2021-2030. Discussion Paper' https://wwfint.awsassets.panda.org/downloads/kunming_2030_discussion_paper_final_english.pdf, accessed 29 August 2021.

[46] See, for example, E.M. Conradie and H.P. Koster, *The T& T Handbook of Christian Theology and Climate Change* (2019).

[47] For example, *Laudato Si*', §§10, 11, 15, 63, 118, 138ff.

[48] Pope Francis, *Fratelli Tutti: On Fraternity and Social Friendship*, (London: Catholic Truth Society, 2020).

[49] *Laudato S*i', §11.

[50] K. Rahner, *Foundations of Christian Faith: An Introduction to the Idea of Christianity* (New York: Crossroad, 1978), p. 127.

https://doi.org/10.1111/nbfr.12716 Published online by Cambridge University Press

a new way of thinking about the world; some, such as in an annex report of the Club of Rome, might even say a *second Enlightenment* that leads to a different interconnected and holistic way of perceiving who we are in the world and our role in it. It is a rediscovery of elements of tradition that are now perceived in a new light, namely the current socio-ecological context of contemporary societies.

Ecological Conversion and the Ecological Virtues

Selfishly destroying nature or using others for our own gain is nothing short of a dismissal of God's gratuitous offer. Conversion always involves a fundamental decision.[51] Radical ecological conversion, supported by Pope Francis and the ecumenical Patriarchate, Bartholomew I, as well as Pope Francis' predecessors, Pope Benedict XVI and Pope John Paul II,[52] is a radical reorientation of our existential concern away from our self-centred obsession with wealth, consumerism, control, and power into a genuine care for the wellbeing of all creatures for their own sake, and participation in God's creation.

Compassion for the other, inclusive of other creatures and those living in different cultural communities and global contexts must be honed until we assume a new kind of habit of concern and action, and, as Pope Francis puts it, 'turn what is happening to the world into our own personal suffering'.[53] Individual actors can easily feel overwhelmed by such a daunting task, but *Laudato Si*' encourages persistence in acting out humble, loving daily gestures, so the converted can help gradually to convert the systematic and institutional dimensions of the problems facing the local and global community.[54]

The question immediately arises as to how to incite energy for change when there is accumulating evidence to suggest that scientific facts alone are not sufficient to encourage responsible action. Theologians also need to be wary of being 'used' by secular agencies on the basis that religion might be persuasive in energising change at the popular level. Arguments to act are both secular and theological, grounded in love of God and neighbour. I suggest that classic perspectives on the virtues can provide aids towards effective ecological conversion.

Practical wisdom, *phronesis* or *prudence* in the Aristotelian and Thomistic traditions, are concerned with deliberation, judgement, and action, and in this sense cannot be separated from how to act, that is,

[51] K. Rahner, 'Conversion', in *Encyclopedia of Theology: The Concise Sacramentum Mundi*, edited by K. Rahner, 291-295 (New York: Crossroad, 1991 [1975]), p. 291.

[52] See Celia Deane-Drummond, 'Joining the Dance: Catholic Social Teaching and Ecology', New Blackfriars 93 (2012), pp. 193–212

[53] Pope Francis, *Laudato Si*', §19.

[54] Pope Francis, *Laudato Si*', §224, 230, 231.

https://doi.org/10.1111/nbfr.12716 Published online by Cambridge University Press

from practical moral action.[55] Socially important virtues, such as justice, for example, are judged as approaching true virtue, but only if they align with practical wisdom. Practical wisdom is about the right use of reason, but it is also about deliberation, judgment, and action. Importantly, practical wisdom also includes, in addition to reason, caution, memory (*memoria*), insight, circumspection and foresight (*providentia*). Foresight echoes the providence of God and so aligns human decision-making with that of divine intent. It is orientated towards the common good, understood in Catholic social teaching as the good of all and the good of each.[56]

A truncated version of the common good excludes creation – it is time to include the created world if scientific arguments for biodiversity and interconnectedness are to be recognised as valid. Justice is, of course, vital in the context of climate change and disproportionate harms, but practical wisdom is needed to show more precisely how to act justly. Practical wisdom is, therefore, a virtue or habit of mind that is orientated towards actions that aim for the excellence of the common good, or the community as a whole, including those living in the global South and the community of all creatures.

To give a concrete example: in a situation where there is a conflict of interests between acting in order to reduce one's carbon footprint (such as using a form of transport that is reliant on battery power), and the mining of lithium that is used for batteries, which then has negative consequences for vulnerable poor communities in the global South, the exercise of practical wisdom helps to sort out the appropriate course of action. Prudence never gives the kind of certainty that is possible when following rules, but because prudence includes action, there is no excuse for inactivity unless there is a positive prudential judgment not to act in given circumstances.

Practical wisdom in Thomistic thought is both individual and political. Political prudence is particularly relevant as it is orientated towards the common good.[57] Although the monarchical political structure that Aquinas accepted does not concur with contemporary norms of democracy, the relevance of prudential decision making in political contexts remains relevant, including his description of vices, such as negligence, which fail to choose the good.[58] Hence, prudence has a social dimen-

[55] I have drawn on prudence for some time as a tool to engender environmental responsibility. See Celia Deane-Drummond, *The Ethics of Nature* (Oxford: Blackwell, 2004), pp. 10-15.

[56] Recent discussion has pressed for widening a definition of the common good so that it includes the cosmos, as in Daniel Scheid, *The Cosmic Common Good*: *Religious Grounds for Ecological Ethics* (Oxford: Oxford University Press, 2016).

[57] Summa Theologiae, 2a2ae Qu. 47.11. For a fuller discussion of prudence in the context of environmental ethics and other relevant virtues such as justice, see Deane-Drummond, *Ethics of Nature*, pp. 10-15.

[58] *Summa Theologiae*, 2a2ae Qu. 54.1; Qu. 54.2.

https://doi.org/10.1111/nbfr.12716 Published online by Cambridge University Press

sion as well because it is as much about institutions as individual acts of virtue.

In addition to prudence, the virtue of *compassion* and its associated virtue *mercy* help connect us with both the needs of the poorest of the poor and the creatures suffering on planet Earth. The theme of mercy has been central to Pope Francis' pontificate, yet it recalls earlier papal teaching, including Pope John XXIII's opening speech to the Second Vatican Council where he called for the Church to engage in the 'medicine of mercy'.[59]

As liberation theologian, Jon Sobrino, suggests, 'everything, absolutely everything, turns on the exercise of mercy'.[60] Sobrino uses the term *misericordia*, sometimes translated as 'compassion'. As Aquinas recognised, the mercy of God, unlike expressions of human mercy, can never contravene justice, as God is not bound by a higher law.[61] Jon Sobrino fills out Aquinas' account of what human mercy entails by developing a *principle of mercy* that challenges unjust structures and insists on human imitation of Jesus' radical acts of mercy, which are specifically orientated towards those who are most vulnerable.[62] Sobrino explores the *material, social and structural dimensions* of what mercy means. He confines his attention to structural flaws in society that impact most on the lives of impoverished human communities. He does not include the vulnerable and suffering creatures of the earth, which is necessary in the current context.

Preliminary Conclusions

I began by putting the case for all theologians taking ecologically relevant scientific issues seriously and I identified some of the reasons for either resistance to engagement or neglect. Biodiversity loss is extreme and theologians need to have the courage to face that challenge without narcissism, anxiety or despair. The scientific consensus admits that time is running out, but concerted action can lead to greater protection of the health of both the planet and ourselves. As we lurch forward culturally into a post-Covid world, it is important for theolo-

[59] See Pope Francis, *The Church of Mercy: A Vision for the Church* (Chicago: Loyola, 2014).

[60] J. Sobrino, 'Spirituality and the Following of Jesus', in *Mysterium liberationis: Fundamental Concepts of Liberation Theology,* edited by I. Ellacuria and J. Sobrino, pp. 677-701 (Maryknoll: Orbis, 1993), p. 682.

[61] Thomas Aquinas, *Commentary on Letter to the Ephesians*, Chapter 2, lecture 2, *in Thomas Aquinas, Commentary on the Letters of Saint Paul to the Galatians and Ephesians*, translated by F.R Larcher, M.L. Lamb. Edited by J. Mortensen and E. Alarcón, Volume 39 (Lander: Aquinas Institute, 2012).

[62] T. Walatka, 'The Principle of Mercy: Jon Sobrino and the Catholic Social Tradition', *Theological Studies*, 77 (2016), pp. 96-117.

https://doi.org/10.1111/nbfr.12716 Published online by Cambridge University Press

gians to incorporate the message of ecological conversion as standard in theological education. Biodiversity is complex in that its range includes genetic, species population, ecosystem and intra-specific variation. Biodiversity provides a marker for biologists to name what is of moral worth. Losses in biodiversity are associated with climate change, but other entangled practices contribute significantly, including modern practices such as agriculture, habitat destruction and the spread of invasive species. While I argue that naming all creatures as having intrinsic value provides a more robust philosophical rationale for ecological protection and restoration, even metrics that presuppose the instrumental value of biodiversity for human use point to the need for concerted and immediate political and individual action. Making the right kind of judgements which adjudicate between the needs of both planet and people requires the exercise of practical wisdom orientated towards the common good, understood as inclusive of other beings. The integral ecology message of *Laudato Si'* was intended not just for a decade, but rather for a generation. It is our generation, it seems to me, that has the overwhelming responsibility to think and act differently, to act according to an integral ecology paradigm, in tune with practical wisdom in order to protect the biodiversity that remains on our planet. Further, living out our lives in compassion and mercy includes learning to slow down and turn away from the technocratic paradigm that threatens to engulf our world and its creatures, while recognising the contribution and gift that science can bring to a discussion of contemporary global problems.

Celia Deane-Drummond
Director and Senior Research Fellow of the Laudato Si' Research Institute,
University of Oxford
Brewer St, Campion Hall
Oxford
OX11QS

lsri.director@campion.ox.ac.uk

https://doi.org/10.1111/nbfr.12716 Published online by Cambridge University Press