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DESTRUCTIVE ACTIVITY IN AN ECOLOGICAL ETHICS OF CO-CREATION

Abstract. A Christian worldview entreats humans to live in ethical relationship with the natural world; our current ecological crisis makes that call of crucial and immediate importance. If humans, and Christians in particular, are to adequately participate in care for creation, then we must proceed with both ecological and theological knowledge about the natural world. In both scientific and theological analyses, we uncover not only creative processes of growth, but elements of chaos and destruction. The carbon cycle, food webs, and evolution are examples of where the earth's survival depends upon destructive processes. In parallel fashion, God's activity in Scripture also entails chaos and destructive activity, such as the flood in Genesis, the wisdom of the Book of Job, and Paul's reflection on creation in Romans. This article argues that humans, called to be co-creators with God, thus need to integrate destructive activity into our framework of what it means to "co-create," thereby participation in creation in a more holistic manner. Far from unleashing unrestricted destruction on the world, such a framework offers ethical guidelines for destroying and creating in ways that support the overall flourishing of the natural world.

Keywords: ecological ethics; co-creator; destruction; ecology; Catholic social teaching; Philip Hefner

1. Introduction. 2. Naturally-occurring and anthropogenic decay and degradation. 2.1. The carbon cycle. 2.2. Food webs. 2.3. Evolution. 3. Biblical destruction in creation. 4. Co-creation and ecological destruction. 5. Conclusion.

1. INTRODUCTION

We humans are constantly reminded – in the form of hurricanes, floods, tsunamis, fires, harm from non-human animals, and even viruses – that we are, in many ways, at odds with other parts of the environment. Some of these events, especially hurricanes, floods,

and droughts, are a result of anthropogenic climate change,[1] but other occurrences of natural destruction are built into the system, so to speak. Ecological processes such as the carbon cycle, food webs, and evolution depend upon decay, destruction, and death in order to function.

In reading Genesis 1, Catherine Keller asserts that "the *tehom* – the deep, the sea, or the chaos – long ago fell victim to an in-house tradition of demonizing it as evil disobedience."[2] The unpredictability of the sea, and more broadly of nature, causes what Keller refers to as "tehomophobia," or a fear of the chaos that is described in Genesis and has always been present in the world.[3] In positing environmental chaos as an evil to be feared and overcome by order, humanity loses sight of the role that chaos and destruction play in the bigger scheme of the earth's processes. Moreover, as Keller poignantly states, "if the seas had been primordially identified as a churning waste, a watery wilderness, we have correspondingly treated them as the ultimate sewer."[4] This might be extrapolated to the rest of the environment: if there are parts of the environment that are dangerous and chaotic, and thus evil, then humanity is free to treat them as waste.

This means that if certain ecological processes or features are regarded as disposable, this puts the integrity of the whole environment at risk. But if humans are envisioned as "co-creators," called to work for the benefit of creation in cooperation with the Creator, then understanding and working within the realities of natural decay and

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1 H. Riebeek, *The Rising Cost of Natural Hazards*, The Earth Observatory, March 28, 2005, (http://earthobservatory.nasa.gov/Features/RisingCost/rising_cost.php), [accessed 08/2020].

2 C. Keller, *No More Sea: The Lost Chaos of the Eschaton*, in: *Christianity and Ecology: Seeking the Well-Being of Earth and Humans*, ed. D.T. Hessel, R. Radford Ruether, Harvard University Press, Cambridge 2000, 183.

3 Ibid., 184.

4 Ibid., 185.

destruction are vital to participating in creation.[5] Rather than waging a battle against the chaos, I argue that engaging themes of destruction in Scripture (with some healthy nuance) can reframe an ecological ethic so that certain types of destruction become incorporated into the processes that drive toward creative and sustainable ends. I do not mean to imply that what occurs in nature is identical with ethical imperatives (i.e., it does not involve an "is-ought" paradigm), but that an ecological ethic must engage with ecological science to draw proper conclusions about ethical ecological relationships, and often, destruction and chaos are a major part of ecology.

A note about terms: in line with Keller, I understand chaos as "nonlinear patterns of unpredictable, asymmetrical dynamics in nature, such as the turbulence of winds and waters, tides, clouds and flames, as well as ecological and economic shifts."[6] This is not identical with destruction, and can even sometimes be a site of creative activity, but chaos includes an element of destruction often enough. Likewise, destruction refers to some force or process that involves death, decay, or harm; it is not always objectively chaotic, though even destruction that occurs within orderly processes might be experienced as chaotic by those affected. As such, I use these terms separately with these distinctions in mind. However, I also argue that there is enough overlap between them, especially when taking human experience of the world into account, that it is helpful to think of them as similar or parallel categories when talking about the theological implications of natural processes.

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5 The encyclical letter *Laborem Exercens* asserts that "*man,* created in the image of God, *shares by his work in the activity of the Creator*", but stops short of naming persons as "co-creators." *Laudato Si'* takes a similar approach. John Paul II, *Laborem Exercens*, Vatican City State 1981; Francis, *Laudato Si'*, Vatican City State 2015.

6 C. Keller, *No More Sea*, op. cit., 193.

2. NATURALLY-OCCURRING AND ANTHROPOGENIC DECAY AND DEGRADATION

Heeding Willis Jenkins's admonition to begin ecological ethics by evaluating the concrete problems of the present situation, this section turns to a scientific analysis of ecological processes which require death and/or decay for proper functioning and an examination of the degradation which has caused the current ecological crisis.[7] These types of processes can be found on ecological, biological, and physiological levels; here, I will explore the examples of the carbon cycle, food webs, and evolution. Each of these processes necessarily entails destruction, but they have also been thrown out of balance by an excess of human-caused, or anthropogenic, environmental degradation.

2.1. THE CARBON CYCLE

Carbon is crucial for the maintenance of all forms of life, from humans and other animals to plants, and stabilizes climate. On some planets, carbon dioxide makes up a significant portion of the atmosphere; on Earth, it is found in the atmosphere in only trace amounts, as the atmosphere acts as a kind of centralized "pit stop" for carbon as it is traded between rocks, water, plants, soil, and fossil fuels.[8] Matter which absorbs and stores carbon is called a "sink," whereas matter that releases "carbon" is referred to as a "source," though some regions, such as old growth forests, both absorb and release carbon and are therefore neutral.[9]

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7 W. Jenkins, *The Future of Ethics: Sustainability, Social Justice, and Religious Creativity*, Georgetown University Press, Washington 2013, 4.

8 D. Archer, *The Global Carbon Cycle*, (Series: Princeton Primers in Climate), Princeton University Press, Princeton 2010, 5-6.

9 Ibid., 106.

The global carbon cycle operates on a few planes. One, referred to as the "stable geologic carbon cycle," is based on the chemical dissolution of rocks and carbon dioxide released through volcanic activity and deep-sea vents. This stable geologic cycle operates on a timeline of at least a hundred million years, sometimes longer, and accounts for long-term climate regulation.[10] Carbon also cycles through ice sheets in a much more irregular manner, where pockets of atmosphere are stored in the ice and then released when the ice breaks down or melts. The timeline for the unstable glacial cycle is shorter than the geologic cycle (still several million years) but erratic.[11] Perturbation in the glacial cycle creates a positive feedback loop, which can have strong effects on climate.[12]

The carbon cycle that occurs within the biosphere, mainly located in forest systems, is fastest and therefore perhaps most relevant for stabilizing carbon levels within our lifetimes.[13] Carbon cycles between "pools" of matter within the ecosystem, moving from living biomass to deadwood and soils as living plant life respirates, dies, and decomposes.[14] These cycles occur on a variety of timelines, but on the whole, carbon cycles through the biosphere much more quickly than it does through the atmosphere, oceans, and geologic matter.[15]

Within the entirety of the global carbon cycle, but especially within the biosphere, the life of some organisms depends upon the death and breakdown of others. Though the carbon itself might be seen as undergoing a process of transformation into various forms, the cycle depends upon the destruction of individual organisms to

10 Ibid., 10.
11 Ibid., 12-13.
12 Ibid., 13.
13 K. Hoover, A.A. Riddle, *Forest Carbon Primer (CRS Report)*, in: *Congressional Research Service*, May 5, 2020, 2 (https://crsreports.congress.gov/product/pdf/R/R46312/6), [accessed 08/2020].
14 Ibid., 2-4.
15 D. Archer, *Global Carbon Cycle*, op. cit., 50-51.

facilitate a climate stable enough for the forms of life that are found on Earth.[16] The decay of organic matter also provides the carbon that is necessary for living matter to produce energy, grow, and one day die and produce the necessary element for other life forms in turn.

The manner in which the global carbon cycle operates creates an overall balance in the Earth's ecosystems. The excessive burning of fossil fuels and deforestation caused by humans, on the other hand, throws off that balance by releasing more carbon into the atmosphere than can be absorbed by sinks. Existing sinks, moreover, are increasingly overwhelmed as forests are cleared. Without means to absorb it, carbon dioxide remains in the atmosphere, acting as a greenhouse gas and causing climate change and levels of destruction that would not otherwise occur.[17] The weathering system of the Earth, which keeps the climate stable, will take hundreds of thousands of years to adjust for anthropogenic climate change.[18] In addition to direct CO2 pathways between human activity and the physical climate system, anthropogenic change also causes feedback loops. For instance, increased temperature causes higher soil respiration, which

16 One might see this entire cycle as purely transformation, but that perspective depends upon a collective understanding of organisms and elements that sees them as part of a whole, rather than as individual organisms or elements. While both perspectives contain insight, I argue that if ecological spiritualities, such as those offered by *Laudato Si'* and Elizabeth Johnson in *Ask the Beasts*, challenge us to see non-human elements of the environment as having value in their own right, which includes understanding them as organisms and elements in and of themselves as well as part of their ecological systems. Proceeding from that perspective, even a non-living element of the environment, like a rock, is destroyed by natural carbon processes insofar as if a rock is dissolved into water, it ceases to be a rock. Likewise, if a plant is eaten by a deer, that plant is destroyed by being eaten. Of course, this idea becomes even more obvious in the following examples, in which systems depend upon the deaths of individual animals. See in particular *Laudato Si'*, chapter 6; E. Johnson, *The Community of Creation*, in: *Ask the Beasts: Darwin and the God of Love*, Bloomsbury, London 2014, 260-286.

17 D. Archer, *The Global Carbon Cycle*, op. cit., 16, 107-109, 142.

18 Ibid., 4.

releases even more carbon into the atmosphere.[19] Human responses to changing climates also impact the entire system, for better or for worse.[20] Humans – and human societies – are thus intimately involved in a network of carbon relationships in which they can cause change, decay, and destruction not only on a simple scale of cause-and-effect, but in an interlinked system where effects ripple and cascade in unpredictable ways. Unmitigated, the effects of anthropogenic change in the carbon cycle will be disastrously destructive.

2.2. FOOD WEBS

A food web is a system of interlocking food chains within an ecosystem.[21] Rather than tracing one line from predators down to fungi as in a chain, food webs reflect the reality that many consumers, producers, and decomposers interact in a more complicated system. This accounts for some of the danger talked about with a loss of biodiversity – the disappearance of one species can have deleterious effects on the stability of an entire ecosystem, not just a chain of three or four other species.[22]

Food webs and chains are divided into trophic levels, which are categorized according to the species' role in the web. The first trophic level is that of producers, or species that produce their own food (like plants), which are thus referred to as autotrophs. Generally, these include plants, algae, phytoplankton, and some types of bacteria.[23] At the second level are consumers, or those species which exist by

19 N. Gruber *et al.*, *The Vulnerability of the Carbon Cycle in the 21st Century: An Assessment of Carbon-Climate-Human Interactions*, in: *The Global Carbon Cycle: Integrating Humans, Climate, and the Natural World*, eds. Ch.B. Field, M.R. Raupach, Island Press, Washington 2004, 45.

20 Ibid., 45-46.

21 *Food chain/web*, in: *Environmental Encyclopedia*, ed. D.S. Blanchfield, Gale, Detroit 2015.

22 K.S. McCann, *Food Webs*, Princeton University Press, Princeton 2012, 18-19.

23 Food chain/web, op. cit.

eating other species. This level can be broken down into further levels of herbivores and carnivores, though data suggests that omnivory is pervasive throughout the predatory trophic levels.[24] The last trophic level is made up of decomposers, which subsist on non-living plant and animal matter (e.g., vultures), thereby "releasing nutrients back into the ecosystem."[25] As with the carbon cycle, the stability of food webs depends upon the death and decay of organisms in order to continue the lives of others.

Trophic levels are measured in terms of "biomass," which is a measure that reflects "the accumulated weight of all living matter."[26] In a healthy food web, biomass decreases as the trophic levels increase to create a pyramid-like structure, so that there are more autotrophs than primary consumers, more secondary than primary consumers, and so forth.[27] When biomass in one trophic level is altered (which often happens as a result of human activity), it creates what is referred to as a "cascade effect." For instance, deforestation and the corresponding spread in urban and suburban environments in the U.S. has impacted the population of top-level predators like gray wolves and mountain lions, which have wider ranging habitats than primary consumers and are thus more affected by deforestation.[28] These kinds of predators are also more likely to be felt as a threat to humans, and are thus hunted and expelled from environments that are inhabited by humans. Without being kept in check by wolves, deer populations explode and in turn result in an overconsumption of vegetation, which also affect leaf litter, arthropods, breeding birds, and soil nutrients.[29] Trophic cascades are also caused by the forces

24 Ibid.; K.S. McCann, *Food Webs*, op. cit., 119.
25 Food chain/web, op. cit.
26 Ibid.
27 K.S. McCann, *Food Webs*, op. cit., 76-77.
28 J.W. Bressette, H. Beck, V.B. Beauchamp, *Beyond the Browse Line: Complex Cascade Effects Mediated by White-Tailed Deer*, Oikos 121(2012), 1749.
29 Ibis., 1749.

of human globalization, which introduce invasive species into new ecosystems. In many cases, invasive species have no natural predators within foreign ecosystems, and thus overconsume and unbalance the system.

2.3. EVOLUTION

Made popular by Charles Darwin, evolutionary theory follows a logic of natural selection by which species' populations grow more fit for their environments over time, as the most well adapted are the ones who live longest and are thus most able to reproduce. This manifests as greater adaptive abilities for a species overall.[30] For instance, it has been observed that the beaks of finches on Galapagos Island grow sharper after a drought, enabling them to eat rougher seeds than they had previously been able to break open.[31] Evolutionary theory also includes the less frequently cited sexual selection, in which one gender of a species evolves in ways which are preferable to the opposite sex but have no apparent adaptive purpose.[32] Perhaps the most well-known example of this, first suggested by Darwin himself, is that of male lions' manes, which seem to serve no purpose except to attract female lions.[33] As interesting a process as the latter is, however, it is primarily the former which will be dealt with here.

It is not only death and decay which are present in the evolutionary process, but struggle

is as well – and not everyone survives the struggle. In fact, the process of evolution depends upon the fact that less adapted versions

30 See Chapter IV, in particular pages 151-154, of Ch. Darwin, *On the Origin of Species: By Means of Natural Selection*, (6th edition), Floating Press, Auckland 2009.

31 *Natural Selection at Work*, in: *Understanding Evolution*, 2016, (http://evolution.berkeley.edu/evolibrary/article/evo_26), [accessed 08/2020].

32 Ch. Darwin, *On the Origin of Species*, op. cit., 158.

33 Ibid., 159. For a more contemporary unpacking of this idea, see: P.M. West, C. Packer, *Sexual Selection, Temperature, and the Lion's Mane*, Science 297(2002), 1339-1343.

of the species are less able to survive, and thus die having had little chance to reproduce.[34] Moreover, sometimes the adaptive traits themselves entail struggle for some members of the species in order to benefit others. Elizabeth Johnson cites the example of the "backup" pelican chick: pelicans lay two eggs per season. One hatches several days before the other and is taken care of by its parent pelicans. If something happens to go wrong with the older chick within the time when it is the only one hatched, a second chick hatches and the adult pelicans still have one successful offspring for the season. However, if the older chick is healthy, it fights for the food supply and overcomes the younger, which either starves or gets kicked out of the nest by its older sibling. This process, which is horrible for the individual backup chick, is ultimately adaptive for the species by allowing each pair to almost always have a fruitful breeding season and add to the population. The evolutionary process which is generative for life also comes with strife.[35]

Hazardous anthropogenic change is not as closely related to evolutionary processes as it is to the carbon cycle and food webs; or, perhaps more accurately, the longitudinal nature of evolution does not allow us to study anthropogenic change as effectively. However, as Rachel Carson noted several decades ago, species adapt through evolution slowly over time, and humans have made conditions on Earth change very quickly.[36] It is already possible to observe changes that populations have made in response to pesticides, antibiotics, and environmental toxins.[37] It is then certainly not illogical to believe

34 Ch. Darwin, *On the Origin of Species*, op. cit., 146.

35 E.A. Johnson, *Ask the Beasts: Darwin and the God of Love*, Bloomsbury, London 2014, 185-186.

36 R. Carson, *Silent Spring*, Houghton Mifflin Company, Boston 1962, 6-7.

37 R. Dunn, *The Garden of Our Neglect: How Humans Shape the Evolution of Other Species*, Scientific American, July 5, 2012, (https://www.scientificamerican.com/article/how--humans-shape-evolution-other-species/), [accessed 08/2020].

that anthropogenic environmental changes will have unforeseeable effects on future evolutionary processes.

It is possible to conclude from this discussion that death, destruction, and decomposition are facets of naturally-occurring ecological and environmental processes, and are in fact vital to the healthy functioning of those processes and the maintenance of life on Earth. Anthropogenic environmental degradation, however, introduces precarity into ecological systems by destroying too much – too much fossil fuel, too many forests, too many predators, too many pests. The current rate of human destruction is more than the environment can handle and is caused by an exploitative relationship with the earth, rather than a perspective that holds the environment as valuable in itself. The current rate and kinds of destruction, along with the anthropocentric framework that supports it, is neither sustainable nor in alignment with the kinds of destruction on which ecological systems depend.

3. BIBLICAL DESTRUCTION IN CREATION

In much of the literature within Christian ecological ethics, Genesis chapters 1 and 2 are used as a framework for understanding the environment, since it is here where God acts as Creator.[38] While this is accurate and often helpful, it does not necessarily represent a holistic picture of who God is and how God acts within the Scriptures. Alongside the act of creation rests the uncomfortable fact that God also wreaks God's fair share of havoc in both the Hebrew Bible and the New Testament. The theme of God's destructive force is consistent across testaments, eras, authors, and genres. By looking at the themes of destruction in Scripture, we see that destruction is not just a natural occurrence or result of human irresponsibility, but is also a theological category.

38 Chapter 2 of *Laudato Si'* is one prominent example of this method.

The purpose here is not to formulate a theodicy or an apologetic for violence of any variety, including that of God. However, recovering the theme of destruction within the context of God's activity functions in two important ways: first, it serves as a reminder that the role of destruction properly belongs to God, as does the role of creator. As God speaks in Dt 32:39, "I kill and I make alive; I wound and I heal".[39] Second, it offers a framework in which naturally-occurring ecological destruction and chaos can be helpfully incorporated into an understanding of creation.

The imprecatory psalms – those psalms that call for God's destructive capacity – are perhaps the most notoriously difficult texts in Scripture. Fourteen psalms can be defined as such, and several more contain imprecatory verses.[40] These psalms implore God to enact justice on Israel's enemies using graphic language such as "the bloodthirsty and treacherous/shall not live out half their days" (Ps 55:23) and, perhaps most infamously, "Happy shall they be who take your little ones/and dash them against the rock!" (Ps 137:9). As will be true of many of the passages in this section, these are very difficult verses to reconcile with a loving and redeeming God. It is not necessary to sanitize the horror and violence contained therein. At the same time, however, it is helpful to read and understand such verses in the context of history and the whole of Scripture.

John N. Day places the imprecatory psalms within the context of the Torah.[41] God makes the Mosaic covenant with Israel and gives Israel the Law as a part of that covenant. The Torah is not simply an arbitrary set of rules for Israel to live by – it is revelatory of a just system and the promise of God to God's people. In Deuteronomy, God's promise is that of vengeance. This is not predicated upon divine

39 All biblical citates from: *The New Revised Standard Version of the Bible*, 1989, (https://www.biblegateway.com/versions/New-Revised-Standard-Version-NRSV-Bible).

40 J.N. Day, *The Imprecatory Psalms and Christian Ethics*, Bibliotheca Sacra 159(2002), 169.

41 Ibid., 168.

anger, per se, but upon the *lex talionis*, or the law of retaliation meant to ensure justice, found in Exodus 21, Leviticus 24, and Deuteronomy 19: "Anyone who maims another shall suffer the same injury in return: fracture for fracture, eye for eye, tooth for tooth; the injury inflicted is the injury to be suffered" (Lev 24:19-20). God gives Israel the Law as a covenant. Having suffered violence at the hands of its enemies, Israel holds God accountable to the Law in turn.[42] The imprecatory psalms do not represent a call for excessive violence (at least not in what the psalmist would have considered "excessive") so much as they represent Israel's trust in the justice of God's law. It is also of utmost importance that the role of vengeance is given to God rather than carried out by individuals or the community.[43]

Terence E. Fretheim also reads the narrative of the flood in Genesis within the framework of the just order of God's creation. He notes that the story begins with the assertion that "the earth was filled with violence" (Gn 6:11) because of the corruption of humanity, and that this corruption is the impetus for the destruction of the flood.[44] The flood is foremost a product of human sin, which disrupts the moral order of creation and affects the earth itself. God does not witness misbehavior and then decide which consequence to assign; consequences are instead built into the moral order, whose role is to ensure that "sin and evil [do] not go unchecked and so that God's good order of creation can be maintained and, if necessary, reestablished."[45] Rather than being imagined as doling out punishments externally to the moral order, God is portrayed as acting as judge insofar as God acts *within* the moral order that God has created.[46]

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42 Ibid., 174.

43 Ibid., 169.

44 T.E. Fretheim, *Creation Untamed: The Bible, God, and Natural Disasters*, Baker Academic, Grand Rapids 2010, 42.

45 Ibid., 49.

46 Ibid., 49.

This, then, is the first takeaway of the flood story: God's destructive actions work within the order of creation. Destructive consequences are built into creation itself, with God acting as their mediator.[47] A second point is this: unlike the *lex talionis*, God's judgement leaves room for God's mercy.[48] At the beginning of Genesis 6:7, God intends to wipe out the entirety of humanity; by the next verse, a righteous Noah has "found favor" with God and thus managed to spare the future of humanity. God also intervenes on behalf of the ark's inhabitants in chapter 8 when God blows a wind to make the water subside (Gn 8:1).

But lest readers of Scripture come under the impression that creation operates with an absolute orderliness, the Book of Job serves to complicate the system. Job becomes an unwitting participant in a bet between God and the satan (understood as "a figure in the divine assembly, not the later devil"[49]) as the latter wagers that he can make the most faithful of God's servants curse God when exposed to hardship (Job 1:10-12). Steeped in a worldview which maintains that suffering is the direct result of sin, Job's friends attempt to convince him that his suffering was brought upon himself. Job, however, remains steadfast in asserting his innocence and demands accountability from God. Believing that creation is meant to be ordered such that it functions in correspondence to human behavior, Job faults God for not maintaining an orderly creation.[50]

Although Job is correct in asserting his innocence, as evidenced by God's rebuke of Job's friends (Job 42:7), his challenge to the injustice of his situation is a flawed one. When Job confronts God, God responds by presenting the portrait of a world that is much larger than Job. God responds with discourses on great, fearsome beasts

47 Ibid., 55.
48 Ibid., 48.
49 Ibid., 69.
50 Ibid., 74-75.

– the behemoth (Job 40:15) and the Leviathan (Job 41:1) – which God has created and which only God can approach because of their great power. These beasts represent an unconquerable chaos intrinsic to the world. God also points out the seemingly nonsensical nature of an ostrich, which stupidly lays its eggs where they can be trampled upon (Job 39:14-15).[51] Even Godself appears to Job in the presence of something generally associated with a chaotic and destructive natural disaster – the whirlwind.[52] It is misleading to make an appeal to injustice to criticize a worldly order that does not correspond directly to human activity, because a mysterious chaos is intrinsic to the created order. God's response "expands Job's horizon to the point where he deeply grasps that God's love does not act according to the rules of retribution which a penal view of history insists upon, but like all true love operates freely in a world of grace that completely enfolds and permeates him, even in pain."[53] Chaos and suffering are intrinsic to creation and cannot be understood through juridical human rationale, but nevertheless, God is present in both.

This hearkens back to Keller's point, made in the introduction: the sea, the deep, or the chaos in Genesis 1 provides the material for creation and does not entirely dissipate after God's creative activity. Far from being evil, the chaos maintains its place in a creation which God calls "good." As Fretheim points out, it would make little sense for God to give the instruction to "fill the earth and subdue it" (Gn 1:28) if the world were already subdued; in addition, the curse on the woman in Genesis *intensifies* the pain of childbirth, implying that some pain was already present in the world even prior to what is read as the original sin.[54]

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51 E.A. Johnson, *Ask the Beasts*, op. cit., 270.

52 T.E. Fretheim, *Creation Untamed*, op. cit., 77.

53 E.A. Johnson, *Ask the Beasts*, op. cit., 271.

54 T.E. Fretheim, *Creation Untamed*, op. cit., 41-42. This understanding of how sin interacts with the natural world is not unlike that of Karl Rahner, who asserts that although human struggles like "toil, ignorance, sickness, pain and death" must be somehow different

The awareness of other ancient creation stories in the modern era have led some to read the first chapter of Genesis as a battle between God and the chaos, paralleling the battle imagery used by the Enuma Elish and Ugaritic texts.[55] This theory posits that creation occurs when the orderliness of the divine overcomes the primordial chaos; the chaos of the waters in Genesis 1 thus become identified with the enemy to be defeated.[56] However, others have used a linguistic analysis of Genesis and the creation myths of the ancient Near East to conclude that "the background of the Genesis creation story has nothing to do with" this theory.[57] Rather, as the instruction to subdue the earth, the flood, and God's conversation with Job show, the chaos has not been destroyed, but remains an embedded and often destructive force within creation. The fact that chaos and destruction remain within the cosmos is not the problem; rather "the problem is the habituation to an order of symmetrical, fixed identities, an order expunged of chaos."[58] And although some texts demonstrate an eschatological hope for the end of chaos, destruction, and pain (e.g., Romans 8), these texts generally refer to destruction or pain that is futile and/or the result of sin, rather than destruction that is a necessary element of the natural world.

However, if it is possible to assert that chaos is not a problem, this raises another issue: what to do with eschatological understandings that do away with chaos, decay, or the sea itself. If decay is a vital part of ecological systems, as demonstrated in the first section, what is there to do with a passage such as Romans 8:20-23? It reads: "For

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because of the existence of sin, these things are part of how the natural world works and thus must be assumed to have existed since the beginning. Karl Rahner, *Foundations of Christian Faith: An Introduction to the Idea of Christianity*, trans. from German W.V. Dych The Seabury Press, New York 1978, 115.

55 C. Keller, *No More Sea*, op. cit., 187.

56 D. Tsumura, *Creation and Destruction: A Reappraisal of the* Chaoskampf *Theory in the Old Testament*, Eisenbrauns, Winona Lake 2005, 190.

57 Ibid., 143.

58 C. Keller, *No More Sea*, op. cit., 193.

the creation was subjected to futility, not of its own will but by the will of the one who subjected it, in hope that the *creation itself will be set free from its bondage to decay* and will obtain the freedom of the glory of the children of God. We know that the whole creation has been groaning in labor pains until now; and not only the creation, but we ourselves, who have the first fruits of the Spirit, groan inwardly while we wait for adoption, the redemption of our bodies (emphasis mine)."

It is first important to note that Paul ties together the fate of humanity and the fate of creation. Creation and humanity groan together; the resurrection of the body is bound up with a renewal of the earth.[59] However, deeper understanding of the passage comes with an analysis of how the image of "labor pains" is used.

Conrad Gempf analyzes the ways in which the New Testament utilizes the imagery of "labor pains" or "birth pangs" and concludes that, while there is sometimes a productive or positive outcome implied by the metaphor, this is not always the case.[60] Often, it is more illustrative of the fact that for women in the ancient world, pregnancy and labor were a dangerous endeavor.[61] Therefore, lacking reference to a positive outcome, this passage is one example of the biblical image of birth pangs that connotes a theme of helplessness and frustration.[62] The labor pains with which creation groans are not resolved via a birthing process but are instead connected to creation's subjection to futility – in fact, Paul must mix metaphors and assert humanity's *adoption* in order to express a hopeful message,[63] which

59 J. Moo, *Continuity, Discontinuity, and Hope: The Contribution of New Testament Eschatology to a Distinctively Christian Environmental Ethos*, Tyndale Bulletin 61(2010)1, 28-29.

60 C. Gempf, *The Imagery of Birth Pangs in the New Testament*, Tyndale Bulletin 45(1994)1, 126.

61 Ibid., 122.

62 Ibid., 124.

63 Ibid., 126.

is not that the pain of creation will be productive, but that it will eventually end.[64]

Carrying this reading further, Laurie J. Braaten asserts that the groaning of creation can be associated with mourning rituals.[65] According to Braaten, there are nine instances in the Hebrew prophets in which creation is said to mourn because of human sin or the subsequent divine judgement.[66] In each case, the motif functions as a lament for the unjust suffering of creation.[67] While Paul was most likely familiar with this motif in the prophets, he probably was not aware of the destruction involved in carbon cycling. When reading Romans 8 through this lens, then, creation seems to be lamenting its bondage to the effects of sin which cause decay, frustration, and futility.

Taken together, these texts lend five important ideas to a theological interpretation of destruction and creation:

First, destruction operates within a framework of moral order. Whether the flood in Genesis, the groaning creation in Romans, or the law codes in the Torah, excessive destruction appears as a consequence of sin and operates under a certain understanding of the order of the world. For the biblical texts, destruction is often a matter of justice.

Second, God is held accountable to that order. As Fretheim asserts, God acts as a mediator of the destruction that is ultimately caused by human violence. This posits God as existing within the order of the world and acting according to its rules, not as an external force acting upon the world. God is also held accountable to the law which God has given when Israel calls out for God's justice in the imprecatory psalms.

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64 Ibid., 124.

65 L.J. Braaten, *The Groaning Creation: The Biblical Background for Romans 8:22*, Biblical Research 50(2005), 23.

66 Ibid., 29.

67 Ibid., 31.

Third, creation and destruction both properly belong to God. The imprecatory psalms also make clear that justice is for God to carry out. In Deuteronomy, God asserts Godself as the one who kills and gives life, who heals and wounds. Genesis 1 and 2 reveal God as Creator, while the book of Job illuminates that God's creative capacity is beyond human understanding.

Fourth, there is eschatological hope for the end of undue suffering. Romans points to a hope that the day will come when the earth need no longer lament the effects of human sin. However, there is a distinction to be made between destruction or decay that is a result of sin and that which is part of natural processes. The latter need not necessarily disappear in the eschaton.

Fifth and finally, creation contains a certain amount of chaos. Existing alongside order, this chaos can be dangerous or destructive, as evidenced by the flood, the earth to be subdued, the behemoth, and the Leviathan. The danger of the chaos, though, does not make it evil – it is included within the creation called "good." In fact, it is the interaction of order and chaos that allows for "what is novel, interesting, creative, and complex to take place."[68] The existence of chaos is what permits creative potential to remain part of the world, thus allowing persons to take part in creative processes.[69]

4. CO-CREATION AND ECOLOGICAL DESTRUCTION

In *Laudato Si'*, Francis echoes the understanding that creation's chaos allows for creative potential: "creating a world in need of development, God in some way sought to limit himself in such a way that many of the things we think of as evils, dangers or sources of suffering, are in reality part of the pains of childbirth which he uses to draw us into the

68 C. Keller, *No More Sea*, op. cit., 195.
69 T.E. Fretheim, *Creation Untamed*, op. cit., 86.

act of cooperation with the Creator."[70] *Gaudium et Spes* and *Laborem Exercens* cite human work as participation in the activity of God, thereby making persons "co-creators" with God.[71] Although this is considered a bold theological claim by some,[72] proponents of the idea situate it as a necessary part of humans being created in the image and likeness of God. Claude Tresmontant, for instance, asserts that the ability of persons to create themselves and participate in their own transformation is precisely what God intended by creating persons in God's own image.[73] God's creative activity and humankind's creative activity exist in a symbiotic relationship.[74] Indeed, human co-creation is crucial for persons to become holy, since holiness requires an active participation in understanding and not just passive obedience.[75] In *Laborem Exercens*, John Paul II couches the idea in the human vocation of labor, where God works as *the* Creator, and humans, made in God's image, are called to act as co-creators when they work.[76] According to this model, humans, in their very being, are created for creativity. Work is not just some wearisome task that

70 Francis, *Laudato Si'*, op. cit., 80.

71 P.A. Lamoureux, *Commentary on 'Laborem Exercens' ('On Human Work')*, in: *Modern Catholic Social Teaching: Commentaries and Interpretations*, eds. K. Himes *et al.*, Georgetown University Press, Washington 2005, 394. This concept has also been used extensively in discussions of bioethics and sexual ethics, but such an analysis is outside the scope of this paper.

72 D. Hollenbach, *Human Work and the Story of Creation: Theology and Ethics in 'Laborem Exercens'*, in: *Co-Creation and Capitalism: John Paul II's 'Laborem Exercens'*, eds. J.W. Houck, O.F. Williams. University Press of America, Washington 1983, 60.

73 C. Tresmontant, *A Study of Hebrew Thought*, trans. from French M.F. Gibson, Desclee Company, New York 1960, 151.

74 Ibid.

75 Ibid., 155.

76 D. Hollenbach, *Human Work and the Story of Creation: Theology and Ethics in 'Laborem Exercens'*, op. cit., 63-64. As noted above, the encyclical puts forth the idea of co-creators without using the term itself: "Man is the image of God partly through the mandate received from his Creator to subdue, to dominate, the earth. In carrying out this mandate, man, every human being, reflects the very action of the Creator of the universe." John Paul II, *Laborem Exercens*, op. cit., 4.

must be carried out for the sake of survival, but an invitation to participate in the divine activity of creation for the benefit of both humans and creation.

When the application moves from the concept of work to the concept of environmental development such as that found in *Laudato Si'*, however, the claim becomes even bolder. If natural, creative, ecological processes include decay and destruction, as demonstrated above, what does that mean for human activity that is "co-creative"? Philip Hefner's theological theory of the human as "created co-creator" provides a way forward. Given the thorough nature of his definition, it is worth quoting at length: "Human beings are God's created co-creators whose purpose is to be the agency, acting in freedom, to birth the future that is most wholesome for the nature that has birthed us – the nature that is not only our own genetic heritage, but also the entire human community and the evolutionary and ecological reality in which and to which we belong. Exercising this agency is said to be God's will for humans."[77]

Hefner's proposal is of particular value to this discussion because of his emphasis on humanity's situatedness in the rest of the natural environment. He asserts that, as created beings, humans are both free and conditioned: "To be created is to be derived, to be dependent upon antecedent factors (environmental, biological, cultural) as well as contemporary sources (environmental, cultural)."[78] It is from this set of conditions that humans' free, co-creative activity emerges, in alignment with God's will for humankind. For Hefner, humans are able to derive some knowledge about their meaning and purpose from their placement in nature and their contribution to it.[79] This assertion does not assume that what "is" is what "ought to be," but relies on the

77 P. Hefner, *The Human Factor: Evolution, Culture, and Religion*, Fortress Press, Minneapolis 1993, 27.

78 Ibid., 36.

79 Ibid., 41.

theological understanding that "nature is the medium through which the world, including human beings, receives knowledge, as well as grace."[80] Humans gain knowledge not only of what exists in their environment, but what processes are necessary for its functioning and flourishing.[81] We can therefore understand our purpose as humans by understanding how best to contribute to the wholesome flourishing of our environment.

Because of the tendency to link destruction and chaos with evil, as Keller observes happening in both history and theology, those who participate in projects that entail destructive activities might be inclined to see destruction as a necessary evil. Few would say that they desire to willingly perpetrate evil – but if destruction is necessary for humans to survive, what else is to be done? However, the equation of destruction with evil is not only theologically flawed and ecologically unrealistic; it also leaves persons and societies with no ethical guideline about how to destroy *well* in the midst of creative activity. As Manuel G. Doncel asserts, following Hefner, humans are conditioned by the ecological systems, social groups, and biology with which they find themselves – but a conditioned existence gestures toward an existence that belongs, and belonging comes with an acknowledgement of physical limitation as well as ethical obligation to other humans and to the rest of the environment.[82] If we are to take seriously Hefner's hypothesis that humanity's purpose can be drawn from observable nature, we must acknowledge that humans exist within ecological systems in which life depends upon the destructive capacities of that same ecological system, and that those systems contain chaos as much as they contain order. Humans must therefore theologically reflect on the destructive and chaotic aspects of nature

80 Ibid., 42.

81 Ibid., 40.

82 M.G. Doncel, *The Kenosis of the Creator and of the Created Co-Creator*, Zygon 39(2004)4, 794-795.

when discerning how to best participate in the ecological systems of which they are a part.

However, and importantly, acknowledging processes of destruction within ecological systems as well as within a theological framework does not lead to an unmitigated approval of destruction, but instead limits the exercise of anthropogenic environmental degradation. If viewed in theological perspective, humans are co-creators with God, and so they are bound to the creative limits set by the Creator. As argued above, God's destructive activity operates within a moral order that holds God accountable to it, may well continue in the eschaton, and works hand in hand with creative activity. And since creation and destruction both properly belong to God, humans are bound to these characteristics of destructive activity as well when working as co-creators. Within this framework, just or natural destruction – that is, destruction not caused by sinfulness such as over-consumption of material goods – functions in very specific and limited ways which ultimately work to further creative processes rather than impede them. Destructive capacities found in nature work toward the maintenance of life in the same way as God is seen acting in Scripture. For the "created co-creator," chaos and struggle are integrated into the created order of the world insofar as they provide the fertile ground to cooperate with the Creator in a creative process.[83]

Human interaction with the environment often necessitates destruction – after all, with very limited exceptions,[84] human creative activity requires the destruction of something else. The material for creation must come from somewhere. As demonstrated in the first section, this is true of the carbon cycle, food webs, and evolution; it

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83 See P.A. Lamoureux, *Commentary on 'Laborem Exercens' ('On Human Work')*, op. cit., 394.

84 Perhaps the only exceptions are creative enterprises such as music-making or writing, assuming that neither is disseminated on paper.

is also true of buildings, infrastructure, transportation mechanisms, clothing, and other material facets of human reality. If chaos and destruction are acknowledged as necessary elements of the world and its ecosystems, it becomes possible to instead cooperate in processes of destruction that are oriented toward a holistically creative framework in which the environment can flourish.

One example of how this might look in practice is "prescribed fire," which is a natural resource management technique that is both destructive and creative. Because of human activity, natural fires are excluded from certain environments. This allows invasive fire-sensitive species to grow alongside species that, over the course of natural fires, had been naturally selected for fire-insensitivity.[85] By burning parts of environments like these, ecosystems which had been imbalanced by invasive species or lack of natural fire are rebalanced. The practice is destructive for clear reasons, but through the destruction of some areas or species, the environment increases in richness and biodiversity among native species and becomes resistant to the much more destructive fire caused by anthropogenic climate change.[86] By placing destruction within the framework of creation, it becomes possible to understand both creation *and* destruction as parallel elements within the same movement toward an ethical relationship with the earth. A healthier creation – one that is native and more diverse – is brought about by cooperating with naturally-occurring destructive processes.

Cooperation between destruction and creation can also be observed in the example of sustainable logging practices. Creative projects often necessitate the use of wood, which can only be attained via the destruction of trees; but how that destruction is carried out may make

85 A.C. Livingston, J.M. Varner, E.S. Jules, J.M. Kane, L.A. Arguello, *Prescribed Fire and Conifer Removal Promote Positive Understorey Vegetation Responses in Oak Woodlands*, Journal of Applied Ecology 53(2016), 1604.

86 Ibid., 1610.

the difference between a sustainable practice and the degradation of an entire ecosystem. For instance, reduced-impact logging in Malaysia has been able to maintain the integrity of the Deramakot Forest by restraining the amount and kind of annual harvesting and promoting the practice of rehabilitation planting.[87] Alongside the maintenance of the Deramakot Forest ecosystem, such a practice is attentive to the carbon cycle through the conservation of carbon sinks. A key to sustainability is thus not avoiding destruction altogether, but employing it in ways that work with the natural ecosystem and ecological processes.

5. CONCLUSION

Destruction, decay, struggle, and chaos are intrinsic elements in the earth's ecosystems that are necessary for the proper functioning of ecological processes. This fact, observable in the natural environment, is paralleled by a biblical framework which posits destructive activity as occurring within a moral order, either as caused by human sinfulness, mediated through God's presence within the order, or as a result of the mysterious chaos that is inherent in creation.

The type of environmental degradation which has caused the current ecological crisis is undoubtedly the result of human sinfulness, at least in part.[88] For instance, *Laudato Si'* explicates that humans have wrongfully interpreted God's call in Genesis to have "dominion" over the earth as permission to exploit the earth, leading to sinful ecological destruction.[89] One might point to the overuse of fossil fuels, the commodification of water, or the mass extinction of species as evidence. Aside from identifying sinful destruction, however,

87 P. Lagan, S. Mannan, H. Matsubayashi, *Sustainable Use of Tropical Forests by Reduced--Impact Logging in Deramakot Forest Reserve, Sabah, Malaysia*, Ecological Society of Japan 22(2007), 416.

88 Francis, *Laudato Si'*, op. cit., 2.

89 Ibid., 66-67.

an analysis of ecological and theological frameworks aids in an understanding of how natural processes of decay and destruction should be thought of as building toward the enrichment of creation and not as an inevitable evil. As Keller argues, a shift away from fearing chaos to accepting (and even loving) it as a part of creation that cannot be reduced to a logical or juridical system will help human communities take a step toward interacting holistically within the environment rather than trying to conquer it.[90] If humans are to participate in God's creative activity as "created co-creators," and thus fulfill their purpose as humans, the reality of destruction within environmental systems must be acknowledged and analyzed so that humans can learn to participate in natural processes of destruction rather than wreaking havoc upon the earth.

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90 C. Keller, *No More Sea*, op. cit., 198.

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