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In This Issue …

"The fear of the Lord is the beginning of Wisdom."
Psalm 111:10

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James C. Peterson

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Transitions

It takes a small army to develop and produce each issue of *PSCF*. We want to thank all who make that possible, with particular thanks at a time of transition to Judith Toronchuk, now leaving the *PSCF* editorial board. Carrying on for Judy will require two new editorial board members: Bethany Sollereder, professor of theology at the University of Edinburgh; and Sy Garte, biochemist and the sage editor of ASA's *God and Nature*.

We must also thank Sara Tolsma for her compelling service as a subject area editor. Biology, ecology, and origins will now be led by Se Kim of the National Academies of Sciences, Engineering, and Medicine. Lauren Seifert of Malone University will be insightfully expanding and guiding our social science reviews.

Appreciation goes as well to John Wood for a lifetime of service that we hope will emulate the Dúnedain. The last three years he has focused on ASA as the interim executive director. We turn now to the accomplished Janel Curry to carry on that work as ASA president.

It should be noted as well that in the midst of all this change, that ASA has grown in size. It has expanded its outreach through local chapter meetings, virtual Brown Bag Lunches, monthly Diving Deeper Discussions, symposia, *God and Nature*, a YouTube channel for ASA and another channel for CSCA, and both in-person and virtual annual meetings. These are round-the-calendar opportunities to share and test what we are discovering.

Reflecting on this, the ASA Board of Directors has concurred unanimously with *PSCF* that we are at the point where that round-the-clock rhythm can best be served by publishing *PSCF* for the fall, winter, and spring quarters, with scholarly focus shifting in the summer quarter to proposals, presentations, and dialogue at the July annual meeting. Since the annual meeting is now in person and virtual, it is available and encouraged for all, wherever they may be.

This is not to announce a reduction in *PSCF* content. Issues can be expanded to cover just as many pages over three issues as over the current four. By going to three issues only and with the annual meeting as the focus in person or virtually in the summer quarter, and with new services as listed above, plus all the other interactions, we are still encouraging new challenges and ideas throughout the calendar year. Three journal publication dates instead of four can redirect some significant costs (such as printing and mailing) to other member services, and it can lessen what has become a significant strain on our office team. Currently, they amazingly process the June issue at the same time as handling all the arrangements, registration, and programming tasks for the annual meeting.

This is a fitting moment then to recognize and thank our ASA team for so expertly meeting the many support needs of our members and programs even as our numbers and events have rapidly expanded. Much appreciated. ►

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Article

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Taxonomic Theology: An Interdisciplinary Approach to a Bibiblical and Biological Theology of Naming

Beth Stovell and Matthew Morris

Taxonomic theology couples a biblical theology of naming with the science of taxonomy to highlight resonances between these disciplines while encouraging fruitful avenues of ethical and theological exploration around the naming of living things. Categories of discussion include the creative, relational, and protective aspects of taxonomy, embedded in a biblical theology of image, stewardship, worship, and blessing. Taxonomic theology offers insights for the taxonomist, the theologian, and the Church as a way to move from theory to practice.

Keywords: Genesis, creator, creation care, Adam, hermeneutics, taxonomy, folk taxonomy, evolution, conservation

In Genesis 2, God creates all "living creatures," brings them to Adam, and asks him to name them. Thus begins the story of taxonomy grounded in the biblical narrative. This article brings together a biblical scholar and an evolutionary biologist to draw an interdisciplinary picture of naming—what we have termed "taxonomic theology." The term "taxonomic theology" indicates that our exploration concerns both questions of taxonomy from a scientific perspective and questions of theology around naming from a biblical perspective. By combining these terms "taxonomy" and "theology" into one, our goal is to show that these two topics associated with naming are mutually informing. In doing so, this interdisciplinary work offers insights into potential theological and ethical responses arising from a deeper examination of naming in biblical and biological disciplines.

The first section of this article will draw on Genesis 2 and the broader frameworks of naming and care for "living creatures" to form a biblical theology of naming. The second section will then delve into the scientific implications of naming as a Christian mandate, exploring the relational, creative, and protective implications of naming from the perspective of evolutionary biology. The article will conclude with a dialogical section in which biology engages theology and theology responds to biology toward a taxonomic theology for Christians today.

A Biblical Theology of Naming

Genesis 2:19–20 describes how God brings the animals ("living creatures") before Adam and Adam names them.

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When we read this depiction of Adam naming the animals in the broader context of Genesis 1–2 and the rest of scripture, it provides several key biblical insights about the value of naming in the Bible that have implications for a taxonomy today.

Naming Is a God-Given Human Affinity

While historically a common way of approaching Genesis 2:19–20 has been to focus on Adam's authority in naming or on the inadequacy of animals for Adam's mate, this approach has led to many questions among recent biblical scholars about whether the context actually warrants such a reading.[1] Others have argued that it is better to read the Hebrew word *adam* in this passage in light of the universal use of the term rather than the specific use. The universal use of *adam* focuses on *adam* as "humanity" rather than the specific use of the figure "Adam," a male person.[2] When one reads this verse with all of humanity in mind, it points to God's call to all humanity to name the living creatures that surround them. This would depict naming as a human capacity given by God that we could expect to see across all cultures around the world. As David Clough explains,

> Adam's action has often been interpreted as an indication of power over other creatures, but the giving of a name to each animal rather suggests attention to its particularity. Adam's attempt to comprehend the fellow creatures he found about him has echoed through human history by attempts to order creaturely diversity.[3]

This reading aligns well with scientific research that shows the universal quality of human naming of nature. As Carol Kaesuk Yoon explains in her *Naming Nature,* folk taxonomy shows us that the desire to name the created world is cross-cultural, lying in the deep recesses of a shared human need. This human need is further evidenced in the research on damage done to the organizational parts of human brains, showing a specific part of the brain where the categorization of living things resides.[4]

Biblical scholars have also emphasized not only the care associated with *adam's* naming of the animals, but also *adam*'s knowledge. For example, Tremper Longman III focuses on the unique relationship between human speech in the act of naming in comparison to the lack of speech in animals. Longman states:

> Naming is a unique ability of humanity among all of God's creatures, indicating language and the ability to categorize. As Alter puts it, "Man is superior to all other living creatures because only he can invent language, only he has the level of consciousness that makes him capable of linguistic ordering."[5]

From a biblical perspective, this reading of Genesis 2:20 fits with the broader context of Genesis 1–2. Genesis 1 pictures God's creation of humanity, male and female (Gen. 1:27), and then God commands them to care for the world God created (Gen. 1:28). Both humans and nonhuman life are called to be fruitful, multiply, and fill God's creation (a blessing to marine and bird life in Gen. 1:22 and to humans in Gen. 1:28). Yet in Genesis 1:28, 2:15, and 2:20, God calls upon humanity to do more. As Moo and Moo tell us,

> The command for human beings to "rule" over other creatures (Gen. 1:26, 28), the charge to "work … and take care of" the garden (Gen. 2:15), and Adam's naming of the animals (Gen. 2:19–20) all serve to challenge us to undertake study of the world and to come to know it as well as we can so that we might appropriately rule in it and serve our Creator well.[6]

If humans are called by God to study the world and name the elements of creation, then the call described by Moo and Moo includes both the scientific forms of naming that we find in taxonomy and the broader forms of common naming found in the natural world. If this desire to name is God given, then the naming processes we use should be God directed and shaped by Christian ethical principles that are consistent with God's vision for care for God's good creation.

Naming Is Part of Stewardship of God's Good Creation

Recently scholars of Genesis have focused on the call to steward God's creation throughout Genesis 1–2.[7] This view of stewardship gives the actions of naming in Genesis 2:19–20 a wider context that helps inform how we read the implications of *adam's* act of naming the animals (living creatures). First, Genesis 1–2 provides us with a picture of both animals and humans as "living creatures" (in Hebrew *nephesh khayyah*). The creation of animals as "living creatures" is mirrored in the creation of *adam* as a "living creature."

The same Hebrew phrase *nephesh khayyah* meaning "living creature(s)" in Genesis 1:20, 24, 30 and 2:19 is the phrase used of *adam* in 2:7. Similarly, the wild animals are "made from the ground" (2:19) and *adam* is "made from the ground" (2:7) (again the Hebrew phrase is identical). There is much that suggests that Genesis 2:7 and 2:19 should be read in close relationship to one another. This universal figure *adam,* as a human made from the ground (like the wild animals), is a "living creature," and is then asked to name the other "living creatures." Our translations tend to obscure this by calling Adam a "living being" rather than a "living creature" (Gen. 2:7) when God's breath fills him. But the phrase in Hebrew is the same. This has implications for the goals of creation care that seeks good not only for human and animal life, but even more broadly for all "living creatures."

Humanity (*adam*) is not only described like the animals around them, but they are then called to name those "living creatures" as part of the larger call to "work … and take care of the garden" (Gen. 2:15). Moo and Moo state,

> It is unsurprising that the very first thing Adam does in Genesis 2:19–20 is to name the animals. To name is to begin to know; if Adam is to serve and protect the garden and rule over other creatures, he needs first to be able to name them.[8]

Thus, Moo and Moo read the call to name not as primarily about authority and domination, but instead as a sign of knowing for the purpose of caring and protecting the created world.

Whether our naming of the created world comes in the form of common naming practices or scientific taxonomy, the biblical picture in Genesis 1–2 shows us that such naming is guided by a desire to serve and protect the goodness of God's creation.

Naming Should Reflect God's Glory Rather Than Function as a Quest for Human Fame

The same language used to describe the naming of the animals in Genesis 2:19–20 is found in other parts of Genesis. These other uses of this naming formula help us better understand the role of naming in scripture more broadly. This approach examines instances of similar linguistic structures of naming as a guide for thinking not only about naming of animals, but also about broader conceptions of naming in Genesis and in other parts of the Old (and New) Testament.

First, Genesis 5:2 describes how God created male and female and named them "human." This verse repeats the same language of naming found in Genesis 2:19–20, which uses the phrase "call" (*qara*) + "name" (*shem*). In other parts of Genesis, first the people (Gen. 4:26), then Abram (12:8, 13:4) "call on the name of the Lord" (NIV). In Hebrew, the language in Genesis 2:19–20 of *adam* calling animals by name (*qara* + *shem*) is the same phrase as calling on the name of the Lord, but now the word "Lord" (*YHWH*) is included in this phrase (*qara* + *shem* + *YHWH*). Moo and Moo have noted that this connection between Genesis 2:19–20 and these other parts of Genesis suggests that the act of naming is associated with the act of worshiping God.[9] This view of naming would be consistent with the larger themes of the Name of the Lord found throughout the Old Testament, where the Name of the Lord aligns someone or something as a form of memory of the Lord and a form of ownership. The Lord's Name claims this person, place, or thing as God's own and as a testament to God.[10] Thus, naming reflects God's glory in his creation of the name bearer.

Another use of a naming formula can be found in Genesis 11. However, this example of naming shows a stark alternative vision from that of Genesis 5. Instead of using naming for God's glory, humans use naming for their own fame. In Genesis 11:4, the people of Babel say, "Come let us build ourselves a city … so that we may *make a name for ourselves*." The Hebrew indicates something important about the use of naming. Rather than being name bearers or naming animals for the purpose of care and protection, the people of Babel have chosen to make a name for themselves. Here a reflexive form of the Hebrew verb *asah* (to make for themselves) is used with *shem* (name). This reflexive form flips the order of naming: instead of God making creatures and asking humans to name them as we find in Genesis 1–2, humans are trying to *make* a name for *themselves*.[11] The result of this action is that human communication is dissolved as languages multiply. While Acts 2 will overturn the cursing aspect of Genesis 11, as the Holy Spirit speaks to the people present in their multitude of languages,[12] nonetheless, the removal of human communication in Genesis 11 acts as punishment for the inverted ways of naming practiced by the people of Babel.

In response to the people trying to make a name for themselves, God scatters the languages and instead

"calls a name" of Babel (again using *qara* + *shem*) (Gen. 11:9). While the Hebrew does not specifically include the subject who names the city here, at least one interpretation of this verse is that God retakes the role of naming of this city.[13] Rather than the city and its tower making a name for the people that gives them fame, God calls the city by a name to remember the problems created by the people because of their lust for their own glory. This leads to another biblical insight valuable for taxonomy: if the goal of taxonomy becomes the praise of the scientist rather than the honoring and protecting of God's creation, then a Christian approach to taxonomy has lost its way.

Naming Emphasizes the Importance of What Is Named and Stamps the Name Bearer as God's Whereas Removing a Name Represents a Curse

Throughout the Old and New Testament, the act of naming has significance for the name bearer and for those who hear of the name bearer and their name. Isaiah 40:26 tells the story of God making the starry host and naming them. A similar theme of creation and naming is in Isaiah 43:1, describing the creation and formation of Jacob/Israel and the summoning by their name, to show that they belong to God. Isaiah 43:7 continues this theme of creation and naming. Now all whom God "created for [his] glory" and "formed and made" are "called by [his] name." In prophetic literature and in the Gospels, naming can be associated with God's activity in a person's life and/or in the lives of God's people.[14] Thus, naming is more than an objective process that is separated from the name bearer: naming marks a person or creature or place as God's and thereby points to their importance and value.

In contrast, throughout the Old and New Testament, the removal of names functions as a curse. In Deuteronomy, a common curse is the removal of a name, often described as "blotting out their name" or "wiping out their name" (Deut. 7:24; 9:14; 12:3; 29:20). Joshua 7:9 continues this notion of blotting out names with the Canaanites.[15] Revelation 3:5 describes the hope for God's people in terms of a reversal of this curse: "The one who is victorious will, like them, be dressed in white. I will never blot out the name of that person from the book of life, but will acknowledge that name before my Father and his angels" (NIV). Here, in Revelation 3, we see the opposite of the curses in Deuteronomy and Joshua: the victorious one (in Christ) will never have their name blotted out from the book of life; instead, Christ will acknowledge their name before his Father and his angels. Thus, Revelation 3 emphasizes the themes we have pointed to above: giving a name and acknowledging that name point to the value and importance of the name bearer, while removal of that name is a path toward death.[16] This has important implications for modern taxonomy when naming or removing names can mean the difference between life and death for a species.

Thus, throughout the Old and New Testaments, naming matters. Naming in scripture points to naming as a God-given human affinity. This human affinity comes with blessings as well as responsibilities. Humans are called by God through naming to be stewards of God's good creation, serving and protecting it. Humans must avoid the tendency to use naming to try to make their own names great and instead give glory to God's name through their actions. In scripture, naming emphasizes the importance of what is named as it stamps the name bearer as God's. In contrast, removing a name represents a curse that has the potential for death. Each of these aspects of a biblical theology of naming has implications for scientific naming, as we will further explore below.

Taxonomy and the Biology of Naming

The science of taxonomy and its allied systems of nomenclature, the pursuit of naming and categorizing living things, is one of the earliest fields of modern biology.[17] Although Linnaeus, sometimes referred to as the "second Adam,"[18] was not the first to categorize the natural world, his method had several advantages over previous attempts, including brevity and coherence. The scientific enterprise of naming that he pioneered is distinct from, but has important resonances with, a biblical theology of naming. In this section, a biologist will describe the enterprise and significance of the science of naming. The focus on taxonomy is not to suggest that Adam was a taxonomist, nor is it to suggest that nonexperts cannot develop their own names for things; rather, it is to highlight parallels between biblical naming and the systematic methodology for naming employed by scientists. Other systems for naming creatures likely follow similar principles, such as indigenous names for species, names given to foods,[19] labels such as "native," "alien," and "weed."

The Rules of Naming

Living things can receive an assortment of geographically or culturally specific names. Consider, for instance, the sockeye salmon. It can be called alevin, fry, parr, smolt, or jack depending on the lifestage or sex of the fish; Kokanee or little redfish, if it inhabits lakes; red or blueback salmon, depending on cultural norms; and lox, when its flesh is cured in brine—and these are just the English names.[20] Before Linnaeus systematized naming, if one naturalist wished to write about a species with a broad geographic range, there was no guarantee that other naturalists would recognize the common name that the former had used, potentially resulting in the "discovery" of the same species multiple times, under different names.[21] Indeed, pre-Linnaean documents can include species names that are difficult to reconcile with known species. What was the *dag gadol* that swallowed Jonah?

Early attempts at providing a scientific, normalized name did not help matters, with a single species name being a Latin description of its salient features: a single name could involve several dense lines of Latin.[22] Linnaeus's gift to taxonomy was to formalize an organizational system that could cut through both the diversity of vernacular names and the stultifying length of scientific names. The system of binomial[23] nomenclature was developed, wherein a species would receive a genus name, positioning it within the scheme of life, and a specific epithet.[24] In much the same way that Western human names tend to identify someone based on a family name (e.g., Edwards), and further identify the individual within the family (e.g., Jonathan Edwards),[25] so the wolf could be called *Canis lupus*, identifying it as something distinct (*lupus*) within a larger grouping (*Canis*). This simple rule brought order to a world of biological diversity that was becoming increasingly chaotic as explorers returned with exotic species that did not easily fit known categories.[26]

Linnaeus's system quickly became the dominant means of naming living things, but it was not without its difficulties. What should be done if two people named the same creature with different Latin binomials? What should happen if closer inspection of a species demonstrated there were, in fact, two species under one name? What if the species had been placed in the wrong genus? Taxonomy proved to be unlike other biological disciplines, in that it required the creation of firm rules of conduct in order to prevent slipping back into pre-Linnaean confusion.[27]

Today, rules for animal naming are governed by the International Commission on Zoological Nomenclature (ICZN), while plant, fungal, and algal naming are governed by the International Botanical Congress.[28] Each organization has its own code with distinct rules. Nomenclatural codes read like legalese, but their general purposes are to maintain order in the world of naming.

In brief, the rules of taxonomy include the following:

1. the use of binomial nomenclature;
2. the exclusive use of the English alphabet in species names, typically free of accents, punctuations, or other symbols;
3. valid species names must be published, with the date of publication set as the date of naming (and there are rules about what constitutes a publication);
4. those who name species are recognized for their work within the full species name;[29]
5. priority is given to those who published first, with limits set on how far back in time one may go to seek the "first" publication;
6. the process to follow if species names are changed;
7. what constitutes a valid species name, and what to do with names no longer in use;
8. the connection of a name to a physical specimen of the thing named, what is referred to as a type specimen.[30]

What is missing from the above list are rules regarding the semantic content of the name itself. Taxonomists utilize a philosophy of naming wherein species are considered individuals,[31] such that names are for referential purposes and are otherwise devoid of semantic content.[32] Thus the specific epithet of *Chaeropus ecaudatus* means "without tail"; no matter that the bandicoot does indeed have a tail.[33] Absurd names are also possible, such as the wasp *Aha ha* and the fish genus (appropriately now discarded to the realm of synonymy) *Sayonara*.[34] By ensuring that semantic content does not matter, order in naming is maintained; names do not need to be constantly updated to match our understanding of the natural history of a species.

Of paramount importance is the notion of the type specimen,[35] the original individual organism that was described in the first publication. This individual

becomes the name bearer for the species,[36] such that if the species is divided into two separate species, all individuals grouped with the type specimen retain the original species designation, while a new type specimen is determined for the new species.[37]

Also missing are rules defining what a species is, which gives taxonomists freedom to name things in the absence of evolutionary data. Collectively, the rules of taxonomy ensure consistency in naming practices, while allowing names to be testable hypotheses that can be revised as knowledge of evolutionary relationships change. Although the rules themselves are quite dry, the act of naming, as described by taxonomists, is creative, relational, and protective.

Naming Is a Creative Act

Despite what one might find in a natural history museum, creatures do not come nicely labeled. On the coast of British Columbia, one could be excused for believing that there is only one species of crow, the American crow (*Corvus brachyrhynchos*, literally "short-beaked crow"). Yet, ornithologists told us, at least until 2020, that there was a second species, identical in all appearances to the first: the northwestern crow (*Corvus caurinus*, literally "crow of the northwest wind"). What distinguished these species was their call;[38] molecular research determined that these species were genetically distinct, having split around 381,000 years ago.[39] When naming species, taxonomists are constantly faced with making decisions about what features are worthy of consideration. Was song, in the absence of other differences, enough to name a new species of crow? When making such judgments, taxonomists become creators of the natural world. Naming is a mix of philosophy (what is a species?), the uncovering of evolutionary relationships (systematics), and creative intuition about what is worthy of naming. Even when true evolutionary relationships are determined, creative decisions need to be made about which clusters of shared ancestry require unique names, and which do not.

It might seem odd to think of naming as an act of creation. Isn't God, through the evolutionary process, the species-creator, and aren't we simply the observers of species differences? Yet there are several practical reasons for considering the human participant as creator during the act of naming: naming brings order out of chaos; it brings species into existence to the human mind; and it is an act of intuitive creativity that seeks to stabilize a shifting world.

We have already discussed the rules of naming. These rules became increasingly important as Western naturalists encountered creatures on other continents that defied local naming customs. Different languages, different naming practices, and new species with strange physical features all conspired to subvert what had seemed like an organized natural world. The chaos of biodiversity threatened to overwhelm naturalists, as there became more species within each group than any one person could know in their lifetime. Scientific names for the same creature were published in different journals, in different regions, and under different languages. The rules were a creative act of organization, ordering the scientific enterprise of naming so that the denizens of this world could be properly organized, named, and known.

Naming not only organizes the natural world, it also brings beings into existence for the human observer. Any two individuals within a species differ phenotypically from one another. It is therefore not always immediately apparent which phenotypic differences are relevant for demarcating species; it takes careful observation and training to learn how to see relevant differences. For the lay person, these relevant differences are missed—until pointed out. In botany, this is termed "plant blindness," an inability by the general public, who lack training in botanical names, to see the diversity that surrounds them,[40] and it almost certainly applies to the world of insects, fish, fungi, and other noncharismatic animals.

Taxonomy helps overcome biodiversity blindness. Experts, through extensive training, see more clearly the relevant demarcators of a species, and help guide us to see the world as they do. Biodiversity that we missed suddenly becomes real to us, and this has real implications for our behaviors, including proper management of commercially important species. In a very real way, the taxonomist, when naming a new species, has brought it into existence to the human mind. The key here is that the creature need not, in reality, exist. So long as it has a name, it is real to *us*, and can be protected, studied, and loved.[41] The northwestern crow, we now know, is not a real species,[42] but its lack of reality now does not change the fact that it was very real to birders who for decades listened closely for the song that demarcated it from

its presumed relatives. Taxonomists giveth, and taxonomists taketh away; this is truly a creative act. Taxonomists change species names not only to update evolutionary relationships, but also because they disagree with the creative decisions employed by previous taxonomists.

Although the history of taxonomy has involved an increase in quantitative rigor, there is no replacement for the gut-level intuition that taxonomists develop over decades of observing individual organisms.[43] Evolution throws a curve ball in that the very thing we seek to name––the species––does not have a single robust definition.[44] The reason for this is that speciation is a process that can be muddied by convergent evolution,[45] hybridization, raceme models of evolution,[46] incomplete speciation, and horizontal gene flow.[47] Furthermore, speciation may involve physiological or cryptic phenotypes that we are unable to directly observe. Taxonomists therefore have to choose whether reproduction, morphology, ecological niche, evolutionary ancestry, or some other criterion should apply in any given case as justification for naming new species.[48] A recent book on taxonomy was entitled *The Art of Naming* precisely because the ability to identify those differences that biologically matter versus those differences that are tangential, involves creativity.[49] Thus taxa are constantly being revised and renamed, not simply because our understanding of evolution changes, but also because any two researchers may take a different creative approach to naming.

Disagreements on species boundaries can lead to the need for authoritative bodies to democratically vote on and maintain local species lists. The American Ornithological Society, for instance, maintains bird names in the United States, and recently voted, citing genetic and hybridization data, to strip the northwestern crow of its species status.[50] Intuition leads different researchers to different conclusions; democracy is required to ensure some degree of consistency so that research can continue. When there is no consensus, fierce debates arise between the "lumpers," who see one species with many populations, and the "splitters," who view each population as its own distinct species.[51] This lack of agreement reflects differences in human temperament, but has significant implications, particularly when a splitter wrote your field guide to poisonous snakes of the region but a lumper labeled the hospital's antivenom.[52] Incredibly, the rules of taxonomy are not designed to arbitrate between such differences of opinion.

Naming Is a Relational Act

We name what we love; this works well for charismatic species that are generally of interest to the public. J.B.S Haldane is famously believed to have said, "God has an inordinate fondness for beetles," remarking on the tremendous diversity of beetles that exists.[53] One could more accurately say that taxonomists have an inordinate fondness for beetles, and so have given more names to beetles than to any other taxa; estimates suggest there are actually more species of microwasps than beetles on this planet,[54] but substantially fewer people to love them. We need experts who can devote their lives to describing, naming, and generally being in relationship with those organisms the public pays less attention to. Unfortunately, these taxonomists are themselves becoming an endangered species.

Prior to DNA barcoding, naming required being in close proximity to the organism being named. It required careful observation, noticing the slightest variation in the minutest organs, casting aside those variations deemed uninformative and tallying up those that truly mattered. A taxonomist could devote their life to one group of organisms. Darwin famously began a year of work on barnacle taxonomy that ended up devouring a better part of a decade;[55] many taxonomists will spend their lives on one genus of rove beetle or one family of flowering plant.[56] They come to know these creatures better than anyone else ever has or likely ever will; from this relationship flows the name. We should resist, however, from overly romanticizing this endeavor; taxonomists can be just as overworked and overwhelmed as anyone else. Those that choose particularly difficult or obscure groups have been known to produce names that express a relationship, but not always one of love. The ground beetle *Agra vation* comes to mind.[57]

DNA barcoding, which relies on sequencing particular regions of DNA and delineating new species based on the extent to which DNA sequences differ among populations,[58] has threatened to overturn the relational aspect of naming. The focus on molecular work has resulted in the discovery of many cryptic species. These cryptic species are often given informal lineage names constituting letters and numbers—little more than gobbledygook to the

layperson—and then little more is done. It is even worse when environmental samples have their DNA sequenced and completely unknown genetic lineages are discovered, but the specimens themselves are then destroyed or lost and the creature connected with the DNA remains unseen.[59] Such newly discovered lineages are piling up at alarming rates, while the taxonomic expertise to observe and name the bearers of this DNA ages into retirement.[60] Zoology is finding itself now with zoologists trained in molecular genetics but not in taxonomy, and the knowledge gap is starting to be felt. There are creatures awaiting names and no skilled personnel to love them. Without names, there is little that governments can do to protect these unnamed creatures.

Naming Is a Protective Act

Naming is not only creative and relational; it is also protective. Although the discipline of taxonomy itself is not explicitly protective, the consequence of taxonomy is management and protection of the thing that was named; for many taxonomists, protection is one of their goals.[61] We can protect only what we know exists; we know that something exists only when experts have signaled that it is worthy of a name. Although this is true of common names—we could identify some particular individual plant in the field, give it a name, and feel a sense of responsibility for the thing we have named—scientific names have special legislative status that gives such naming practical significance.

When the peoples of Lake Sammamish in the state of Washington appealed to have their local population of Kokanee salmon recognized as a unique species, they did so knowing that any local name they gave to the fish had no legislative teeth.[62] Scientists needed to give the fish a name in order to apply the Endangered Species Act. Without a special dispensation from the scientists, there would be no federal protection for a declining fish stock with local significance. Applying these protections is another thing: many species are on the verge of extinction despite being named, and yet they thrived under their own folk taxonomies.[63]

The relationship between protection and naming is so powerful that exceptions are made to the otherwise inviolate rules of naming. If a species is on the cusp of extinction, there are grounds to protect that species name even if the science of taxonomy suggests the species belongs to a different genus than it is currently in, or the rule of priority has uncovered an earlier name to which it actually belongs. The problem is that legislation is slow to catch up with changes to species names, and it is the names, not the individual creatures, that are legally protected.[64] A valid name change could remove a species from legal protection if the former name is what is listed.

In exceptional cases, species can retain their name even after evolving to something new. The Florida panther (*Panthera concolor cougar*), after suffering population collapse followed by excessive inbreeding, was intentionally hybridized with a nearby subspecies (*Panthera concolor concolor*), altering the genetic constitution of the population such that it was no longer the Florida panther subspecies. This should have stripped the Florida panther of its legal protections, but conservationists worked with the government to ensure that these hybrids retained their subspecies status and therefore their legal protections.[65]

Must naming always be protective? After all, we certainly name creatures that are not typically loved, such as human parasites. In such cases, naming would seem to be a destructive act; once named, we can better study something in order to eliminate it. In the opinion of this author, however, such exceptions prove the rule. Indeed, naming of parasites, viruses, and other members of nature's "rogue gallery" can be a protective act in multiple ways which include the following:

(1) Naming parasites, pests, and viruses is still often an act of love by those who do the naming. Speak to a tapeworm researcher and you will find profound awe and respect for the creature being named, and a real sense of loss if tapeworms were to go extinct.[66] The adaptations that parasites demonstrate can be breathtaking, but would not be discovered if they were not first named.[67]

(2) Even if a pest were to be named for the purposes of destruction, this can have the effect of protecting other species, by developing targeted destructive techniques that reduce incidental mortality.[68]

(3) Scientists have had the opportunity to eliminate one named pathogen, the smallpox virus, but they have controversially refused to do so.[69] We have certainly unintentionally driven species to extinction, but the scientific community does not appear to have the will to intentionally direct

extinctions, so even naming the undesirable is an act of protection.

Where naming may be destructive, and even chaotic, is in the unnecessary lumping or splitting of species conducted by researchers more interested in publications than in reality.

One could argue that recent pushes for ecosystem conservation, rather than species conservation, will reduce the protective consequences of naming. We are doubtful that this will be true. To understand if ecosystem conservation is working, the desired outcome of biodiversity conservation will need to be assessed, which, in turn, will require having names for the creatures contained therein. Naming, then, is the first step in providing the data to justify continued ecosystem management.

A Dialogical Response: Scientist to Theologian and Theologian to Scientist

Identifying the biblical and biological aspects of naming is an important start to greater understanding of the value of naming. Yet, in order to take this exploration a step further, it is helpful to create a dialogue between biology and theology. In this section, we explore how biology responds to theology and how theology responds to biology around the concept of naming. Our biologist explores how the biblical theology of naming creates pathways for a scientific approach to naming and our theologian explores how a scientific approach to naming results in new directions in theology.

Biology Responds to Theology

A theology of naming has clear resonances with the aspects of taxonomy described above:

Naming is a God-given human affinity.

A biblical hermeneutic that understands Adam as the everyperson has profound implications for taxonomy as a Christian—indeed, human—vocation. Too often Christian biology professors encounter budding ecology students who have been warned against entering biology by well-intended members of the church, for fear that they will be wasting their time on trivial pursuits, or will lose their faith as they undergo secular training. To communicate that naming is a God-given responsibility, and that being made in the image of God includes the vocation of naming in order to better love and protect that which God loves and protects, helps to bridge the too-often contentious divide between science and faith.

However, this also raises some interesting questions about the relationship between adamic naming and the science of taxonomy. It is not obvious that Adam's naming is equivalent to scientific naming. Those culturally rooted names that were the source of confusion for the biologist embody God's calling; the Christian taxonomist should be inclined to respect local naming practices while recognizing the legislative need for scientific names.

Given that the affinity for naming nature is a part of what makes us human,[70] one must ask how such an affinity first evolved. There is, perhaps, a difference between capacity and responsibility; other living things have the capacity to categorize the natural world without being given the responsibility to care for it. Although it is difficult to study this adequately, research on various vertebrates has shown that animals can use vocal cues to communicate about other species they have encountered. Chickadees, for instance, use different calls to identify and communicate about different types of predators, and these communications can lead to action even in unrelated eavesdroppers such as nuthatches.[71] Whether such sounds constitute *names* is less clear. Although only humans are called to steward, it would appear the faculty for naming has a fitness-related component that permitted its first appearance in nonhuman animals.

Naming is part of stewardship of God's good creation.

The rules of scientific naming do not explicitly include protection as an outcome of naming. Instead, protection is an outcome of legislation that recognizes scientific names over vernacular names. If naming itself is a part of caring for creation, then perhaps the Christian taxonomist will want to think carefully about the relationship between the content of a name and the ability to protect the creature so-named. The Slovenian blind cave beetle *Anophthalmus hitleri* has no connection to Hitler. It has no mustache-like markings on its side; it was not discovered by Hitler nor did he own one as a pet. Rather, an amateur entomologist discovered this creature in 1933 and named it after his Führer. No rule forbids this; the content of the name does not matter. Unfortunately, this name has spelled disaster for the beetle, with an extensive black market trade in this species, driven by Nazi

enthusiasts.[72] The Christian taxonomist needs to give careful consideration to the semantic content of the name.

Naming should reflect God's glory rather than function as a quest for human fame.

The theology of naming shows that taxonomy has some work to do to atone for past, and ongoing, mistakes. Although the semantic content of a name is not supposed to matter, a biblical theology of naming indicates that to some extent it does, since naming is an act of worship. It is not clear how far one should take this principle. Taxonomists have been in the habit of giving creatures flippant or bawdy names; they have named creatures after other gods and goddesses; they have named less desirable creatures after people they had grievances with;[73] they have used naming as a means to elevate their own status—whether naming organisms after their patrons, people they wanted to be in good relationship with, or even themselves (this last, an acknowledged cardinal sin in taxonomy); and they have used naming to make money, selling naming rights to the highest bidder and turning species names into product placements.[74] The specific epithet of the monkey *Callicebus aureipalatii* means "golden palace," a name chosen by the online casino GoldenPalace.com after they successfully won a bid for naming rights.[75] Is this best practice in taxonomy? There are no rules preventing any of these things. We do not want to suggest that all such practices are wrong (surely God appreciates the wasp name *Aha ha*), and surely there is a place to name organisms after culturally significant stories and people. The religious taxonomist, however, might wish to think seriously about which naming practices best bring glory to God.

The temptation for fame is a real one in taxonomy. Besides naming species with the hope of being noticed, certain taxonomists have taken splitting to a new level. These rogue scientists search the literature for descriptions of populations with some morphological or genetic distinctions, and then give these populations new species names in their self-published journals. They abide by all of the rules, yet sow confusion while growing their list of publications.[76] Such unregulated misbehavior has been termed "taxonomic vandalism"; it is a real threat to conservation.[77]

Similarly, there is a growing call to recognize that taxonomy has perpetrated a form of colonial violence against indigenous peoples by "discovering" species already bearing names, and renaming them in the image of the colonial power. A recent paper has suggested that 95% of recently named birds came from the global South, yet were named by and after individuals from the global North.[78] Species with vernacular names that bear colonial overtones are being renamed, while newly discovered species are receiving scientific names that honor or are in the language of the surrounding culture.[79] It is likely that there will be resistance to altering time-honored scientific names that have colonialist overtones; but even if the semantic content of a name has no bearing on the organism, it can surely affect the people we are called to love. The religious taxonomist may wish to think carefully about rectifying past names that were made for the glory of the discoverer.

Naming stamps the name bearer as God's whereas removing names represents a curse.

The relationship between naming and removing names, or even refusing to name, has implications for taxonomy. It is not clear if we are to interpret Adam's naming of the animals as Adam giving names to each species, or to each individual organism, or to neither; God names both groups and individuals. Conservation efforts typically revolve around saving populations, not individuals, but there are voices in environmental ethics who would argue that the individual creature, regardless of conservation status, has value and should be protected.[80] Does God have names for individual creatures in the same way he does for individual humans?

What about those creatures that lack scientific names, and so do not warrant protection? Many naturally occurring animal hybrids inhabit the strange no-man's land of naming and protection.[81] Hybrids are the result of reproduction between two species. Sometimes these hybrids are fertile and can persist indefinitely in the wild. They may even be better adapted to their local environments than the native species. Some hybrids are deemed worthy of protection because they provide some advantage, such as hybrid food crops or recreational fishes such as splake (hybrid between lake and brook trout). In other cases, hybrids are destroyed as genetically impure members of a protected species.[82] Hybridization is an important evolutionary occurrence, yet hybrids of protected species apparently have no right to live; losing a species name through hybridization appears to be a curse to the individual.

Domestic organisms, like hybrids, straddle unusual areas within naming.[83] Many creatures, which in the wild would be considered separate species, are grouped together because of the speed at which they evolved, resulting in biologists often ignoring the significance of domestic animals. Indeed, the popular citizen science app *iNaturalist* requires that photographs of cultivated or domestic species be specially flagged so that they do not interfere with "research-grade" identifications, the result being a diminishment in the significance of such creatures as components of urban biodiversity. Laboratory strains can similarly be genetically distinct from their wild counterparts; are they worthy of naming? Do modern naming conventions of laboratory animals (for example, FVB/NTac) devalue them as beings of worth? Advanced techniques have now permitted the "synthetic speciation" of genetically modified organisms,[84] with some beings, such as the frog-derived xenobots,[85] having no natural counterparts. How names are bestowed on such beings, and our responsibilities toward them, is a pressing concern that warrants further attention.

Thus, science has much to learn from a theology of naming, while at the same time raising important issues for theological reflection. The lines between the two disciplines are not always without additional questions, but together they mutually encourage new approaches to our thought and responses to naming.

Theology Responds to Biology

In recent years, a growing number of theologians have explored the influence of science on theology, but few have explored how a scientific approach to naming affects theology specifically. Here are a few ways in which the scientific approach provided above can affect new avenues of theological research and Christian response.

Naming is a creative act.

The creative nature of naming in taxonomy has theological significance. First, theological discussions of creativity begin with God's act of creation as foundational for our own creativity. God the creator makes his creatures creative beings.[86] Throughout the Old and New Testament, God's Spirit fills or falls upon those who create and those who speak and write, reflecting aspects of God's work in the world. Modern theologians have argued that this connection, between God as creator and human creation, continues today.[87] As biblical scholar Richard Hess explains, the figures of Bezalel and Oholiab in Exodus 31 not only receive God's Spirit in order to build the tabernacle and epitomize the spirit of creativity, their names also capture the creative work that God has asked them to undertake. By comparing these two names to ancient Near Eastern naming practices, Hess highlights how Bezalel means "in the shadow of God," which points to God's protection and care over Bezalel's life and actions; Oholiab means "the tabernacle of the Father," which equally points to God's fatherly protection over Ohaliab's life and Ohaliab's specific role as tabernacle maker.[88]

Recent research in theology has focused on the way that creativity connects to what it means for human beings to be human.[89] While much of this research has focused on how theology relates to creativity in the arts, this is a space where scientists are like artists as they exercise their creativity in naming. In this way, scientists and artists alike partake in God's goals of new creation, a theme and purpose we find throughout the Old Testament and the New Testament.[90]

This creative act of naming in taxonomy gives human beings the opportunity to experience and see God's created world in new ways. As noted above, the blindness humans experience without naming is remedied by the creative act of naming. In naming, humans are then able to better know and care for the creation that God gave them. As taxonomists seek to make static that which is evolving, they also seek to find order in what would otherwise be chaos. Many theologians have noted a theological motif throughout scripture of how God seeks to bring order out of chaos as an act of new creation.[91] Meanwhile, scholars who sit at the crossroads of science and theology have demonstrated how thoughtful explorations of chaos within creation can help us better understand both science and faith.[92] In this way, acknowledging the creative nature of naming in taxonomy builds toward new theological trajectories.

Naming is a relational act.

Genesis 1–2 demonstrates that God's work in creation intended human beings to not only have relationships with one another, but also to form a relationship with the living beings in the world around them. As we noted above, creation care is built on the idea of this relationship as one of responsibility and care for the earth that God created. In

this way, naming is an act of worshiping God. Thus, when we speak about naming what we love, we are also being called by God to love the world that we have been given.

One way that we can respond to God's call is through naming. We may then see this as a recursive spiral: God created us to be in relationship to our world; as we grow in this relationship, we can expand how we care for the world through naming; this naming, in turn, develops a deeper sense of care and protection for the beings that are named; the more we care about the world, the more we are inclined to name it and name it well. In contrast, when we do not care about the world or specifically dislike aspects of the created world, we may be tempted to leave it unnamed or name it based on our preferences. But theological responses to naming ask us to follow Jesus's command to "love your enemies" (Matt. 5:44) and to learn from Jesus's own Incarnation.

Theologians often point to how relationships with one another are founded on the relational nature of the Triune God himself.[93] Recently, theologians such as Denis Edwards have explored how both Trinitarian doctrine and the doctrine of the Incarnation shape how we understand our relationship with the rest of God's created world. Edwards argues for Christians to experience an "ecological conversion." As Edwards explains,

> The conviction that God is the Creator of the universe as well as the Earth and all its creatures is certainly central to Christian Faith. It is, however, part of a much larger picture––one of a God who creates, who gives God's very self to the creation in the incarnation of the Word, and who brings healing and fulfillment to creation.[94]

Thus, God's act of naming as relational is linked to the relational nature of God's act of creation and to God's very relational self and to God's act of Incarnation, which permanently joined divinity to the created world.

Naming is a protective act.

As mentioned in our discussion of naming as relational, the relationships that God has designed for human beings to have with God's creation are both relational and protective. From the start of scripture, God calls us toward care for his creation and the ethical treatment of all life. In this way, theology and ethics are benefited by the taxonomic principles of naming as a protective act. While many theologians and ethicists have explored the relationship between theology, ethics, and ecology in the field of ecotheology, exploring naming as a protective act provides new ways of exploring this topic.

A developing hermeneutical approach to biblical studies is Earth Bible hermeneutics. This hermeneutical approach has developed alongside the wider field of ecotheology. It explores how the physical world and its creatures are represented in scripture and how this reading influences how we understand God's purposes of care and protection for the creation God made.[95] The naming of plant and animal life in scripture has played a role in this form of biblical interpretation. One recent example of how this work has developed is the interdisciplinary project *Dictionary of Nature Imagery of the Bible*. This project brings together scientists who study ancient flora and fauna (archaeo-biologists, -ecologists, -zoologists, -ornithologists, and other scientists) with biblical scholars in order to better understand the biblical imagery within the Bible.[96] This, in turn, has affected how modern Israeli animals are protected. Thus, seeing naming as a protective act in a broader scientific framework has a point of integration with the work of ecotheology, the Earth Bible, and other interdisciplinary hermeneutics already underway.

Conclusion

What does a taxonomic theology of naming add to both the taxonomy and the theology that has come before? This article offers several crucial insights, but it is only a starting point to a broader discussion. There are implications for the practice of taxonomy, theological investigation, and the mission of the church. A few highlights from this article could be summarized as follows:

Taxonomic Theology for Taxonomists

1. Taxonomists who write and reflect on their practice invariably discuss the creative, relational, and protective aspects of their discipline. These categories coincide well with a biblical theology of naming in which God names things into being, in which naming is a sign of intimate knowledge of the thing being named, and in which naming is a prerequisite for proper stewardship. Taxonomic theology can therefore offer a metaphysical rationale for something perceived, but not explained, by the taxonomist.

2. Taxonomic theology suggests that the taxonomist should think beyond the rules of taxonomy to best practice regarding love of God and love of neighbor. Rather than seeking their own glory, they should seek the glory of God, by considering the semantic content of the name of the creature, by resisting the temptation to magnify their own glory through a proliferation of unnecessary species names, and by considering the effect of names on others, including our indigenous neighbors.

3. If naming is truly protective, taxonomists must think deeply about whether folk taxonomies or Western scientific taxonomies are better for protection. Yoon argues that the public has handed naming over to the experts to the detriment of the co-flourishing of humans and nonhuman species.[97] How can we rely on both the expertise of taxonomists and the folk taxonomies of local cultures to better conserve species?

Taxonomic Theology for Theologians

1. Taxonomic theology suggests that theologians need to think more broadly about what is included in the divine callings of God and how this relates to being made in the image of God, moving to a place of inclusion on the naming of living things as part of this divine calling.

2. The naming of less desirable organisms has implications for creativity, relationship, and protection that theologians have not, perhaps, taken as seriously as they should. What does it mean to love both human neighbor and mosquito?

3. More broadly, thinking about taxonomy as a creative act has theological implications for what it means to be creative beings within creation.

4. Taxonomic theology raises questions that span theological and scientific categories: for example, does God love and value the individual organism, or the higher biological taxa? If the former, this has significant implications for creatures on the taxonomic fringes, such as hybrids, domestic organisms, laboratory strains, and synthetic species, that do not receive the same sort of taxonomic considerations and therefore do not receive the same sorts of protection. Theologically, how are we to think about the place of these organisms in God's creation?

Taxonomic Theology for the Church

1. Naming living things is not just a calling for Adam, nor is it restricted to scientific professionals—it is a calling for every person. There is a responsibility for the church to learn the names of the things that surround them in order to better steward those creatures that are directly within their sphere of responsibility. Citizen science apps (for example, eBird, iNaturalist) abound that could help guide church leaders in this direction.

2. Further, seminaries that train future church leaders would benefit from learning more about the value of taxonomic and biological sciences to help church leaders grow in their appreciation of God's creation. In this way, taxonomic theology offers a bridge from the academy to the church that could be helpful for the next generation of church leaders.

3. Evangelicals are underrepresented in the sciences.[98] Taxonomic theology suggests that barriers placed on Christian students entering biology need to be removed so that more Christians can enter taxonomy feeling empowered by the church—that this vocation is, indeed, part of the Christian calling.

In short, taxonomic theology integrates a biblical theology of naming with the scientific discipline of naming, but it resonates beyond both spheres to the practice of the church itself. Such implications of taxonomic theology are only a starting place for such an interdisciplinary idea, as we consider the next steps.

Taxonomic theology shows us that God calls humanity to name the living creatures around them in Genesis 2, and that this desire to name is built into humanity. Naming is a creative act that brings order out of chaos, brings species into existence to the human mind, and is an act of intuition. In naming, humans take part in stewarding God's good creation. Naming creates a relationship between humans and the created world. Naming has ethical implications. Naming should reflect God's glory rather than function as a quest for human fame. Naming should function protectively. Naming emphasizes the importance of what is named, and it stamps the name bearer as God's. Removing a name represents a curse. In this way, naming holds the key to life and death. Thus, we are called to name thoughtfully and carefully and we are called to care for the world and the "living creatures" God has created. ►

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Notes

[1]Scholars such as Wayne Grudem and John Piper and other contributing scholars to recent works on "biblical manhood and womanhood" tend to build much of their arguments of male authority on reading Adam's naming of Eve in Genesis 2 as an act of authority. See Wayne Grudem and John Piper, eds. *Recovering Biblical Manhood and Womanhood: A Response to Evangelical Feminism* (Wheaton, IL: Crossway, 2021). In contrast, scholars such as Tammi Schneider have questioned these assumptions and instead highlighted other implications around Eve's naming and how Eve names her children in *Mothers of Promise: Women in the Book of Genesis* (Grand Rapids, MI: Baker Academic, 2008), 170–74.

[2]Sandra Richter, *Stewards of Eden* explains this notion of adam well. See Sandra Richter, *Stewards of Eden: What the Bible Says about the Environment and Why It Matters* (Downers Grove, IL: IVP Academic, 2020). For more on Adam and naming across interpretive traditions, see Michael E. Stone, "Adam's Naming of the Animals: Naming or Creation?," in *The Poetics of Grammar and the Metaphysics of Sound and Sign, Jerusalem Studies in Religion and Culture 6*, ed. Sergio La Porta and David Shulman (Leiden, Netherlands: Brill, 2007), 69–80.

[3]See David L. Clough, On Animals: Volume 1: Systematic Theology (New York: Bloomsbury, 2014), 51.

[4]See Carol Kaesuk Yoon, *Naming Nature: The Clash Between Instinct and Science* (New York: W.W. Norton, 2009).

5Longman cites Robert Alter, *Art of Biblical Narrative* (New York: Basic, 1981), 44. See Tremper Longman III, *Genesis*, Story of God Bible Commentary (Grand Rapids, MI: Zondervan, 2016), 50.

[6]Douglas Moo and Jonathan Moo, *Creation Care: A Biblical Theology of the Natural World, Biblical Theology for Life* (Grand Rapids, MI: Zondervan, 2018), 50.

[7]Such scholarship may take the form of "creation care" or "environmental" or "ecological" readings of Genesis. Examples of these kinds of readings of Genesis (and scripture more widely) include Moo and Moo, *Creation Care*; Sandra L. Richter, *Epic of Eden: A Christian Entry into the Old Testament* (Downers Grove, IL: IVP Academic, 2008); Richter, *Stewards of Eden*; Nicola Hoggard Creegan and Andrew Shepherd, *Creation and Hope: Reflections on Ecological Anticipation and Action from Aotearoa New Zealand* (Eugene, OR: Wipf and Stock, 2018); and David G. Horrell, Cherryl Hunt, Christopher Southgate, and Francesca Stavrakopoulou, eds., *Ecological Hermeneutics: Biblical, Historical and Theological Perspectives* (New York: T&T Clark, 2010).

[8]Moo and Moo, *Creation Care*, 80.

[9]Moo and Moo, *Creation Care*, 50–51.

[10]See Sandra L. Richter, *The Deuteronomistic History and the Name Theology: Lešakkēn* Šemô Šām *in the Bible and the Ancient Near East*, Beihefte zur Zeitschrift für die alttestamentliche Wissenschaft (Berlin, Germany: Walter de Gruyter, 2002); and Daniel I. Block, "'A Place for My Name': Horeb and Zion in the Mosaic Vision of Israelite Worship," *Journal of the Evangelical Theological Society* 58, no. 2 (2015): 221–47, https://www.galaxie.com//article/jets58-2-01.

[11]Here the verb is not *qara* (to call) + *shem*, but instead *asah* (to make) + *shem*. *Asah* functions in a cohortative best, translated "let us make/do this for ourselves." The reflexive nature of this act of naming is important. Rather than receiving the names that God has given and responding by naming out of a desire to know and care for others, they are trying to "make a name" for themselves.

[12]On Acts 2 and Genesis 11, see John G. Davies, "Pentecost and Glossalia," *Journal of Theological Studies* 3 (1952): 228–31, https://www.jstor.org/stable/23952857; James Scott, "Acts 2:9–11 as an Anticipation of the Mission to the Nations," in *The Mission of the Early Church to Jews and Gentiles,* ed. Jostein Ådna and Hans Kvalbein (Tübingen, Germany: Mohr Siebeck, 2000), 87–124, at 105.

[13]While many translators interpret the lack of subject for *qara* in Genesis 11:9 with a passive English translation as in NIV and NRSV, the verb itself is not in a passive form. Instead, it is a Qal perfect 3rd m sing, which is typically an active verbal form. This same verbal form (Qal perf 3ms) is used in the very next phrase with God as its subject in v. 9 ("God confused" *YHWH balal*). Even scholars who translate *qara* in passive ways see the purpose of this phrase as pointing to a linguistic link between God's actions of confusing the languages (*balal)* with the name of the city *Babel*. Andrew E. Steinmann points out the irony of this connection, particularly in comparison to the later Babylonian claim that the name Babel meant "gate of God." See Andrew E. Steinmann, *Genesis: An Introduction and Commentary*, TOTC 1 (Downers Grove, IL: IVP Academic, 2019), 132.

[14]Finlay explains the role of naming in Isaiah and its relationship to God's activity. See Timothy D. Finlay, *The Birth Report Genre in the Hebrew Bible*, FAT 2, R12 (Tübingen, Germany: Mohr Siebeck, 2005), 194–95.

[15]See Arie Versluis, *The Command to Exterminate the Canaanites: Deuteronomy 7* (Leiden, Netherlands: Brill, 2017), 119, 137, 166, 184.

[16]Ian Paul points to the association between the removal of names of criminals and this description in Revelation 3. See Ian Paul, *Revelation: An Introduction and Commentary*, TNTC 20 (Downers Grove, IL: IVP Academic, 2018), 103–9.

[17]Taxonomy and nomenclature are interrelated. Nomenclature refers specifically to the process of naming, while taxonomy involves the act of describing, classifying, and naming living things. A related term, systematics, involves the study of the relationships between living things. All three activities are interrelated but have their subtle distinctions. For instance, taxonomy existed before the field of evolutionary systematics. See Kevin de Queiroz, "The PhyloCode and the Distinction between Taxonomy and Nomenclature," *Systematic Biology* 55, no. 1 (2006): 160–62,

https://www.jstor.org/stable/20142908. For a brief, and thoroughly enjoyable, history of taxonomy, see Yoon, *Naming Nature*.

[18]Peter Harrison, "Linnaeus as a Second Adam? Taxonomy and the Religious Vocation," *Zygon* 44, no. 4 (2009): 879–93, https://doi.org/10.1111/j.1467-9744.2009.01039.x. As Harrison points out, Linnaeus did not call himself a second Adam. This designation came from a particular critic of Linnaeus. However, the name stuck.

[19]See discussion on this in Matthew Morris, "Naming as a Form of Stewardship: A Case Study on Fraudulent Fishes Sold in Calgary, Alberta, Canada," *Perspectives on Science and Christian Faith* 72, no. 3 (2020): 151–66, https://www.asa3.org/ASA/PSCF/2020/PSCF9-20Morris.pdf.

[20]For a discussion on Central Salish names for sockeye, see Ethan Pincott, "Contact and Change in Central Salish Words for Salmon," *International Conference on Salish and Neighbouring Languages* 53 (2018): 182–95, https://lingpapers.sites.olt.ubc.ca/files/2018/07/10_Central-Salish-words-for-salmon.pdf.

[21]This goal of taxonomic stability––producing one species name that can be recognized by all and that will not change over time––is often cited as a justification for the enterprise of taxonomy. See, for instance, Julia D. Sigwart, *What Species Mean: A User's Guide to the Units of Biodiversity* (Boca Raton, FL: CRC Press, 2018); and Michael Ohl, *The Art of Naming*, trans. Elisabeth Lauffer (Cambridge, MA: The MIT Press, 2018). For an overview of the problem in botany, see Lorraine Daston, "Type Specimens and Scientific Memory," *Critical Inquiry* 31, no. 1 (2004): 153–82, https://doi.org/10.1086/427306.

[22]Karen Magnuson Beil, *What Linnaeus Saw* (New York: W. W. Norton & Company, 2019); Judith E. Winston, *Describing Species: Practical Taxonomic Procedure for Biologists* (New York: Columbia University Press, 1999).

[23]The International Commission on Zoological Nomenclature now prefers the term "binominal," although binomial is still in common use and will be used here. Sigwart, *What Species Mean*.

[24]Typically, the genus on its own, and the genus + specific epithet combination are written in *italics* or are underlined. The genus is capitalized. The specific epithet is never capitalized. This is to demonstrate that the genus name is a proper noun, while the specific epithet is an adjective. No rule governs this, but it follows standard procedure of italicizing non-English words and permits species names to stand out in the text. Other taxonomic ranks are capitalized but not italicized. See Sigwart, *What Species Mean*.

[25]The metaphor of binomial nomenclature being akin to first name, last name is adapted from Yoon, *Naming Nature*. Of course, the genus positions the creature within a broader organizational framework––the genus belongs to a family, the family to an order, the order to a class, the class to a phylum, the phylum to a kingdom, and the kingdom to a domain (with subcategories and unranked taxa also possible).

[26]Harrison, "Linnaeus as a Second Adam?"; Beil, *What Linnaeus Saw*; and Richard Conniff, *The Species Seekers* (New York: W. W. Norton & Company, 2011).

[27]Ohl, *The Art of Naming*. It could be argued that other scientific disciplines also have rules and can also rely on democratic voting principles—for instance, there are governing bodies to formalize the names of geologic layers and periods in Earth's history. However, this author is hard-pressed to find a document that governs an entire scientific discipline akin to that produced by the International Commission on Zoological Nomenclature and its botanical equivalent.

[28]International Commission on Zoological Nomenclature can be found at https://www.iczn.org/. Prokaryotes and archaea, viruses, and protists also have organizations that oversee naming conventions in their respective fields. Botanical and animal codes differ in important ways; for instance, the botanical code does not permit tautonyms (the genus and specific epithet being the same), while the animal code does (e.g., *Gorilla gorilla*). There are differences in rules of attribution, etc. Neither code allows for the same genus name to be applied to unrelated organisms (*Gorilla* could not also be used to name a gorilla-esque fish), but nothing forbids this between codes (a plant and animal can share a genus name). See Sigwart, *What Species Mean*, and Winston, *Describing Species*.

[29]For animals, the full species name includes not only the specific epithet, but also the attribution for the person(s) who published that name, followed by the year of publication: for example, *Homo sapiens* Linnaeus, 1758 is the full name for humans, indicating the name was first proposed by Linnaeus and published in 1758. Brackets are sometimes present around the person's name and date of publication, which tells us the species was originally published under a different genus. For instance, *Oncorhynchus mykiss* (Walbaum, 1792) indicates that the rainbow trout was first named by Walbaum, but if you went to his 1792 publication you would find a different genus name associated with *mykiss*.

[30]There are many other rules as well, but the salient ones for this article have been identified. ICZN, *International Code of Zoological Nomenclature. Fourth Edition* (London, UK: International Trust for Zoological Nomenclature, 1999), https://www.iczn.org/the-code/the-international-code-of-zoological-nomenclature/the-code-online/. For those interested in how modern places and people are converted into binomial nomenclature, see L. W. Grensted and J. Chester Bradley, "Transliteration and Latinization of Greek Words," reprinted and updated from *The Bulletin of Zoological Nomenclature* 15, no. 34/36 (1958): 1111–13. https://www.iczn.org/assets/92273ee2d1/Formation_of_names.pdf.

[31]Ohl, *The Art of Naming*.

[32]Sigwart, *What Species Mean*; see also a robust discussion on the philosophy of species as individuals, and the implications this has for the semantic content of species names, in Ohl, *The Art of Naming*.

[33]John Wright, *The Naming of the Shrew* (London, UK: Bloomsbury, 2014).

[34]For *Aha ha* and other similarly humorous names, see Ohl, *The Art of Naming;* and Wright, *The Naming of the Shrew*. *Sayonara* has not, to our knowledge, been mentioned by other authors; it was found while reviewing fish genera in *Eschmeyer's Catalog of Fishes*, assessed May 13, 2021, https://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp.

[35]Technically, a type is simply a term that is used to "denote a particular kind of specimen or taxon." In previous iterations of the ICZN Code, it was used as shorthand for the different name-bearing types (holotypes—the single individual organism which acts as the name bearer for the species; neotypes—individuals that become the name bearer when the original type is no longer believed to be extant; lectotype—an individual selected from a type

series to be the name bearer (often occurs in older publications when several individuals were used to describe the species, not one of which is given the name-bearing status); and syntype—a type series wherein all individuals are collectively the name bearer). This shorthand will be adopted in this article. See Glossary in ICZN, *International Code of Zoological Nomenclature. Fourth Edition*. Types that do not have name bearing status also exist (e.g., paratypes, paralectotypes, allotypes, etc.).

[36]Ohl, *The Art of Naming*, discusses the role of the type as name bearer in great detail. Some interesting recent changes to the type specimen have permitted the use of non-organismal types (e.g., photographs). For some recent discussion, see Thomas M. Donegan, "New Species and Subspecies Descriptions Do Not and Should Not Always Require a Dead Type Specimen," *Zootaxa* 1761 (2008): 37–48, http://dx.doi.org/10.11646/zootaxa.1761.1.4; Anatoly I. Shatalkin and Tatiana V. Galinskaya, "A Commentary on the Practice of Using the So-Called Typeless Species," *ZooKeys* 693 (2017): 129–39, https://doi.org/10.3897%2Fzookeys.693.10945; Sinang Hongsanan et al., "Can We Use Environmental DNA as Holotypes?," *Fungal Diversity* 92 (2018): 1–30, https://doi.org/10.1007/s13225-018-0404-x ; and Ronald H. Pine and Eliécer E. Gutiérrez, "What is an 'Extant' Type Specimen? Problems Arising from Naming Mammalian Species-Group Taxa without Preserved Types," *Mammal Review* 48, no. 1 (2018): 12–23, https://doi.org/10.1111/mam.12108.

[37]For details, see ICZN, *International Code of Zoological Nomenclature. Fourth Edition*.

[38]The northwest crow is also marginally smaller. "All About Birds: Northwestern Crow," Cornell Lab of Ornithology, Ithaca, NY, accessed May 5, 2021, https://www.allaboutbirds.org/guide/Northwestern_Crow/overview#.

[39]David L. Slager et al., "Cryptic and Extensive Hybridization between Ancient Lineages of American Crows," *Molecular Ecology* 29, no. 5 (2020): 956–69, https://doi.org/10.1111/mec.15377.

[40]James H. Wandersee and Elisabeth E. Schussler, "Preventing Plant Blindness," *The American Biology Teacher* 61, no. 2 (1999): 82–86, https://doi.org/10.2307/4450624.

[41]Christopher Kemp describes the naming of the olinguito thus: "He named it, and he made it real." Christopher Kemp, *The Lost Species: Great Expeditions in the Collections of Natural History Museums* (Chicago, IL: University of Chicago Press, 2017), 4.

[42]Kaeli Swift, "Why the Northwestern Crow Vanished Overnight," *Audubon* (September 4, 2020), accessed May 5, 2021, https://www.audubon.org/news/why-northwestern-crow-vanished-overnight.

[43]An insightful history of taxonomy documents the increased appearance of objectivity in taxonomy. See Yoon, *Naming Nature*. Just because there is disagreement does not mean species are not *real*, but should be expected given the fuzziness of evolutionary processes. Sigwart in *What Species Mean* argues that species names are hypotheses that are constantly being revised with new information; this seems overly idealized. Species names are also the product of creative decision making.

[44]Darwin famously wrote, in a letter to Joseph Hooker, in 1856: "It is really laughable to see what different ideas are prominent in various naturalists' minds, when they speak of 'species'…It all comes, I believe, from trying to define the undefinable." *Darwin Correspondence Project*, University of Cambridge, accessed May 13, 2021, https://www.darwinproject.ac.uk/letter/DCP-LETT-2022.xml.

[45]D. Graham Burnett recounts the 1818 trial in New York centering on the identity of the whale (fish or mammal) and the implications this had for the sale of fish oil. Of particular note was the public mockery of a biologist who testified that a whale was no more a fish than a man; the convergent evolution of fins and body shape had confused people as to which features were most salient for classification. See D. Graham Burnett, *Trying Leviathan* (Princeton, NJ: Princeton University Press, 2010).

[46]Such an evolutionary model, wherein an ancestral population produces multiple sister taxa while itself persisting, is not unusual. It produces what has been referred to as a star phylogeny; when time is incorporated into the phylogeny it takes on the appearance of a raceme––a single stem persisting through time but throwing off multiple sister taxa. For instance, see Michael A. Bell and Windsor E. Aguirre, "Contemporary Evolution, Allelic Recycling, and Adaptive Radiation of the Threespine Stickleback," *Evolutionary Ecology Research* 15 (2013): 377–411, https://condor.depaul.edu/~waguirre/bell_aguirre_2013.pdf. Such models of evolution make species naming difficult; the threespine stickleback described in this article has gone through multiple rounds of splitting and lumping, and is currently considered a "species complex" to get around the need for multiple names. For example, see Jeffrey S. McKinnon and Howard D. Rundle, "Speciation in Nature: The Threespine Stickleback Model Systems," *Trends in Ecology and Evolution* 17, no. 10 (2002): 480–88, http://dx.doi.org/10.1016/S0169-5347(02)02579-X.

[47]For an enlightening introduction to this topic, see David Quammen, *The Tangled Tree: A Radical New History of Life* (New York: Simon & Schuster, 2018). It should also be pointed out that knowledge of evolutionary relationships is not a prerequisite for naming, and in many cases, morphology or ecological niche are more important than evolutionary relationships in naming species (e.g., in paleontology evolution can often be inferred only through fossils, giving the morphological species concept greater significance than the phylogenetic species concept). Many members of the Burgess Shale or Ediacaran fauna have no known evolutionary relationships with other things, but that does not prevent them from being named.

[48]There is too much literature on the species problem to do it justice. As a simple introduction, see John Wilkins, "How Many Species Concepts Are There?," *The Guardian* (October 20, 2010), accessed May 6, 2021, https://www.theguardian.com/science/punctuated-equilibrium/2010/oct/20/3. Wilkins has authored several books on this topic, including John Wilkins, *Species: A History of the Idea* (Berkeley, CA: University of California Press, 2009).

[49]Ohl, *The Art of Naming*.

[50]Swift, "Why the Northwestern Crow Vanished Overnight."

[51]Yoon, *Naming Nature*.

[52]Benjamin Jones, "A Few Bad Scientists are Threatening to Topple Taxonomy," *Smithsonian Magazine* (September 7, 2017), accessed May 6, 2021, https://www.smithsonianmag.com/science-nature/the-big-ugly-problem-heart-of-taxonomy-180964629/.

[53]As recounted in G. E. Hutchinson, "Homage to Santa Rosalia, or Why Are There So Many Kinds of Animals?" *The American Naturalist* 93, no. 870 (1959): 145–59, https://www.jstor.org/stable/2458768.

[54]Andrew A. Forbes et al., "Quantifying the Unquantifiable: Why Hymenoptera, not Coleoptera, is the Most Speciose Animal Order," *BMC Ecology* 18, no. 21 (2018), https://doi.org/10.1186/s12898-018-0176-x.

[55]Rebecca Stott, *Darwin and the Barnacle* (London, UK: Faber and Faber, 2003).

[56]Kemp, *The Lost Species*.

[57]Wright, *The Naming of the Shrew*.

[58]Paul D. N. Hebert et al., "Biological Identification through DNA Barcodes," *Proceedings of the Royal Society B* 270, no. 1512 (2003): 313–21, https://doi.org/10.1098/rspb.2002.2218.

[59]Hongsanan et al., "Can We Use Environmental DNA as Holotypes?"

[60]This loss of expertise is occurring at the same time that funding to museum collections—the heart of taxonomy—is being cut. See Kemp, *The Lost Species*.

[61]For taxonomists describing their conservation motivations, see Ohl, *The Art of Naming* and Kemp, *The Lost Species*. There is significant debate about the actual relationship between conservation and taxonomy/nomenclature. See Georgina M. Mace, "The Role of Taxonomy in Species Conservation," *Philosophical Transactions of the Royal Society B* 359, no. 1444 (2004): 711–19, https://doi.org/10.1098/rstb.2003.1454; Stephen T. Garnett and Les Christidis, "Taxonomy Anarchy Hampers Conservation," *Nature* 546, no. 7656 (2017): 25–27, https://doi.org/10.1038/546025a; Scott A. Thomson et al., "Taxonomy Based on Science Is Necessary for Global Conservation," *PLoS Biology* 16, no. 3 (2018): e2005075, https://doi.org/10.1371%2Fjournal.pbio.2005075; and Stijn Conix, "Taxonomy and Conservation Science: Interdependent and Value-Laden," *History and Philosophy of the Life Sciences* 41, no. 2 (2019): 15, https://doi.org/10.1007/s40656-019-0252-3.

[62]Trout Unlimited et al., "Petition to List the Lake Sammamish Kokanee (*Oncorhynchus nerka*) as Threatened or Endangered under the Federal Endangered Species Act (2007)," July 9, 2007, 35 pages, accessed May 6, 2021, https://your.kingcounty.gov/dnrp/library/water-and-land/salmon/kokanee/esa-process/final-kokanee-listing-petition-070907.pdf. Legislation does recognize the possibility of protecting locally adapted populations within a species.

[63]This is a really important criticism of Western taxonomy and conservation, and was pointed out by an anonymous reviewer.

[64]From the ICZN: "International conventions and national or regional legislation concerning threatened or endangered animals specify the species or subspecies name of the animals that the law intends to protect. Thereafter, protection goes with the name rather than the endangered species itself. Any subsequent change in name could therefore affect conservation measures. The Commission often acts to protect the names of endangered species." ICZN, "Conservation," n.d., accessed May 6, 2021, https://www.iczn.org/about-the-iczn/why-is-the-iczn-important/conservation/.

[65]Andrew Moseman, "Out-of-State Mates Bring Florida Panthers Back from the Brink," *Discover Magazine* (September 24, 2010), accessed May 6, 2021, https://www.discovermagazine.com/planet-earth/out-of-state-mates-bring-florida-panthers-back-from-the-brink.

[66]See, for instance, Carl Zimmer's interviews with parasite researchers in Carl Zimmer, *Parasite Rex: Inside the Bizarre World of Nature's Most Dangerous Creatures* (New York: Free Press, 2000).

[67]Indeed, in the world of natural theology, parasites were sometimes used as exemplars of intelligent design; their adaptations were so breathtakingly complex that they were seen as reasons to praise God! See, for example, the discussion of James McCosh's writings in Matthew Morris, "We Know in Part: James McCosh on Evolution and Christian Faith," *Journal of the History of Biology* 47, no. 3 (2014): 363–410, https://www.jstor.org/stable/43863384.

[68]For instance, the American military recruited entomologists to help identify the vectors of illnesses plaguing troops in remote countries, the net result being targeted elimination rather than widespread release of insecticides. See H. B. Hungerford, "The Relation of Entomology to the War Effort," *Transactions of the Kentucky Academy of Science* 46 (1943): 303–8, https://doi.org/10.2307/3624970.

[69]Arthur L. Caplan, "Is Disease Eradication Ethical?," *The Lancet*, 373, no. 9682 (2009): 2192–93, https://doi.org/10.1016/S0140-6736(09)61179-X; Susannah Locke, "Why the World Can't Bring Itself to Destroy Smallpox Once and for All," *Vox* (May 27, 2014), https://www.vox.com/2014/5/27/5754548/why-the-world-cant-bring-itself-to-destroy-smallpox-once-and-for-all; and Gareth Williams, "Let's Finally Condemn the Smallpox Virus to Extinction," *New Scientist* (May 14, 2014), accessed January 26, 2022, https://www.newscientist.com/article/mg22229694-800-lets-finally-condemn-the-smallpox-virus-to-extinction/.

[70]Yoon, *Naming Nature*.

[71]Christopher N. Templeton and Erick Greene, "Nuthatches Eavesdrop on Variations in Heterospecific Chickadee Mobbing Alarm Calls," *Proceedings of the National Academy of Sciences* 104, no. 13 (2007): 5479–82, https://doi.org/10.1073/pnas.0605183104. For other examples, see Yoon, *Naming Nature*.

[72]Ruth Elkins, "Fans Exterminate 'Hitler' Beetle," *Independent* (August 20, 2006), accessed May 6, 2021, https://www.independent.co.uk/news/world/europe/fans-exterminate-hitler-beetle-6232054.html.

[73]Indeed, Linnaeus did this very thing; Sigwart, *What Species Mean*.

[74]See Ohl, *The Art of Naming*; and Wright, *The Naming of the Shrew*.

[75]Wright, *The Naming of the Shrew*.

[76]Jones, "A Few Bad Scientists are Threatening to Topple Taxonomy."

[77]Matthew Moore, Mary E. Jameson, and Aura Paucar-Cabrera, "Taxonomic Vandalism is an Emerging Problem for Biodiversity Science: A Case Study in the Rutelini (Coleoptera: Scarabaeidae: Rutelinae)," Entomological Society of America Annual Meeting, Oregon Convention Center, Portland, OR (November 17, 2014).

[78]Shane G. DuBay, Daniela H. Palmer Droguett, and Natalia Piland, "Global Inequity in Scientific Names and Who They Honor," *BioR$_x$iv* preprint (2020), accessed May 6, 2021, https://www.biorxiv.org/content/10.1101/2020.08.09.243238v1.full.pdf, https://doi.org/10.1101/2020.08.09.243238.

[79]There is an ongoing discussion about changing the common names of birds to remove racist overtones or honorifics of people with questionable pasts. For example, see the recent change of McCown's longspur, named after John P. McCown, Confederate soldier, to the thick-billed longspur discussed in Jessica Leber, "The McCown's

Longspur Is No More, but the Debate over Bird Names Continues," *Audubon* (September 3, 2020), accessed May 6, 2021, https://www.audubon.org/news/the-mccowns-longspur-no-more-debate-over-bird-names-continues. In Alberta, the Facebook group Alberta Native Wildflowers, Plants, Trees has begun to call out racially insensitive common names for plants, and is proposing already-existing alternatives. A bird and a fish native to Alberta have a common name, part of which is used as a pejorative to indigenous women; this name was still used by the government in publications as recently as 2015. Some recently discovered species have had indigenous names reflected in their species name: Len Norman Gillman and Shane Donald Wright, "Restoring Indigenous Names in Taxonomy," *Communications Biology* 3 (2020): 609, https://doi.org/10.1038/s42003-020-01344-y. These authors call for substantive changes to naming practices going forward. Changing already established but racially charged scientific names is seemingly more complicated and has not, to our knowledge, been done, although graduate students have begun compiling a list of such names. See Eli Caha, "Amid Protests against Racism, Scientists Move to Strip Offensive Names from Journals, Prizes, and More," *Science* (July 2, 2020; updated July 6, 2020), accessed May 6, 2021, https://www.sciencemag.org/news/2020/07/amid-protests-against-racism-scientists-move-strip-offensive-names-journals-prizes-and. Joe Cain has a good introduction to why changing existing species names will prove difficult. See Joe Cain, "Changing Offensive Names in Taxonomy Will Be a Hard Ask," Professor Joe Cain Blog (2020), accessed May 6, 2021, https://profjoecain.net/changing-offensive-names-taxonomy/.

[80]For a good introduction, see Ronald Sandler, "Intrinsic Value, Ecology, and Conservation," *Nature Education Knowledge* 3, no. 10 (2012): 4, https://www.nature.com/scitable/knowledge/library/intrinsic-value-ecology-and-conservation-25815400/.

[81]Harriet Ritvo, *The Platypus and the Mermaid and Other Figments of the Classifying Imagination* (Cambridge, MA: Harvard University Press, 1997).

[82]In Alberta, only "pure" populations of westslope cutthroat trout are considered eligible for conservation, where "pure" was defined as a population wherein the average genome of all tested fish was >99% westslope cutthroat trout. Plans to mitigate hybridization included "clearing" an area of hybrids before introducing pure trout. See DFO, *Recovery Potential Assessment of Pure Native Westslope Cutthroat Trout, Alberta Population*. DFO Canadian Science Advisory Secretariat Science Advisory Report 2009/050 (2010): 19, https://www.dfo-mpo.gc.ca/csas-sccs/Publications/SAR-AS/2009/2009_050-eng.htm.

[83]Katrina van Grouw, *Unnatural Selection* (Princeton, NJ: Princeton University Press, 2018).

[84]Maciej Maselko et al., "Engineering Multiple Species-Like Genetic Incompatibilities in Insects," *Nature Communications* 11 (2020): 4468, https://www.nature.com/articles/s41467-020-18348-1.

[85]Sam Kriegman et al., "A Scalable Pipeline for Designing Reconfigurable Organisms," *Proceedings of the National Academy of Sciences* 117, no. 4 (2020): 1853–59, https://doi.org/10.1073/pnas.1910837117.

[86]Trevor A. Hart connects God's actions in creation to human creativity. See Trevor A. Hart, *Making Good: Creation, Creativity, and Artistry* (Waco, TX: Baylor University Press, 2014).

[87]Many scholars working at the intersection of faith and art have pointed to this theme of God as maker/creator inspiring making and creation in theology. See, for example, Makoto Fujimura, *Art and Faith: A Theology of Making* (New Haven, CT: Yale University Press, 2021).

[88]Richard S. Hess, "Bezalel and Oholiab: Spirit and Creativity" in *Presence, Power and Promise: The Role of the Spirit of God in the Old Testamen*t, ed. David G. Firth and Paul D. Wegner (Downers Grove, IL: IVP Academic, 2011), 161–72.

[89]David Brown, *Divine Generosity and Human Creativity: Theology through Symbol, Painting and Architecture* (New York: Routledge, 2017).

[90]For more on these themes, see Sean M. McDonough, *Creation and New Creation: Understanding God's Creation Project* (Peabody, MA: Hendrickson Publishers, 2017).

[91]This theme is explored in J. Richard Middleton, *A New Heaven and a New Earth: Reclaiming Biblical Eschatology* (Grand Rapids, MI: Baker Academic, 2014).

[92]See for example, Eric M. Vail, *Creation and Chaos Talk: Charting a Way Forward,* Princeton Theological Monograph Series (Eugene, OR: Wipf and Stock, 2012).

[93]In systematic theology, theologians such as Stanley Grenz have argued for a relational nature to the Trinity in works such as Stanley Grenz, *Theology for the Community of God* (Grand Rapids, MI: Eerdmans, 2000). Meanwhile biblical scholars have pointed to this theology of community in John's Gospel; see Mary L. Coloe, *Dwelling in the Household of God: Johannine Ecclesiology and Spirituality* (Collegeville, MN: Liturgical Press, 2017).

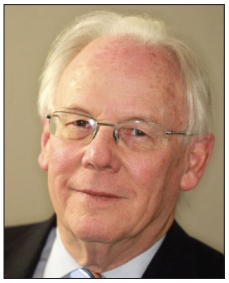
[94]Denis Edwards, *Partaking of God: Trinity, Evolution, and Ecology* (Collegeville, MN: Liturgical Press, 2014), 2.

[95]Works in this field include Diane Bergant, *The Earth Is the Lord's: The Bible, Ecology and Worship* (Collegeville, MN: Liturgical Press, 1998); Denis Edwards, ed., *Earth Revealing – Earth Healing: Ecology and Christian Theology* (Collegeville, MN: Liturgical Press, 2001); W. Granberg-Michaelson, ed., *Tending the Garden: Essays on the Gospel and the Earth* (Grand Rapids, MI: Eerdmans, 1987); Norman Habel, chief ed., *The Earth Bible Series*, volumes 1–5 (New York: Sheffield Academic Press, 2000–2002); and Norman Habel, Vicky Balabanski, and Gerald West, series eds., *The Earth Bible Commentary* (New York: Bloomsbury Publishing, 2011–present).

[96]This project includes an online dictionary (https://dni.tau.ac.il), a research unit at the Society of Biblical Literature's annual meetings, and a developing book series called the DNI (Dictionary of Nature Imagery) Bible Supplement series published by T&T Clark.

[97]Yoon, *Naming Nature*.

[98]M. Elizabeth Barnes et al., "Are Scientists Biased Against Christians? Exploring Real and Perceived Bias Against Christians in Academic Biology," *PLOS One* 15, no. 1 (2020): e0226826, https://doi.org/10.1371%2Fjournal.pone.0226826.



D. Gareth Jones

Article

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An Anatomist Considers Overflow at the Boundaries of Being a Person

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In dealing with the body of a deceased individual, the anatomist has to decide whether this individual is to be treated as a person. One approach is to gain insights from those who are definitely persons—healthy children and adults—and work toward those in which there is uncertainty and ambiguity, in this instance, the deceased. The same applies at the other end of life when dealing with embryos and fetuses. In both cases, marginal persons are given the benefit of the doubt, using the concept of "overflow."

An analysis is undertaken of the treatment of the deceased: initially, of the recently deceased; then assessing approaches to human remains from the remote past; and finally, the troubling status of dissected plastinated bodies, "plastinates." Against this background, attention moves to ways of approaching embryos. Following an overview of a range of theological insights into embryonic existence, attention is paid to the heterogeneity of blastocysts, the significance of their immediate environment, and their place within the broader human community. Reference is also made to the advent of synthetic embryos and the challenge they will present for a notion of personhood. An attempt is made to assess where these ambiguous versions of ourselves fit into the priorities of the human community, and whether an approach based on the notion of "overflow" will provide helpful pointers.

Keywords: human person, dead human body, anonymous human material, plastinate, embryo, blastocyst, fetus, prenatal life, "overflow" concept, human dignity

Debate about the emergence of personhood during gestation has a long history, crossing disciplinary boundaries, and mired in conflict. In Christian circles, it is often guided by theological insights into God's purposes for embryos and fetuses. The major thrust of debate in theologically conservative Christian circles has traditionally been on the evil of abortion and the destruction of the fetus. The rationale for this position is that human personhood commences at conception (fertilization), with the rider that God's love for prenatal life (the fetus and the earlier embryo) commences at this point, leading to the notion that all prenatal life is inviolable. This leaves no room for any research on embryos, or if consistently applied, for any procedures such as *in vitro* fertilization (IVF) that involve the destruction of embryos. From the perspective of a biomedical scientist this leads to a science-faith divide that is not informed in its rigidity. This article contends that there are uncertainties in the notion of personhood at the extremes of human life, in its earliest stages and at the time of death, and that these should be taken into account by bioethicists and Christians in determining how best to treat these equivocal entities.

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The task of recognizing when we are in the presence of another human person can be fraught with ambiguity and contention. James Peterson's article in the 2022 June issue of this journal eloquently pinpoints the possibilities and pitfalls of attempting this in relation to the developing human individual.[1] The difficulties have been cited on countless occasions within both the general ethical and also the Christian literature, so much so that congenial and productive debate can seem elusive. Peterson is to be commended for broadening the scope of enquiry by reference to the dead body, slavery, and genocide, thereby demonstrating that this is a matter that extends across the whole span of human existence, and is not confined to the prenatal period.

The present article concentrates on the latter stages of human life, as a prelude to turning once again to prenatal life. By working from instances where it is relatively straightforward to determine that a human person is present, the aim is to throw light on those situations where there are uncertainties and ambiguities. The approach is to start from those who are definitely persons, such as healthy children and adults, and work toward those who many regard as less definitely persons, such as the recently deceased on the one hand, and embryos on the other. The concept of "overflow" is developed in order to give these marginal persons the benefit of the doubt, using a range of biblically based values. The imagery behind the development of this concept is that of a river overflowing its banks, or of a hall overflowing with people. In both instances, the water or the people are spilling out from a well-defined container into a surrounding space that takes on some of the characteristics of the river or the hall. Hence, those who are not conclusively persons are compared favorably with those who are unquestionably persons. They are given the benefit of the doubt, even if it is a constrained benefit; this explains why a variety of descriptors has been employed, namely, equivocal and borderline. This is most readily appreciated when looking back at what once was but has now been lost; but it also conveys the hope that what is now undeveloped will one day become what it is meant to be.

Laying the Groundwork

Under most circumstances, we recognize that we are in the presence of another person when that individual is akin to us, with characteristics similar to those we possess. There is an equivalence that we find easy to accept. A more detailed description of what it means to be a person is beyond the scope of this article, except to state that, in Christian terms, it is to be made in the image and likeness of God, with a uniqueness and ability to live in relationship with God and other persons. It is the potential of being able to give of oneself to and for another, and of living together in human community. But all is not straightforward at the peripheries—whether backward into the past, or forward into the future. Respectively, these movements represent a past as embryos and fetuses, and a future as cadavers. We are unable to experience what the one was like, or the other will be like. When did others first recognize us as persons, and when in the future will others cease to treat us as persons?

Phrasing these considerations in individualistic terms highlights the far more general question of when and how we recognize that a human person is present in human tissue. How, and under what circumstances, are we to acknowledge embryos, fetuses, and the recently deceased as fellow humans with the same claims and privileges that we ourselves enjoy? When are we to love them, care for them, and sacrifice for them? When are they our neighbors, to all intents and purposes equal to us?

A Human Presence in the Recently Deceased

Peterson made the observation that we should treat a human corpse with great respect even though it is no longer a person.[2] Since it is no longer a person, it can be buried, cremated, and dissected in a variety of ways. But why treat it with respect, and why are there restrictions on what can be done with a dead body?

An immediate response is based on the recognizability of the recently deceased. We recognize each other because we recognize each other's bodies, and while this applies supremely during life, some very important aspects of this identity continue following death. In other words, the dead body has intrinsic value; it is an end-in-and-of-itself.[3] During life, we recognize each other by recognizing each other's bodies, since a person and their body are more-or-less inseparable; at death, the intrinsic value of a living person

is bestowed upon the body. A number of years ago W. F. May commented:

> ... while the body retains a recognizable form, even in death, it commands the respect of identity. No longer a human presence, it still reminds us of the presence that once was utterly inseparable from it.[4]

If this is the case, in R. N. Wennberg's words, it is not surprising that

> we don't treat human corpses as garbage, because the corpse is closely associated with persons: it is the remains of a physical organism that at one time supported and made possible personal life.[5]

Here is the link between treatment of the living and the dead, with the treatment of the living influencing the treatment of the dead.

The dead body is sufficiently recognizable to remind the living of the human person who once existed, no matter how ambiguous this now is. It serves as a source of memories and responses, leading to the conviction that a corpse should be respected and treated in a "decent" manner, the term used in the original 1832 and subsequent Anatomy Acts in the United Kingdom. Desecration of a corpse is, in an intangible way, desecration of a person, even though the person who was known and loved is no longer present as a companion and soul mate.[6] The thrust of this Act was to counter the serious lack of respect shown by those in anatomy schools, who went to the lengths of digging up the bodies of the recently deceased, without the knowledge, let alone consent, of their relatives.

More poignantly, the deceased person was a relative and friend, and these people are now grieving the death. The intensity of this loss will decrease as time passes, but this does not deny the significance of the cadaver as an integral part of the initial grieving process. This is another feature of the built-in opacity of the recently deceased—no longer a vital human presence, and yet neither an entity lacking any meaningful human connections.

Additional light is thrown on the human presence of the recently deceased by the manner in which they are able to contribute to the living, by serving as a source of organs in organ transplantation. In this way, cadavers have *instrumental value*. They can function in this manner only because of their close resemblance to the living. Taken together, these complementary values suggest that the deceased are to be *treated* as having moral significance as a result of their human presence, if not active personhood.[7]

It is for this reason that most ethicists now argue that only bodies that have been expressly donated for these purposes should be used in these ways.[8] Fully informed consent strengthens the bond between the living and the dead. Disrespect is shown to a person-now-dead when that person's body is allowed to be dissected after death in the absence of any consent on the person's part prior to death and/or without any close friends and relatives to represent the deceased. This is the case with "unclaimed bodies"; there has been no consent for their use in anatomy. It is a form of exploitation of both the dead and the living, precisely because informed consent is central to the treatment of human persons.

A somewhat different illustration of the importance of consent is that of Henrietta Lacks, a working class African-American woman, from whom a biopsy of a cancerous cervical tumor was removed in 1951. The cells were taken without her consent or even knowledge; neither was her family consulted. This marked the beginning of the immortal HeLa cell line, the first human cells to be grown successfully in the laboratory. No one could have foreseen in the early 1950s how useful this line was to become for many branches of medicine. Along with the myriad successes of the HeLa cell line went a host of ethical and social problems, spurred on by the ever-increasing power of genetic analyses. In hindsight, it became apparent that the successes had paid little attention to the respect owed both the dead in general, and the family in particular.

This discussion is based on the premise that the bodies of the dead are being viewed through the lens of a "transitional state"—not definitively a human presence, but neither entirely lacking a human presence. The dead exist in a twilight border state, in which there are uncertainties in both the moral and theological realms. Despite such uncertainties, the dead are given the benefit of the doubt that they represent the human condition, albeit a constrained benefit.

The rationale for arguing like this, when dealing with the recently deceased, stems from their associations for the living. "Mary-Ann" was known to those around her for her values, interests, and likes and dislikes: characteristics that imbued her with a status

as one of us, as someone like us, as someone made in God's image. She had a dignity bestowed upon her as one of God's creatures. On her death, she has not ceased to be someone loved by God, even though she can no longer contribute to the ongoing life of the human community. And yet her body still reminds us of what she was like and of how she contributed as one of God's people. We respect her, and her body is a reminder of what she once represented.

A Human Presence in the Remote Past

If the recently deceased maintain marks of human personhood, or are reminders of human personhood, for how long does this apply? The passage of time will not completely eradicate these memories, although they will lose many of their associations. Consider human bones uncovered in an archaeological dig. There are no known living descendants, and hence no loved ones to mourn the skeletal material as it is uncovered and brought into the laboratory. It is "anonymous archival material": exhibit N571/0215. Do these skeletal remains retain any human presence, or has this been eradicated with the passage of the years?

Anonymous archival material has no known links to its original subject; if found in a museum, no information is available regarding whether consent was obtained for its collection and removal to the museum, and little or nothing is known about the method of acquisition of the material.[9] For biological anthropologists in the field, its dating depends on a host of other factors, but study of the skeletal remains can yield important information about the conditions under which these people lived, their nutritional status, the illnesses from which they suffered, and their lifespan.[10] In other words, anthropological study of the skeletal material brings these people "back to life," and reveals strong hints of the human presence they once possessed. This is not lost completely, even though these individuals, now encountered as human remains, have not contributed to the ongoing life of any community for many years. Nevertheless, they place demands upon contemporary populations to treat them in an ethical fashion on account of their relationship to present-day humans.[11]

It is these human associations that lead indigenous populations to request the return of the remains of their ancestors from overseas museums and anthropological collections.[12] In these instances, there is a perceived relationship between the present-day tribal or cultural group and the skeletal remains of their ancestors.[13] There is a direct link between the two, with the remains providing deeply personal meaning for the living, based upon recognition, not only of their humanness but of their familial link. For example, for Māori in New Zealand, the past is intimately linked to the present, and this includes ancestors. They are to be protected since they are core to the identity of the extant populations. Where they are buried is regarded as crucial because it connects them to the land. Regardless of the specific interpretation in any one cultural context, the underlying message is that these long-buried or long-stored skeletal remains have a human presence with cultural and religious meaning.

Reflection upon anonymous human material in museums leads to similar conclusions. Problems arise since this material was not collected in line with present-day ethical expectations; there was no informed consent, and no acknowledgement of the dignity of the human beings involved. Four options present themselves:

1. Dispose of the tissue respectfully, an action that precludes its use to benefit the human community.
2. Use it in teaching, and hence benefit health science students.
3. Use it in research, with the intention of benefiting the human community either scientifically or clinically.
4. Leave it in storage with the hope that it may be useful at some stage in the future in unspecified research projects.

Each of these options comes with positives and negatives.[14] Above all, the availability of archival material represents a compromise. Routinely, it is preferable to err on the side of altruism, with consent provided for the use of all newly acquired human tissue.[15] This is unattainable for anonymous archival material, and yet even this material should be treated with care and respect; they are reminders of the personhood of the individuals of whom they were once an integral part.

Consider the following unusual circumstance. Very recently, a funeral notice appeared in the local

newspaper for a memorial service to lay to rest "the gold miner" in a cemetery close to where a considerable amount of gold mining had taken place in the latter half of the nineteenth century.[16] The intriguing feature of this burial is that the person concerned died 140 years ago when he was originally buried. Later, in 1983, the body was exhumed during archaeological work prior to the construction of a dam. Since that time, the bones had been kept in the Department of Anatomy's biological anthropology collection at the University of Otago for use in teaching and research.

Prior to the recent funeral, the funeral director commented that this gold miner was representative of all the gold miners who had lost their lives in the harsh conditions of the gold-mining period. More poignantly, efforts had been made to arrange the skeletal remains as accurately as possible, in order to maintain a level of respect and dignity that "everyone deserves to have."

This is an extreme example of respecting the human person through the medium of the skeletal remains, but is it justified? Nothing is known about the man himself, and there is no record of his descendants; if there are any, they will have known nothing about what became of him, let alone about his recent funeral. He was one of many who died in isolation far away from home and family. The bones alone remain to provide significant, if incomplete, information about the once-living person. The bones represent that individual and are unmistakably human. Consequently, they should be treated in as dignified a fashion as possible.[17]

Respect along these lines stems from the association of the bones with once-living human beings, even when the identification of that person is unknown. There is a direct conceptual link between the two; the bones are human bones, and as such indicate a human presence. It is this principle that underlies forensic investigations on the one hand, and the study of indigenous skeletal remains on the other.[18] In spite of this, the efforts to re-enact a nineteenth-century burial were driven by cultural considerations rather than by ones stemming from a close relationship between the bones and a human presence. The latter demanded only a simple respectful burial.

Although no attention was given to DNA analysis in this case, such analysis opens new avenues of analysis, both anthropologically and ethically. The study of ancient DNA demonstrates that genetic information can provide invaluable data on nutritional status, disease states, and living conditions. Together, these provide evidence that the skeletal material represents human beings who, while no longer alive, are still part of the human community.

Entering the Dubious World of Plastinates

Apart from routine preservation, the preceding situations have not involved any attempt to modify the dead body. There has been no attempt to transform the body to make it appear other than the remains of a once-living subject. This changed in the 1970s and 1980s with the advent of the technique of "plastination," a method of preserving tissues by replacing the tissue fluids with plastic.[19] Human specimens preserved in this manner are dry, odorless, and durable, and they retain the natural structure of the tissues. They have proved extremely useful for the teaching of human anatomy in health science settings, where the emphasis is on the structure of body parts, limbs, and organs. However, beyond these strictly educational uses, a range of public exhibitions of dissected whole bodies ("plastinates") has emerged. Of these, the best known are the Body Worlds series of exhibitions.[20] In these, plastinates are displayed in upright poses, giving the impression that they are "alive." To reinforce this impression, they are depicted as being involved in a number of sporting activities, playing chess, riding a horse, or even having sexual intercourse. The effect is dramatic and awe inspiring, and elicits reactions ranging from wonderment at the beauty and complexity of the human body, to disgust.[21]

No matter how one reacts to the exhibitions, these dead and dissected bodies are nothing if not human. Their apparent lifelikeness and apparent participation in sporting and cultural activities mean that their human presence is unmistakable. This may be deceptive, since it has been made possible by the artifice of the technicians responsible for the plastination, but it is difficult to reject entirely. Equally unmistakable is its ambivalence, since it is thirty per cent human tissue and seventy per cent plastic. It is more than a model, because it reflects the individuality of the original person—all the way down to the level of cells and tissues.[22] If one knew what

to look for, it would be possible to distinguish one individual/plastinate from another. Some of the characteristics of "Erin" when alive are replicated in "Erin" now that she is dead and remains as a preserved, dissected plastinate. The human presence cannot be ignored.

Plastinates represent a new category of dead human body, separate from both a new corpse and decaying remains.[23] They have been contentiously described as "post-mortal bodies." Even if their artificiality has cyborgian overtones as a consequence of being part human and part machine, their human presence shines through.[24]

Those behind these exhibitions claim that plastinates are "real" human beings, but this is only partially correct, since they have been modified to become a new entity—one based on a human template but increasingly artificial.[25] The plastinated version of Erin is no more than partially Erin, although core characteristics remain. The end result is a conundrum, because the newly constructed plastinated body is far removed from that of the original living individual. Plastinates represent their own category of being: a "living deadness," part mortuary and part art gallery. For von Hagens, they are frozen in time between death and decay;[26] they have achieved a post-Christian, secular form of immortality.[27]

Where then can their human presence be found? Although far from being alive, they are poignant reminders of the human form. The anatomical detail and the organization of the human body revealed by plastinates stand out as startling examples of the intricacy of the human body revealed by the brilliance of those who have undertaken the dissection. Coming face-to-face with plastinates is an unnerving experience.[28] They are dead, no matter how "dressed up" they may be to suggest life and continuing happiness. They are neither enjoying nor bemoaning their experience of being dead. But there can be little doubt that they reflect the humanness of these once-living individuals. While their artificiality may be spurious, and their presentation to resemble the young and healthy gravely misleading, none of this would be possible if they lacked substantial human characteristics. They are reminders that a human presence does not cease at death, and that dead bodies do not become a nothing.

Although there has been no specific Christian commentary in the preceding sections, Christian motifs have been present throughout—the centrality of the body for our lives as created beings, the ongoing significance of the body even after death, the recognition of human dignity throughout life and beyond, and the centrality of informed consent as acknowledgment of our standing as people with responsibilities before God and the human community.

Recognizing a Human Presence in Prenatal Life

The move from the end of human life to its beginning may appear incongruous, and yet both are fraught with tension and uncertainty. In the case of the preborn, extreme perspectives predominate—complete protection or no protection at all, absolute moral value or no meaningful value, everything or nothing. Rarely are such inflexible descriptors applied to other spheres of human endeavor, where gradations of value or varying degrees of significance are recognized. The same consideration applies at the early stages of human development.

The major tenor of the debate around prenatal life revolves around the fetus and abortion, as so glaringly demonstrated by the revitalized Roe v. Wade debate in the United States.[29] This reinforces the all-or-nothing framework employed so frequently in approaches to the fetus, and by extension to the embryo. Unfortunately, this camouflages the ambiguities inherent in any assessment of the human embryo, leading to bioethical stalemate and political stagnation. The long-standing vehemence of the abortion debate has been transferred to the far more recent embryo debate.[30] Any scientific distinctions between the embryo (ranging from fertilization to eight-weeks' gestation) and the fetus (from nine-weeks' gestation to term) disappeared as the whole weight of ethical interest shifted to fertilization (or conception—the term frequently used by Christian writers[31]).

This conflation of embryonic and fetal debates has had far-reaching consequences, arising from equating the status and value of the early embryo and the late fetus. Distinctions between the two have been obliterated, with the result that arguments against abortion have become arguments against the reproductive technologies, insofar as they entail any

destruction or modification of embryos. Destruction of the fetus and destruction of the embryo have become morally and theologically equivalent, with each having a moral value equivalent to that of postnatal humans.[32]

This equivalence has proved attractive on account of its perceived simplicity and assurance. It permits the claim to be made that a procedure imperiling the ongoing development of a one-day-old embryo is ethically and theologically equivalent to causing the death of a five-year-old child or a forty-year-old adult. No distinctions are recognized between these three scenarios, with the result that ethical considerations applying to postnatal humans are equally applicable to the earliest stages of embryonic development. All are human; all have been made in the image of God. No matter how assured this stance is, it is intimately dependent upon a future perspective—what they are expected to become. Their potential is bestowed on a basis of trust and hope. However, unlike the recently deceased, who have previously made their presence felt as members of the human community, embryos do not bring with them memories, regardless of what their future prospects may be.

References to early embryos may suggest that they are homogeneous entities with an inbuilt capacity to become fully developed human individuals, regardless of the environment in which they are located. This is an unhelpful oversimplification. The fertilized egg is a single cell, the "zygote," and is totipotent, giving rise eventually to the fetus and placenta. This single cell divides to produce two, then four, then eight smaller, identical cells. These are the "blastomeres," which at the eight-cell stage are only loosely associated with one another, and have the potential to develop into complete adults if separated from the surrounding blastomeres.

By five- to seven-days gestation, this equal developmental potential has been lost. An inner group of cells, the inner cell mass (ICM), continues to be undifferentiated, and a small number of these cells will give rise to the future individual. The embryo at this stage has an internal cavity, and is termed the "blastocyst." The outer cells form a surface layer, the "trophectoderm," which becomes the "trophoblast" when implantation occurs into the wall of the mother's uterus (completed by fourteen days). It is these cells that eventually give rise to the placenta.

By fifteen to sixteen days, the "primitive streak" is visible. This is a transitory developmental structure, that instigates the appearance of the neural plate, from which arises the first rudiment of the nervous system early in the third week of gestation. From this point onward, a spatially defined entity, capable of developing into a fetus and infant, begins to exist. The appearance of the primitive streak is widely regarded as marking a point of transition, with some arguing that no coherent entity exists prior to it, and hence there is no entity present that can be meaningfully referred to as a human individual.[33]

Theological Insights into Embryonic Existence

These embryological details appear to be far removed from the approaches of some, but not all, theological commentators. For Calum MacKellar, each new embryo is a creation of God and an expression of profound and real love.[34] This love applies no matter how the embryo came into existence—through rape or incest, or within a happy family—nor its location—in the uterus, the abdominal cavity, or *in vitro* in the laboratory. God's love applies irrespective of whether the embryo possesses the capability of developing into a child. The reason given is that the embryo has full moral status, no matter where it is found and regardless of whether it has any potential, biologically and environmentally, to develop any farther. What counts is embryonic existence, no matter for how short a time.

Edwin Hui had earlier reached very similar conclusions, contending that the zygote, with its capacity for self-development, is a human person with the potential for ongoing development.[35] God's work in creating an embryo led Hui to oppose any technological inroads into the reproductive process, since use of the artificial reproductive technologies forces God to accept the child to whom he has not given that gift of life. Hui allowed no place for any study of human embryos, since any procedures that undermine our dependence upon God and our interdependence on fellow human beings are unacceptable. From Hui's perspective, God uses only natural processes. It seems that nowhere is scientific creativity allowed a supplementary role, even to enhance the natural process, rendering the human-divine relationship far more asymmetrical in this area than in many others.[36]

These approaches suggest that some Christian conceptions allow no room for any scientific inquiry into human blastocysts. There is, it seems, direct conflict between Christian ideals and scientific creativity. Embryos belong to God's domain, and as such are untouchable by human beings. They are viewed as having a human presence from day one. However, this does not represent the only Christian approach.

Thomas Shannon and James Walter argue that an individual is not present until two to three weeks after the beginning of fertilization, prior to which the genetic status of the embryo is associated with what is common to all, the embryo's "common nature," and not what is unique to a particular individual.[37] From this, it follows that an individual cannot be recognized as having human presence earlier than the two- to three-week period. In their thinking, an ontological individual emerges when the totipotency of the cells of the embryo is lost, around three weeks of gestation. Hence, personhood and individuality cannot be identified before this time. They conclude that the pre-implantation embryo possesses a "premoral value" that needs to be judged in the light of other premoral and moral goods, such as the benefits that may accrue from research on these embryos in reproductive and other areas.

The differences between Hui and MacKellar on the one hand, and Shannon and Walter on the other, are considerable, even as both positions strive to be faithful to their respective theological traditions (Protestant evangelical and Roman Catholic, respectively). The differences can largely be reduced to whether they are prepared to entertain a role for science in describing the nature of the early embryo, or whether this is entirely the domain of theology unencumbered by any scientific insights. This, in turn, raises the question of whether theology itself, explicitly or implicitly, has been influenced, over the centuries, by scientific and cultural viewpoints.

For his part, Ted Peters questions why so many theologians, when confronted by the value of the human embryo, are drawn to the past, confining the debate to what he considers is a confused account of genetic origin.[38] He contends that this is not required by Christian theology, since it leaves out of the account God's eschatological call to become who we are destined to be. This is closely allied with gifts given us by God, namely, our creativity as human beings, our glimpse of God's promised future, and our ability to make decisions for the good.

For Peters, we are to treat others as having intrinsic value. Dignity is the fruit of an ongoing, loving relationship, expressed so clearly in the developing relationship between a mother and her newborn. To confer dignity on someone who does not yet experience it, or claim it, is a gesture of hope. It is the end-product of God's saving activity rather than something imparted with the genetic code. We impute dignity to those who may not already experience it, enabling them to claim it for themselves.

Peters's position is a melding of divine action in conferring dignity and of human response in claiming dignity, ensuring that individuals are provided with an opportunity to blossom and flourish. This is an expression of God's love for all, leading to God's bestowal of unmerited dignity on all. Embryos are members of the human community, with a hope based on God's promises of a coming kingdom of justice and fulfilment. The Christian commitment should be to achieve as much equality as feasible for individuals, and to provide conditions that will enable the human community as a whole to flourish.

In light of this discussion, where does a biblical account enter the picture, and can it throw light on the personhood of very early embryos? It is difficult to accept that the biblical writers provide every insight into blastocysts, since these are products of contemporary analysis and were unknown to the biblical writers. The notion that the human embryo is inviolable from conception relies upon biblical passages in which God's servants looked back at the ways in which they had been protected from their earliest development (Job 10:8–12; Pss. 22:9, 10; 51:5; 139:13–16; Isa. 49:1; Jer. 1:5). These *retrospective* data serve as very important spiritual guideposts for individuals, but they provide a far less reliable framework for determining what can and cannot be done to blastocysts in the laboratory. These are retrospective statements that are being interpreted *prospectively*.[39] To make the personal history of God's servants into a general principle relating to the status of all embryos, regardless of their relationship to a community of faith, moves far beyond any biblical evidence. It is also important not to overlook the imprecatory psalms, such as Psalm 137, where infants are not protected, but are seen as part of the

nation's desire for God to intervene to keep his covenant, and right all wrongs.

It is impossible to discuss contemporary embryological issues solely on the basis of the biblical writers alone. This in no way downgrades the important insights provided by a range of biblical writers on the value of prenatal life, but it signals caution that we do not indulge in what has been termed "reverse transposition."[40] This is the application of scientific knowledge to the Bible, to make it refer to a concept such as fertilization that was unknown to the biblical writers. When these writers referred to a woman conceiving a child, what they had in mind was her awareness of being pregnant. The same applies to all arguments that are allegedly based on scripture, but use genetic uniqueness (a scientific notion) to bolster claims that human personhood commences at conception. The belief that every human embryo ever conceived is to be protected is a possible, but not an inevitable, extension of biblical principles. In all these instances, extra-biblical data and ideas are being employed as though they are implicit within scripture, when they are not.

Much of what passes as biblical commentary on early development owes far more to ideas originating outside scripture than is being acknowledged. Nevertheless, the desire for biblical perspectives serves a crucial function in providing restraint on overextension of scientific concepts and theorizing. A spirit of humility is essential, serving to balance grandiose interpretations of the biblical evidence and the pretentious and dangerous investigations of some scientific endeavors.

Early Embryos and the Human Community

Regardless of what perspective one adopts toward them, embryos and, in particular, blastocysts are ambiguous entities. They give the impression of occupying a different stratum from most others within the human community, and yet they never exist in isolation of others, even in the laboratory. Their existence and flourishing are dependent upon others within this community, and on the relationships they have with others.

This observation elicits two reactions. Being the weakest of all human forms, they should be protected under all circumstances and never be used in research. Alternatively, their value is to be seen alongside that of other human beings, none of whom are of absolute moral value. All are created in God's image, and all are to be valued as much as is feasible.

The intact blastocyst within a woman's body is totipotent, and can therefore form a new complete individual. It also exists within a uterine environment that allows this to take place. Once one or more of these conditions is removed, the blastocyst ceases to be totipotent. This is the situation of *in vitro* blastocysts (those in the laboratory), since they have been removed from a uterine environment, and are "*potentially* totipotent."[41] Their status reverts to that of "*actually* totipotent" when introduced into a woman's uterus for further development.

Another way of phrasing this is to refer to "blastocysts within an environment congenial to further development" as against "blastocysts within an environment hostile to further development."[42] The first situation has the potential of producing a human individual; the second has no such potential. Far away from the laboratory, environmental factors always have to be taken into account in determining the fate of blastocysts, which are found naturally in a range of environments, some of which enhance their ontogenetic development, whereas others hinder it. Some blastocysts, found naturally within the abdominal cavity, lack the potential to become flourishing individuals.

Some theological approaches ignore this environmental conundrum, enabling them to claim that blastocysts should be treated as persons, even though there are no scientific means of providing meaningful information on the question.[43] A corollary of a position like this is that the environment plays no part in God's purposes, even though no blastocyst will mature into an individual human being in the absence of a nurturing environment. Once the environment is factored into the equation, it is difficult to claim that God is committed to every blastocyst. There is no way of knowing whether every embryo has been selected for ongoing existence, a point that has been made repeatedly over the years in relation to the spontaneous abortion/miscarriage of early embryos.[44] All people who are now alive were once embryos and may have been set aside as embryos, but can the same be said of those entities that never made it beyond embryos?[45]

A fascinating perspective is provided by those families who, having been through an IVF program, still have embryos in storage, but do not want a further child. The remaining embryos are, to all intents and purposes, redundant. There are legitimate ethical and theological issues raised by this situation. What is of relevance for the present discussion is to ask whether they should be seen as equivalent to "unborn children/pre-persons," or whether they are the unfortunate byproducts of a procedure intended to bring new life into existence? If it is the first, they should never be knowingly destroyed (and probably should not have been produced in the first place). If the second, and this is the position argued here, there is no theological reason why they should be retained indefinitely.

It is presumptuous to claim that all blastocysts are persons or have the indelible features of persons. This presumption becomes even more questionable when the origin of the blastocysts lies outside the "normal" fertilization of sperm and ovum, having been manufactured from stem cells.[46] These are synthetic embryos resulting from mixing induced pluripotent stem cells with chemicals capable of coaxing them to form spherical structures, "iBlastoids," that resemble early human embryos. The result is an integrated human embryo model containing cell types related to all the founding cell lineages of the fetus and its supporting tissues.[47] Whether such embryos are ever allowed to develop further remains to be seen—and will be dependent upon scientific expertise and political will. But should this scenario ever eventuate, will the blastocysts have the status of human persons?

These may be flights of the imagination at present, but they add to the list of borderline entities that one day may have distinct human characteristics. Their ambivalence is far more profound than that of routinely fertilized embryos, and yet there will be pressure to categorize them in one way or another. If it is accepted that they have human characteristics, either actual or potential, regardless of their origin and unknown potential, any procedures conducted on them should be undertaken with the respect due to equivocal persons.

The Concept of "Overflow"

It has been impossible to escape the opacity of both the deceased and early embryos, different as these two groups are. In contrast to healthy adults, the personhood of both is equivocal. Debate about whether the embryo is a person with potential, or a potential person, has led to considerable conflict, with the former suggesting that the embryo definitely is a person from fertilization (the moment of conception), and the latter that a person can be definitively identified only at some later point during gestation. The argument of this article is that, although it is not possible to be categorical about when the early embryo can be valued as a person equivalent to that of a postnatal human, this does not entail agnosticism about it. The concept of "overflow" proposes that equivocal entities be given the benefit of the doubt. Even though they are not conclusively persons, any marks indicative of personhood should be taken into account in determining how they are to be treated. The onus will be on bestowing them with as much dignity as possible, as a gesture of hope, signifying God's love for them and our high regard for them. This resembles Peters's approach that we are to impute dignity to those who may not experience it in their present stage of development.[48] This approach aims to do what is best for embryos and fetuses, but alongside the demands of others, including those who are definite persons.

Underlying this approach is the impetus to show love for our neighbor, as the Good Samaritan did for the man beaten and left at the roadside (Luke 10:25–37). The early embryo is a neighbor to those making decisions about its future. It is the stranger in need of recognition as a fellow human, but how far does this extend? The Samaritan passing by the injured man had to decide what he would sacrifice in order to give help to this stranger, how much of his own comfort he would relinquish, and the extent to which he was willing to assist. In the contemporary world, the task is to determine how much we are willing to sacrifice to protect the early embryo (as well as the deceased); how much can be justified?

The notion of "overflow" gives the benefit of the doubt to the early embryo, an equivocal person rather than a definite person.[49] It is to be protected, if feasible, but on occasion, a balance has to be struck between its interests and those of definite persons. In practice, this will demand rigorous assessment on a case-by-case basis, an assessment to be guided by love and concern for the other, and a desire to protect

the interests of prenatal life within the broader context of the welfare and interests of all relevant others. ►

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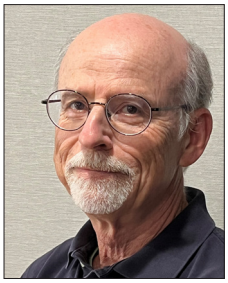

Gary Emberger

Article

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The Nonviolent Character of God, Evolution, and the Fall of Satan

Gary Emberger

The evolutionary creation model of origins best matches the scientific evidence for evolution with common descent. However, the violence and harm associated with the evolutionary history of life may be viewed as incompatible with religious traditions such as Anabaptist that understand God to be nonviolent as revealed in the life and teaching of Jesus. This article argues that malevolent wills such as fallen angels opposed God's will in the evolutionary process and that explanations for natural evils that do not recognize the corrupting activities of fallen spirit-beings make God culpable for evil and non-Christlike in moral character. In this light, the rejection of the angelic-fall thesis by many writers is surprising. Consequently, a number of common objections to the thesis are examined. The angelic-fall approach to natural evil has biblical support, a long history in the church, support of theologians, the ability to resist objections, and many useful outcomes.

Key Words: Anabaptism, natural evil, evolution, evolutionary creation, theistic evolution, God's moral character, theodicy, angelic fall, God's sovereignty, nonviolent, Christocentric hermeneutic, Satan, demons, free will

Three basic models of origins exist that recognize God as Creator: young-earth creation, old-earth creation, and theistic evolution.[1] The models and their variations differ in their acceptance of the geological time scale and evolutionary common descent. Young-earth creation rejects both, old-earth creation accepts the geological time scale but not common descent, and theistic evolution accepts both.

Due to the strength of the scientific evidence for the geological time scale and evolutionary common descent, many Christians believe that God brought about the diversity of life on Earth through evolutionary processes over millions of years. For example, one of the central beliefs of BioLogos,[2] an organization dedicated to the integration of God's Word and God's World, states:

> We believe that the diversity and interrelation of all life on earth are best explained by the God-ordained process of evolution with common descent. Thus, evolution is not in opposition to God, but a means by which God providentially achieves his purposes. Therefore, we reject ideologies that claim that evolution is a purposeless process or that evolution replaces God.[3]

The specific model of origins reflected in this statement is termed "evolutionary creation," the BioLogos preferred term over "theistic evolution."[4] Although I agree that evolution with common

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descent is God's creative process, I do not agree that millions of years of evolutionary violence is an accurate reflection of God's ideal will for creation, or of God's character. My disagreement derives from the nonviolent character of God[5] as revealed in the life and teaching of Jesus[6] and as understood in Anabaptist thought and practice.[7] I write as a biologist (not a theologian) with a long association with the Brethren in Christ, one of the historic peace (i.e., practicing nonviolence) denominations in the Anabaptist tradition. But by no means is this article an attempt to delineate *the* Anabaptist view of evolution and animal suffering. Anabaptists hold no single view on these topics. Although some of the early Anabaptists wrote on topics related to this article, that history is tangential to the goal of this article.[8] The views expressed here are *compatible* with current views of *all* faith groups that hold to a nonviolent conception of God's character.

Evolutionary harms such as predation and disease are often described as natural evils. When I taught at a Christian university, I explored topics such as natural evil, theodicy, and the significance of death before human sin—although not from a specifically Anabaptist point of view.[9] A major goal of this article is to evaluate explanations for evolutionary natural evil from the perspective of the nonviolent moral character of God.

Because I assert that evolutionary suffering is not attributable to God, the theological value is highlighted of an angelic-fall approach to address the violence associated with evolution. In brief, this approach maintains that evolutionary suffering is to be attributed to spirit-beings in opposition to God's will. Gregory Boyd expresses surprise that Christian thinkers rarely "appeal to these opposing powers as they attempt to make sense of the horrors found in the evolutionary process and throughout nature today."[10] Indeed, a review of pertinent *Perspectives on Science and Christian Faith (PSCF)* articles reveals that appeals to malevolent spirit-beings as a source for evolutionary harms are usually ignored, dismissed, or vigorously rejected. Common objections to the angelic-fall approach thesis will be addressed.

Finally, in claiming that God's nonviolent moral character is incompatible with the violence inherent in the evolutionary process, I offer a few speculative thoughts on the plausibility of a nonviolent evolutionary process of creation.

God and Natural Evil

The present world is replete with beauty, an amazing diversity of living things, astounding complexity, mutually beneficial symbiotic relationships, and intricate ecological interdependence. But there is also *harm*. This harm occurs via a bewildering array of biological manifestations including pathogens, parasites, and predators as well as cancers, genetic diseases, and birth defects. In addition, living things may also be harmed or killed by storms, earthquakes, volcanoes, droughts, fires, and other abiotic causes. Natural causes of harm are usually categorized as "natural evils" to distinguish them from "moral evils" which are harms brought about by free agents such as humans.

Of particular importance in the evolutionary creation model evaluated in this article is the recognition that natural evils occurred throughout the entire history of life on Earth, long before humans and human sin.[11] If God is nonviolent and God's character is the same throughout all time, we are compelled to ask whether God would create through such a process.

How have theologians made sense of a world containing natural evils? This question is the basis for what is often termed "the problem of evil." The "problem" is often presented as three premises and a conclusion: (1) God is omnipotent and able to prevent evil; (2) God is perfectly good/loving and will want to prevent evil; and (3) evil events occur; and therefore, God does not exist or one of the premises is inaccurate.[12]

Attempts to explain the apparent contradiction between God's power and goodness on the one hand and the presence of evil on the other, are called theodicies or defenses. Bethany Sollereder differentiates between these by explaining that theodicies intend to give the actual purposes of evil in God's creation whereas "a defense sets the less ambitious goal of simply trying to show that genuine evil and God's existence are not logically incompatible."[13] Sollereder offers a useful guide to theodicies and defenses, featuring a delightful flow chart and a terrain map encouraging the reader to "pick your own theological expedition" through many of the common approaches to the problem of evil.[14]

The next section of this article evaluates proposed theodicies or defenses in light of God's character as revealed by Jesus. In this regard, so important is

the truth that Jesus makes God's character known, that Anabaptists and some other Christians[15] adopt a Christ-centered hermeneutic by which to understand all portrayals of God.[16] This Christocentric interpretative key means that nothing should qualify or compete with the revelation of God as revealed in Jesus. If God is portrayed in a manner (e.g., violent, or sanctioning violence) contrary to Jesus's life and teaching, that portrayal is considered inaccurate. In parallel fashion, Michael Lloyd employs a set of "Christological criteria for disentangling the will of God from the unintended phenomena of creaturely occurrence" when evaluating explanations for natural evil.[17] Lloyd's criteria include the divine hostility to suffering revealed in Jesus's healing miracles and the attack on death in the resurrection of Jesus.

Approaches to Evolutionary Suffering

It is not within the purview of this article to explore the vast literature on theodicies and/or defenses. Rather, I will present an overview of general approaches to natural evil. Not all approaches to natural evil specifically address the evolutionary suffering of animals, but as Gijsbert van den Brink suggests, if "some particular type of theodicy or defense works for natural evil in general, it is not clear in advance why it should not work for the problem of the evolutionary suffering of animals."[18]

One approach is to simply **dismiss evolutionary evil** with the claim that animals do not suffer.[19] While some animals may experience pain, they do not experience suffering. This *neo-Cartesian* approach hearkens back to Descartes in the seventeenth century who claimed that animals do not experience pain and could not suffer. This approach is deeply problematic on evidential and moral terms.

Another approach claims **inscrutability** or **skeptical theism**, that is, our capacity is too limited to understand the reasons God might have for allowing evolutionary suffering and evil.[20] Indeed, all attempts to fathom the existence of evil in God's good creation involve mystery. While recognizing mystery as both inescapable and necessary, there remains value in discussing and debating specific approaches to the problem of evil.

Deism presents a distant, uninvolved God. This God is all-powerful in bringing the universe into being, but this God is simply not interested in our lives or in intervening in any way with the creation.[21] Deism explains the existence of natural evil at the expense of the loving, good, and personal nature of God revealed in the Bible and in believers' lives.

A **human fall** approach attributes natural evils to human sin, "the Fall" causing not only moral evil to become a reality, but also introducing natural evil to mar God's originally perfect creation.[22] Human sin produced a cosmic fall. When once there were no predators, parasites, or tsunamis, creation was radically reconfigured/cursed. This approach is the basis for the young-earth creation model of origins. In addition to biblical concerns, this model suffers from tremendous problems including problematic biological reconfigurations such as instantaneously changing herbivores into predators, and scientific challenges from geology, paleontology, and astronomy.

The following approaches are more applicable to the issue of animal suffering during the long evolutionary history of life on Earth.

Process theology offers an approach in which all entities have *essential* freedom, freedom that is not a divine gift. God has as much power as it is possible to have, but God's only power over any entity is persuasion. God may wish that a nonviolent world existed; however, God can only woo it or lure it, he cannot coerce it.[23] Some versions of open and relational theology align with the "persuasion" aspect of process theology. An example is Thomas Jay Oord's *essential kenosis* model of God.[24] Among other things, this model states that God's eternal nature is self-giving love. God *must* love and because of love, God provides freedom and agency to all creatures in every moment of their existence. God cannot coerce or control creatures or overcome their freedom and agency. Likewise, God cannot affect inanimate matter by interrupting or overcoming the "regularities of existence" such as natural laws given to creation out of love. God calls and inspires creation toward love, well-being, and flourishing. God invites creatures to co-create, but creatures may not cooperate. Applied to evolution, God cannot unilaterally determine which evolutionary paths are taken. The evolutionary process with its extinctions, harmful creatures, and creaturely suffering is accepted as a consequence. God is not culpable for evolutionary evil because by God's very essence, God cannot unilaterally prevent evil.

Process theology and Oord's essential kenosis model defend God's goodness but at the expense of God's omnipotence. Further, because God cannot unilaterally control animate creatures or inanimate matter, there seems little grounding for eschatological hope, Jesus's miracles, or his resurrection.[25]

A **Christological** approach suggests that the "manner in which life feeds on life throughout nature reflects the cruciform character of God and was necessary given God's cruciform goals for creation."[26] Similarly, "the 'cruciformity' of nature should not surprise those who have the cross of Christ as the center of their faith."[27] In response, Boyd finds it hard

> to interpret the manner in which many creatures survive only by stealing the life of other creatures to be a reflection of the cruciform character of the Creator. While the cross reveals a God of *self-sacrificial* love, predators *force* their prey to be sacrificed.[28]

It may be further questioned whether the cruciformity of nature should be looked to as the basis for evolutionary values such as greater complexity, beauty, and diversity. Is there a unique creativity associated with violence? Is this the message of the cross? Michael Lloyd writes:

> Surely a religion built on the cross of Christ would shrink from allowing violence such a monopolistic role in the creation of values. Does not the cross of Christ suggest that, contrary to all perception to the contrary, it is the *refusal* of violence that is most creative of value? Where the extinction of one species has led to the rise of another, should we not attribute that more to the extraordinary fertility of a God who brings good out of evil within a fallen creation than to the fertility of violence per se?[29]

Only way, greater good, package deal, and **best of all possible worlds** approaches to natural evil all indicate that animal suffering throughout evolutionary history was either necessary to God's plan and purposes or in some manner unavoidable. Thus, the only or necessary or at least unavoidable way for God to bring about a world containing the incredible beauty, complexity, and diversity of life which we see was through an evolutionary process of chance events along with competition and natural selection with its associated pain, death, predation, and extinction.[30] For example, only through the gazelle's deadly interaction with the lion could its admired fleetness develop. Or, only by the extinction of dinosaurs did mammals have the opportunity to diversify.[31] On the human level, it is suggested that evolutionary struggle was the only way to create moral beings like us with "the capacity to know good and evil."[32]

John Polkinghorne's *free-process* defense is in this category of approaches. Here, God gifted creation with the freedom to make itself. He states:

> The created order looks like a package deal. Exactly the same biochemical processes that enable cells to mutate, making evolution possible, are those that enable cells to become cancerous and generate tumours.[33]

Likewise, tectonic plates, essential to life on Earth, may slip, causing destructive earthquakes. God does not desire natural evils but allows them to happen in a creation given the gift of being itself.[34]

All *only way* approaches have serious challenges. As addressed earlier, should such creativity be uniquely granted to violent processes? Are the goods great enough to outweigh the eons of suffering? Couldn't an omnipotent God devise a creative path with less involuntary suffering on the part of so many organisms?[35]

Lloyd brings a further series of challenges:

> The Christian theologian … has to ask why disease and death are so assaulted in the ministry of Jesus, if they are so instrumentally necessary to the purposes of God.
>
> If it is God's will to create a natural order that is inherently predatory for the instrumental goods that that order will enable, then some account needs to be given of how that may be reconciled with the prophetic vision of a future in which predators and prey lie down together. If natural evil in general and PANE [pre-Adamic natural evil] in particular are so necessary to the enrichment brought about by the higher-order goods, will a healed and harmonious new creation be thereby diminished and impoverished? … The challenge to instrumental accounts here is to demonstrate why that which is desirable in the beginning will not be desirable at the end.
>
> Instrumental accounts are vulnerable to the charge that they diminish the praiseworthiness of God, for he who brings an end to pain, loss, and disharmony at the eschaton remains the one who established them in the first place.[36]

Concerning the free-process approach in particular, Lloyd asks how the "freedom of the evolutionary

process" constitutes a good.[37] Freedom applied to *personal agents* in relationship carries meaning. It is not clear what freedom means when applied to a *process* populated by nonpersonal entities. Is it different from randomness? Polkinghorne argues that the "great good" is that "creatures are allowed 'to make themselves'" and that "all of created nature is allowed to be itself."[38] Lloyd concludes:

> It seems invalid to use the word "create" of a nonpersonal entity. Does not the word "create" imply an element of intentionality? It is unclear what exactly is the good here for which God would be warranted in allowing the possibility—or probability or well-nigh certainty—of such terror and torment.[39]

A further challenge exists. The same Christocentric "measuring rod" used to reject sub-Christlike violent portraits of God in the Bible calls into serious doubt any theodicy or defense in which God is responsible for evolutionary violence—where eons of animal suffering was either necessary or unavoidable to God's purposes.

But, if *God* is not to blame for evolutionary natural evil and if *human sin* is not to blame, what's left? Read on.

One final approach to natural evil to consider is that of an **angelic fall**. For God's purposes, God gifted angels with moral freedom. Satan rebelled against God and has been wreaking havoc in creation ever since. Given that natural evil occurred long before humans existed, the rebellion of Satan and other fallen spirit-beings long predates human sin. The critical feature of the angelic-fall thesis is that unlike the previous approaches, the source of evolutionary harms is found in the wills of malevolent spirit-beings opposed to God.

Among the scholars who employ an angelic-fall approach to natural evil,[40] Boyd constructs a trinitarian warfare theodicy around the reality of Satan's rebellion and attack on God's creation. In this theodicy, God creates the world out of the triune love experienced by the Father, Son, and Holy Spirit with the goal of creating a people who would say yes to this love, embody this love, and reflect this triune love back to God.

Among the theses that form the basis of the theodicy, one is that love must be *freely* chosen. Humans and angels possess self-determining freedom (incompatibilistic freedom). This means, though, that love may be rejected. Another thesis is that love entails *risk*. The freedom given to agents (humans, angels) means that God's free creatures might actively resist God's will. A further thesis is that the freedom given agents must be, within limits, *irrevocable*. In part, this explains why God cannot prevent evil acts God would otherwise prevent, including those associated with evolutionary harms.

Interestingly, Boyd's theses are similar to elements of Oord's essential kenosis model. But whereas Oord claims God, *by God's very nature*, cannot unilaterally prevent evolutionary evil, Boyd claims that *opposition from malevolent spirit-agents* underlies God's inability to unilaterally prevent all evolutionary evil.

Readers interested in Boyd's theodicy should consult the given references. The three theses I mention serve only to help explain why God's creation could include beings with wills in opposition to God's will. An examination of his full theodicy or any other theodicy or defense is beyond the scope of this article even though additional insights to evolutionary suffering are found among them and in approaches not mentioned here. My more-modest goals are to offer, in the next section, biblical support for satanic influence in the natural world and to respond, in the section after, to a number of common objections to the angelic-fall thesis.

Satan and the Natural World: God at War

Why did Jesus come to Earth? Among the possible responses to this question, does the following verse come to mind?

> The Son of God was revealed for this purpose, to destroy the works of the devil. (1 John 3:8)[41]

What are the works of Satan? Satan is described as holding the power of death (Heb. 2:14), as a tempter (Luke 4:2; 2 Cor. 2:11; 1 Thess. 3:5), as blinding the minds of unbelievers (2 Cor. 4:4), as an enemy planting weeds in the wheat field of God's kingdom (Matt. 13:24–30), and as a lion seeking someone to devour (1 Pet. 5:8). Jesus describes Satan as the "ruler of this world" (John 12:31). Paul refers to Satan as "the god of this world" (2 Cor. 4:4), and 1 John 5:19 tells us "the whole world lies under the power of the evil one." The gospel writers tell us many people were possessed by demons (Mark 1:32–34; 9:20–29).

Jesus *rebuked* the wind and *quieted* the sea (Mark 4:39) in the same manner in which he *rebuked* and *quieted* the demon in Mark 1:25.

Jesus came to destroy Satan's works. Hebrews 2:14 tells us that Jesus through his death "might destroy the one who has the power of death, that is, the devil," and in John 12:31, Jesus says he came to drive out the ruler of this world. John 16:11 declares "the ruler of this world has been condemned." Jesus's healing ministry was a direct assault on Satan's rule as evidenced when he healed a woman crippled by a spirit for eighteen years (Luke 13:10–17). Peter tells us that Jesus went about "healing all who were oppressed by the devil" (Acts 10:38). In healing a man of leprosy (Mark 1:40–42) and a woman of a bleeding disorder (Luke 8:43–48) and a mute boy suffering from convulsions (Mark 9:25–26), Jesus was freeing them from satanic oppression. When the seventy returned to Jesus, they said, "Lord, in your name even the demons submit to us!" In response, Jesus said, "I watched Satan fall from heaven like a flash of lightning" (Luke 10:18).

Boyd makes the following observation:

> In short, Satan and his legions are directly or indirectly behind all forms of "natural evil." Satan turns the neutral medium of the natural order into a weapon just as human agents sometimes use rocks, sticks, or water as weapons when they choose to do so … Jesus always considered "natural" infirmities and diseases as directly or indirectly the work of Satan's kingdom.[42]

Paul describes the Christian life not as a struggle against "enemies of blood and flesh" but against "the cosmic powers of this present darkness, against the spiritual forces of evil in the heavenly places" (Eph. 6:12). In the first-century worldview, the spiritual forces of evil included many classes of fallen spirit-agents such as rulers, principalities, dominions, authorities, and others (collectively called the "powers").[43] C.S. Lewis said, "There is no neutral ground in the universe: every square inch, every split second, is claimed by God and counterclaimed by Satan."[44] I argue that every "split second" includes the temporal battleground of eons of evolutionary time.

On the surface it may seem that God's omnipotence and sovereignty is diminished in this warfare portrait of evolutionary time. But as Lewis states:

> If God thinks this state of war in the universe a price worth paying for free will—that is, for making a live world in which creatures can do real good or harm and something of real importance can happen, instead of a toy world which only moves when he pulls the strings—then we may take it it is worth paying.[45]

Lewis suggests that the more powerful an agent is (e.g., Satan), the more severe will be the consequences of evil choices. This thought corresponds to another of Boyd's trinitarian warfare theodicy theses: that the greater the potential an agent has for love, the greater the potential the agent has for harm—in reference to the great blessing Satan may have been, as opposed to the great harm he has brought.[46]

In some circles, though, Satan is not a particularly attractive hypothesis. But, as Lewis notes:

> The doctrine of Satan's existence and fall is not among the things we know to be untrue: it contradicts not the facts discovered by scientists but the mere, vague "climate of opinion" that we happen to be living in.[47]

Boyd states that the "current 'climate of opinion' regarding the disbelief in spirit-agents is nothing more than an assumption shared by a relatively small cadre of Western scholars."[48] Further, he suggests that Western culture is beginning to relearn that "the cosmos is a veritable society of intelligent interacting beings, some of whom are not physical."[49]

Still, for many scholars writing for *PSCF* and elsewhere, significant consideration of an angelic fall is absent in their approach to natural evil. For example, Denis Lamoureux considers what are called natural evils to be "necessary components in a normally functioning biosphere,"[50] a view not too dissimilar from Luke Janssen, John Wood, and George Murphy.[51] Other writers such as Keith Miller, David Snoke, Christopher Southgate, Bethany Sollereder, Loren Haarsma, and Jon Garvey object specifically to the angelic-fall thesis.[52]

What concerns underlie the downplaying of the angelic-fall thesis? I am reminded of the well-known comment by C. S. Lewis:

> There are two equal and opposite errors into which our race can fall about the devils. One is to disbelieve in their existence. The other is to believe, and to feel an excessive and unhealthy interest in them.[53]

As is true of many issues involving a spectrum of positions, it is usually wise to avoid the extremes. Does the angelic-fall thesis come perilously close to the "unhealthy interest" extreme end of the spectrum—seeing a demon behind every undesirable aspect of creation? On this question, Lewis made his position clear:

> It seems to me, therefore, a reasonable supposition, that some mighty created power had already been at work for ill on the material universe, or the solar system, or, at least, the planet Earth, before man ever came on the scene: and that when man fell, someone had, indeed, tempted him.
> …
> If there is such a power, as I myself believe, it may well have corrupted the animal creation before man appeared. The intrinsic evil of the animal world lies in the fact that animals, or some animals, live by destroying each other.[54]

Lewis was apparently not concerned that an angelic-fall approach to animal suffering represents an "error."

The most commonly offered concerns and/or objections to the angelic-fall thesis are examined in the next section. Additional objections, involving dualism, God's omnipotence, and creational fragility, are discussed by Boyd.[55]

Six Objections to the Angelic-Fall Approach

1. God calls the completed creation good and very good

If creation had been corrupted by fallen angels, would there not be some mention or warning that it was not good? This objection centers on the meaning of "good." As John Walton argues, "good" in Genesis 1 is a reference to creation being functional, not its moral goodness: "When we think of 'good' in connection to being functional rather than moral, we don't have to explain how predation can be part of a morally good world."[56]

Lloyd maintains that, in contrast to pagan assumptions that creation was an accidental by-product of cosmic violence between the gods, it was rather "intended, willed, and valued by its Creator." In this manner, Genesis 1:31 declares the "ontological goodness" of creation. Even a creation, fallen due to angelic sin, "remains ontologically good in the estimation of its Creator."[57] By no means is it required to understand the goodness declared in Genesis 1 to be that of moral perfection.

The planting of a garden in Eden, a special place *distinct from the rest of creation*, the command to *subdue* the earth, and the presence of the *serpent* are additional elements of the Genesis narrative that imply creation is something other than morally perfect.

2. All of creation, even the violent aspects, is claimed as God's work

Lions seek their food from God (Ps. 104:21), and God hunts prey for the lion (Job 38:39). God takes the breath away from living creatures and they die (Ps. 104:29). Psalm 104:32 tells us that God looks on the earth and it trembles (i.e., earthquakes), and touches the mountains and they smoke (i.e., volcanoes). If these events are due to Satan, why are they pictured as God's work? This objection does not recognize ancient Israel's theological worldview in which God is the *sole* divine causal agent.[58] God controls natural events—rainfall, the fruit of the womb, the fruit of the ground, the fruit of livestock, death, and life. God controls personal fortune and misfortune, and victory and defeat in battle. God rewards the obedient and punishes the disobedient. This worldview preserves God's sovereignty but compromises God's morality by attributing evil to God.[59]

Jewish thought concerning evil and their political plight underwent considerable development during the intertestamental period. A type of apocalyptic worldview developed that saw good and evil engaged in a cosmic struggle. Jesus and the writers of the New Testament saw Satan as head of a satanic army. The Kingdom of God which Jesus inaugurated came to vanquish Satan's kingdom. Of great significance in this development was that God was no longer considered the sole spiritual causal agent behind good and evil. Jesus demonstrated this reality throughout his ministry as he went about defeating the kingdom of Satan.[60]

A further note about God feeding carnivores: out of love, God maintains the integrity of ecosystems and the organisms in them, even the corrupted elements. In an analogous manner, God sends rain on the righteous and unrighteous (Matt. 5:45).

3. Values come from disvalues

Sollereder maintains that the angelic-fall thesis is problematic because it denies the central insight of Darwin, that *values* such as the "fleet-footedness of the deer" or the "coordination and strength of the orca" emerge from *disvalues* such as competition and violence between predator and prey.[61]

A distinction is made between the term "disvalue," meaning harm intrinsic to and necessary to God's good creation but carrying no moral content, and the term "natural evil," meaning harm originating from a moral agent in opposition to God.[62] In Sollereder's usage, the harms, violence, and suffering arising from the evolutionary process give rise to values. By contrast, the angelic-fall thesis considers evolutionary violence to be a natural evil, the result of angelic sin.

It is difficult to justify as a *value* the predatory actions of a pod of orcas surrounding a living blue whale, slowly killing it by ripping off chunks of skin and blubber with one orca feeding on the tongue of the still-living whale.[63] Likewise, not all animals are fleet-footed enough to escape prolonged, painful deaths as revealed by any YouTube search for hyenas eating large prey animals alive. I consider these acts of violence to be in stark contrast to God's ideal will for animals as discussed in this article under "Evolution without Violence?"

In Jesus's ministry, natural phenomena such as disease, deformity, and birth defects were considered the result of Satanic activity and signs that creation was not functioning as God intended. These phenomena are natural evils, not disvalues. Boyd writes, "Far from revealing God's character, such 'natural' phenomena reveal the character of his archenemy, Satan, according to Jesus and the gospel authors."[64] It is entirely reasonable to suspect that the same "powers" behind the physical illnesses Jesus healed are also exercising a corrupting influence on nature through the evolutionary process.[65]

4. Satan cannot be a co-creator with God

Related to the previous objection is the concern that Satan, not God, becomes credited with the production of evolutionary values. Sollereder asks:

> Would we then be forced to honor the fallen angels for the fleet-footedness of the deer or the coordination and strength of the orca? Satan would end up being the … originator of the diversity generated by cellular mutation and all the speciation events arising from predation or natural disasters.[66]

Karl Giberson and Francis Collins state the concern more bluntly:

> To ascribe the creation of *anything* in nature to Satan is to elevate Satan from a *creature* to a co-creator of the world with God. This claim is quite heretical from a technical point of view. No distortion of Christian theology can accommodate the idea that Satan created portions of the world.[67]

In response, the angelic-fall thesis maintains that demonic beings did not create; rather, they corrupted what God created. Violent animals, destructive parasites, deadly bacteria, and genetic diseases are distortions of God's creatures. Interestingly, in a perverse sort of way, corrupted evolutionary pathways lead to significant biological diversity. Something similar occurs in human society when sin leads to a greater diversity of activities, such as that of drug dealer, prostitute, and warrior, than would otherwise occur in a sinless world.

Throughout evolutionary time, Boyd claims that

> the Creator creates, Satan and the powers then corrupt what the Creator created, but God always wisely finds a way to bring good out of evil and to turn the enemy's corruption to God's advantage by using it to advance the evolutionary process.[68]

It should be clear that while God works to bring good out of evil, God does not create the evil in order to bring the good.[69] Evils are not part of God's design.

5. There is little scriptural support for the view of Satanic corruption

Granted, the Bible does not come right out and declare that Satan corrupted evolution, but should we expect it to? After all, the Bible is not a book of science or systematic theology. It is also worth noting that the Bible is the story of God, not Satan, and God has no reason to give undue attention to a defeated enemy. To return to the objection, I believe that there are two questions to address. First, is the Bible's view of reality sufficiently supernatural to include fallen spirit-beings? Second, is Satan able to affect matter so as to corrupt creation in evolutionary time?

To the first question: the supernatural worldview of the biblical writers and their readers is often underappreciated in our heavily secularized Western

world. Michael Heiser has extensively explored the supernatural worldview of the Bible.[70] He writes:

> Many Christians resist or feel uneasy with the supernatural worldview of the Bible. I've written a good deal about the unseen realm and its place in the biblical worldview. My goal has been to help people rediscover the Bible for what it is—a supernatural epic—and to stop reading it like it's a textbook. I've tried to convince people that the content of the Bible is either presented as story or framed by story and that the Bible's story is inescapably supernatural.[71]

Concerning evil spirit-beings, he notes:

> This overview of the evil forces in the Bible shows that the world contains an army of unseen sinister intelligences, guided by a superintelligent malevolence, collectively watching humanity through a thin preternatural veil, waiting for opportunities to dominate and decimate human lives.[72]

Jesus and demons spoke to each other (Matt. 8:28–32; Mark 3:11–12; Luke 4:33–35; 8:26–33) with "no hint that Jesus was 'playing along' with a deluded, mentally ill individual who only thought he was possessed."[73] A Christocentric hermeneutic validates the reality of Jesus's recognition of demons as wills in opposition to God and capable of corrupting human health. Nicola Hoggard Creegan, although ambivalent about identifying Satan as the cause of natural evil,[74] asks, "Why discard the element of the demonic when the scriptures are so full of it?"[75]

The Bible's picture of reality is thoroughly supernatural. Whether Satan can affect matter in such a way as to corrupt the evolutionary process is examined as a separate objection.

6. Satan cannot manipulate matter so as to corrupt evolution

As documented by Boyd, early church writers such as Origen and Tertullian did not hesitate to ascribe natural evils such as famine, tempests, and diseases of plants, animals, and people to Satan and demons. Athenagoras, a second-century apologist, describes Satan as the "prince of matter" and wrote that Satan was originally "the spirit which is about matter who was created by God, just as the other angels were … and entrusted with the control of matter and the forms of matter."[76]

The Job narrative is noteworthy in attributing to Satan, deadly fire and wind and loathsome skin sores (Job 1, 2). God and two angels appeared to Abraham "in the flesh" and ate a meal (Gen. 18:8). The two angels went on to Sodom, physically took hold of and moved people, shut a door, and caused blindness (Gen. 19:10–11, 16). Physical ailments are attributed to Satan (Matt. 12:22; Luke 13:10–17). The stone was rolled away from Jesus's tomb by an angel (Matt. 28:2). An angel spoke to the women at the tomb, creating sound waves to be heard (Matt. 28:5). An angel opened a prison door in Acts 5:19. Another angel tapped Peter on the side to wake him, and then removed his chains (Acts 12:7).

What is extraordinary about all of these accounts is the profound concept that nonmaterial spirit-beings, seemingly inhabiting another dimension, are able to assume material form and affect matter or remain in nonmaterial form and affect matter. But from the Bible's perspective, this is to be expected: the material universe is the creation of the immaterial Trinity. As material beings, the natural world we inhabit is experienced as full reality, but we must remember our status as "created."

Meghan Larissa Good describes "Reality" using the image of a small cabin (our material world) within an immense and wild forest ("the infinite, eternal Life of God"). The cabin has a window (the Bible) offering us "glimpses of the strange and wonderful Really Real."[77] Reality beyond the window is beyond our imagination. For all we know, it may be extraordinarily easy for spirit-beings, both good and evil, to affect the material world, including DNA at the molecular level. Exactly how does Satan affect matter? We don't know, but neither do we know exactly how God affects matter, and yet we believe that God does. Satan's ability to corrupt the evolutionary process is likely limited but there is no biblical reason to dismiss the possibility.

God's Sovereignty and Free Will

A question associated with attributing natural evil to satanic actions is whether moral agents are actually free to act in opposition to God's will. In the minds of some, this question could be formulated as another specific objection to the angelic-fall thesis. I present it as a separate section of this article.

Although the expressions "God's sovereignty" and "human responsibility" are not found in the Bible, the Bible teaches doctrines reasonably described by

these terms.[78] The two expressions occupy the end points of a continuum with the two usually held in tension. When the tension is resolved exclusively in favor of divine sovereignty, theistic determinism is the result. In this view, everything, absolutely everything, is under God's direct control: from the movement of molecules, to our thoughts and behaviors, to the occurrence of good and evil;[79] God would be less glorified if it were not so.[80] Movement toward the other end of the spectrum recognizes both God's sovereignty and God's gift of free will to moral agents (humans, angels) capable of making real choices of moral significance, sometimes against God's will.[81]

Three booklets, written at the beginning of the current-day COVID-19 pandemic, illustrate various theological points along the sovereignty/free-will continuum. For example, John Piper's view is 100% divine determinism when he states: "The coronavirus was sent … by God … God governs it. He will end it."[82] In contrast, John Lennox maintains that God is not the author of evil such as COVID-19 and we do not live in a deterministic universe.[83] N.T. Wright mentions "the dark power that from the start has tried to destroy God's good handiwork," alluding to a will in opposition to God.[84]

The question of God's sovereignty and the free will of other agents is critical. Only a view on the continuum at some distance from theistic determinism offers the possibility for moral agents, such as fallen angels, to freely choose to oppose God, resulting in natural evils not of God's will.

Evolution without Violence?

What if Satan had not sinned? The angelic-fall thesis links natural evils such as predation, harmful mutations, and disease to satanic corruption. But others identify these same phenomena as core aspects of modern theories of evolution. For example, many evolutionary creationists cite the grace and spring of the antelope as a direct effect of the power and swiftness of the lion. Would there be a lion or an antelope without predation? Was it possible for God to bring about a creation of complexity, beauty, diversity, and endless adaptations without employing violent processes?

These questions are intriguing, but answers are elusive. The Bible offers clues, but we have no unfallen creation, no *Perelandra*[85] with which to compare.[86] I offer the following four observations and speculations for consideration.

1. The Bible offers a glimpse of God's nonviolent ideal will for creation. In the beginning, God did not give animals to humans to eat or to each other to eat. He gave green plants to *all* of them (Gen. 1:29–30). Only after the Flood was permission granted for humans to eat animals (Gen. 9:1–4). Along with this permission came the "fear and dread" of humans by animals, very unlike the imagery in Gen. 2:19 where Adam interacts with and names the animals. Isaiah offers an eschatological vision of "new heavens and a new earth" where "the wolf and the lamb shall feed together," "a little child shall lead them," "the lion shall eat straw like the ox," and "they will not hurt or destroy on all my holy mountain" (Isa. 65:17; 11:6–9; 65:25a).[87] "The creation waits with eager longing for the revealing of the children of God … when the creation itself will be set free from its bondage to decay" (Rom. 8:19, 21).

Revelation 21:1–4 reveals that on the new earth, when God's Kingdom comes in its fullness at the end of the age, "he will wipe every tear from their eyes. Death will be no more; mourning and crying and pain will be no more, for the first things have passed away." Regarding this future, N.T. Wright states:

> One day all creation will be rescued from slavery, from the corruption, decay, and death which deface its beauty, destroy its relationships, remove the sense of God's presence from it, and make it a place of injustice, violence, and brutality. That is the message of rescue, of "salvation," at the heart of one of the greatest chapters Paul ever wrote, the eighth chapter of his Letter to the Romans.[88]

The entire cosmos will be renewed, and heaven and earth brought together.[89] Wright imagines a landscape filled with peaceful animals, the garden tended once more, and the animals renamed.[90]

The creational ideal from Genesis to Revelation employs imagery that excludes predator violence. The consistency of God's creational ideal is expected given God's unchanging character. The implication is that the same nonviolence expected of people toward each other also represents God's ideal will for relationships between humans and animals and among animals.

2. There is no warrant to assume creation *must* function the way it currently does. The angelic-fall thesis assumes Satan waged war against God's creation at all levels of life, including birth and death, reproduction, and speciation. Without satanic corruption, for example, might death have been a "natural and harmless feature of the original landscape"?[91] Might animals have died a serene sort of death free of pain and disease, in which their good deaths allowed for recycling and resource availability? Death and decomposition might be necessary, given the second law of thermodynamics, but are predator-prey relationships and animal suffering *required* by that law?[92] Will there even be a second law of thermodynamics when Christ returns to reign? Are the elevated birthrates and deathrates of our current world satanic corruptions of birth and death?[93]

The eons-long warfare between God and demonic forces produced a world of inextricable complexity. As a result, the functionality and species composition of *current* ecosystems unsurprisingly includes elements attributed to Satan. For example, ecosystem health and species diversity are impaired if predators are removed.[94] Likewise, perverse forms of biological diversity such as parasites and pathogens sometimes have significant roles within ecosystems.

But if Satan had not sinned, disruptive satanic elements would be absent. Modern-day lions, for example, would not exist. A lion's physical, physiological, and neurological specializations for predation are distortions of what a lion otherwise might have been. For that matter, to the extent their adaptations derive from lion avoidance, current-day antelopes would not exist either. The absence of lions and antelopes would not diminish creation. Animal strength, grace, and agility is not inexorably tied to predator-prey relationships (see below).

3. Evolutionary creation is possible in a sinless world. I offer three observations in support of the plausibility of God using nonviolent means to drive evolutionary change and speciation.

First, there is an increased recognition of sources of inherited variation and evolutionary mechanisms apart from standard models of evolutionary change.[95] A prime example is the importance and pervasiveness of species interactions described as cooperation, mutualism, and symbiosis. At the most basic level of life, for example, the origin of eukaryotic cells lies in endosymbiotic events involving ancient bacteria that became mitochondria and chloroplasts. Bacteria and other microbes form the symbiotic microbiomes of the gut and skin of many animals. The great majority of plants exist in mutualistic associations with their underground, fungal, mycorrhizal partners. Coral reef communities are rich in mutualisms; corals, themselves, depend on photosynthetic algae living symbiotically in their cells. The pollination of flowers involves an incredibly diverse array of insect, bird, and mammal mutualistic partners. Cooperative species interactions at all levels of life are the expected evolutionary outcome of a nonviolent and loving God.

Second, the means by which God's sovereignty interacts with evolution is of great interest to Christians.[96] To this end, Peter Bussey suggests the intriguing possibility that God contacts the minds of animals (those with "mentality") to "incline individuals or groups to particular types of behavior. For example, it might be beneficial if particular pairs of animals could be induced to breed together in order to produce offspring with certain enhanced characteristics."[97] Animals might be influenced "to migrate into more challenging environments" to favor "the development of more advanced biological adaptations."[98] Such divine guidance could "induce new possibilities of evolutionary direction."[99] How God guided evolution is ultimately a mystery, but surely God could employ nonviolent mechanisms such as that proposed by Bussey.

Lastly, what if God's interest in the evolutionary development of life includes goals in addition to the creation of human beings? Psalm 104:26 tells us: "There go the ships, and Leviathan that you formed to sport [play, frolic] in it," and Job 40:20 tells of mountains where "all the wild animals play." Over the course of evolutionary time, perhaps God took delight in guiding evolution "to see" how fast animals could run, how high they could leap, how they could fly, how deep they could dive in the ocean, or how big or small the vertebrates could be. God's guidance of nonviolent "play" activities of creatures, including nonviolent forms of competition, could produce a wide array of species adaptations.

Imagination and faith allow us to see through the current creation and envision a creation brought into existence without violence and unmarred by angelic sin.[100] Such a creation might resemble ours in some

respects and be very different at the same time. It would be unambiguously wonderful.

4. Both science *and* theology are necessary to tell the *whole* story of life. The angelic-fall thesis is not antievolutionary or incompatible with the sciences. It makes no plea to incorporate demonic activity into scientific theories of evolutionary change. It has no expectation for science to detect supernatural interventions of any sort—either satanic or by God. It simply insists that evolution, as described scientifically, cannot encompass all that is true of the story of life.

Whereas science does not recognize supernatural purpose or guidance behind evolution, the theist insists that the story of life is incomplete apart from God's sovereignty. To this end, many theists believe that God guided evolution to ultimately bring about organisms capable of being endowed with God's image. Such an interventionist view is a recognized form of theistic evolution. For example, Gerald Rau distinguishes between planned evolution (PE) and directed evolution (DE),[101] two models differentiated under a broadly defined theistic evolution model. PE and DE differ primarily on the issue of God's intervention in the evolutionary process with PE leaning toward no intervention and DE accepting intervention. It seems to me that the angelic-fall thesis aligns with the DE model in that it can accommodate not only God's guiding interventions in the evolutionary history of life but also the interventions of malevolent spirit-beings, the result being a good but marred creation.

Science, in contrast, is expected to form its story of the history of life through empirical study of nature using standard scientific methodologies and to develop theoretical explanations of evolution in terms of natural processes. The story of life told by either science or theology alone is incomplete.

Conclusions

Although I argue for the plausibility of satanic corruption of the evolutionary process, I do not want to imply that creation is so marred and ruined that it no longer bears witness to God. God's eternal power, divine nature, and glory are seen through the things God has made (Rom. 1:20; Ps. 19:1). And yet, while we are "fearfully and wonderfully made" (Ps. 139:14), "the whole creation has been groaning" (Rom. 8:22). Though there is no call to see Satan behind every undesirable event, creation contains elements Jesus attributed to Satan. This ambiguousness in creation is well-voiced by Philip Yancey when he observes that "we live in a good world, spoiled."[102]

In this article, I posited that the violence associated with the evolutionary history of life is incongruous with the nonviolent moral character of God as revealed by Jesus. The angelic-fall approach to evolutionary violence removes culpability for such evil both from humans and from God. Culpability is assigned instead to the malevolent wills of fallen spirit-agents working in opposition to God over the course of evolutionary time.

Of course, many questions remain unanswered. But without an angelic fall, we are faced with an intractable problem of evil. Boyd states:

> Our "problem of evil" is not the "problem of evil" Jesus and his disciples confronted. If, in contrast to Jesus's approach, one believes that a good and wise divine purpose ultimately lies behind sickness, disease, and all the atrocities that make the world a nightmarish place, then one subtly shifts the problem of evil from something one has to war against to something one has to think through. Rather than being a problem of overcoming the evil deeds of the devil and its army, our problem of evil has become a problem of intellectually explaining how an all-good and all-powerful God could will what certainly are evil deeds of the devil. Perhaps most tragically, in trading problems in this fashion, we have surrendered a spiritual conflict we are commissioned to fight … for an intellectual puzzle we can never resolve.[103]

The attribution of natural evil—whether current or in evolutionary time—to wills other than God's has many useful outcomes:

- It emphasizes consistency in God's moral character in all present-day relationships with creation and throughout the development of life over time. The removal of ambiguity about God's moral character brings glory to God and enhances Christian witness to the world.
- It encourages us to view evolutionary creation through the lens of the nonviolent moral character of God rather than viewing God through the lens of evolutionary creation. It recognizes that for the theist, the scientific story of life is not the complete story. At the same time, it accepts the scientific

evidence for an ancient Earth and for evolution with common descent, and it welcomes ongoing investigations into the mechanisms of evolutionary change.

- It accords with the Bible's teaching that Jesus is nonviolent, that Jesus best reveals God, and that Jesus came to destroy the Kingdom of Satan. In contrast, the Bible is silent about concepts such as "only way" or "greater good" explanations for evil.
- It fosters a pastoral perspective by allowing us to recognize natural evils for what they are—harms originating in wills in opposition to God. The warfare model explains why God cannot prevent all occurrences of evil. In that sense, referring to natural catastrophes as "acts of God" is a misnomer. Indeed, Boyd regularly places "natural evil" in quotes to highlight that to the extent they are caused by fallen free agents exercising their will, there is nothing natural about them.[104] And, from an eschatological perspective, all evil, whether moral or "natural," will be removed and redeemed.
- It promotes a version of evolutionary creation that is interventive, in which God's sovereign will and God's purpose for creation are accomplished despite opposition from evil wills. Creation bears the scars of satanic conflict just as human history is littered with the effects of human sin. But just as Christians believe that God intervenes in human lives and exercises sovereignty throughout the messy history of humanity, this view maintains that God *acts* in creation to bring about as much good as possible out of satanic distortions and to sovereignly accomplish God's ultimate will for creation.
- It reminds us that the Bible presents reality as profoundly supernatural. One of the challenges facing all believers, including scientists, living in a heavily secularized culture such as ours, is to resist the pressure to minimize the supernatural reality behind the thin veil separating the material and immaterial realms.
- It aligns our efforts with God reflected in the earthly ministry of Jesus to fight "misery-inflicting" natural evils such as diseases, parasites, deformities, and other things "that do not reflect the loving character of God that was definitively revealed on Calvary."[105]

Mystery remains in all approaches attempting to explain natural evil, but God's moral character should not be part of that mystery. ►

Notes

[1]Gerald Rau, *Mapping the Origins Debate: Six Models of the Beginning of Everything* (Downers Grove, IL: InterVarsity Press, 2012).

[2]"About Us," BioLogos, accessed May 31, 2022, https://biologos.org/about-us#our-mission.

[3]"What We Believe," BioLogos, accessed May 31, 2022, https://biologos.org/about-us/what-we-believe.

[4]BioLogos, "'Evolutionary Creation'" is distinct from "'Theistic Evolution,'" accessed May 31, 2022, https://biologos.org/common-questions/what-is-evolutionary-creation.

[5]In defining orthodoxy, the ancient creeds took care to establish the doctrine of the divinity of Christ—that Jesus is God. But of more radical significance is that the doctrine also means that Jesus reveals God, a truth sometimes expressed more informally as *God is like Jesus* or *God looks like Jesus*. See Brian D. McLaren, *A New Kind of Christianity: Ten Questions That Are Transforming the Faith* (New York: HarperCollins, 2010), 114. Few doctrines are as well supported biblically as the claim that God's preeminent self-revelation is Jesus, God incarnate. Given this, we may be confident that God's moral character is accurately displayed by Jesus and that the same nonviolent, loving, self-sacrificial life that Jesus lived also characterizes God: John 1:1, 14, 18; 14:8–9; Col. 1:15–16, 19; 2:9; Heb. 1:1–3. The Bible also describes the centrality of love in understanding the character of God and our relationship to him and to others: Mark 12:30–31; 1 John 3:16; 4:8, 16b.

[6]A distinctive of Anabaptism was their commitment to peace and nonviolence modeled on the life and teaching of Jesus: Matt. 5:9, 38–39, 43–45a; 7:12; 26:52; Luke 6:27–29; Rom. 12:14; 1 Cor. 4:11–12; James 3:17–18; 1 Pet. 3:9. Jesus's command to love one's enemies was understood to be normative for the Christian life, as was his teaching that enemies were not to be fought with the weapons of this world (John 18:36). Violence was renounced.

[7]John H. Redekop, "Anabaptism: The Basic Beliefs," Canadian Conference of Mennonite Brethren Churches, accessed May 31, 2022, https://www.mennonitebrethren.ca/wp-content/uploads/2022/09/Anabaptism-The-Basic-Beliefs-v.1.pdf; "Anabaptism," Messiah University, accessed May 31, 2022, https://www.messiah.edu/info/20265/the_three_traditions_that_shape_our_mission_and_why/326/anabaptism; and Palmer Becker, "What Is an Anabaptist Christian?," Mennonite Mission Network, accessed May 31, 2022, https://assets.mennonites.org/Downloads/DL.MissioDei18.E.pdf.

[8]For those interested in exploring this history, a reviewer recommends Tom Finger's text *A Contemporary Anabaptist Theology* and the writings of Hans Denck, an early Anabaptist "theologian" from southern Germany.

[9]Gary Emberger, "Theological and Scientific Explanations for the Origin and Purpose of Natural Evil," *Perspectives on Science and Christian Faith* 46, no. 3 (1994): 150–58, https://www.asa3.org/ASA/PSCF/1994/PSCF9-94Emberger.html; and Emberger, "Theological Analysis of Selected Recent Creationist Assertions," *Perspectives on Science and*

Christian Faith 52, no. 3 (2000): 160–68, https://www.asa3.org/ASA/PSCF/2000/PSCF9-00Emberger.html.

[10]Gregory A. Boyd, "An Enemy Did This: A Cosmic Conflict," in *All Creation Groans: Toward a Theology of Disease and Global Health*, ed. Daniel W. O'Neill and Beth Snodderly (Eugene, OR: Pickwick Publications, 2021), 205.

[11]The old-earth creation model, while rejecting evolutionary common descent, nevertheless carries some of the same concerns about natural evil and the character of God as does evolutionary creation. But because the question of the compatibility of God's character with evolutionary suffering is maximized with the evolutionary creation model, my article is limited to that model. Briefly, though, in old-earth creation, natural evils are viewed as creation design features in God's very good creation, "optimized by God to enhance the well-being and minimize the suffering of his creatures" and meant to enhance "the free-will capacity of redeemed humans." See James Dew, J. B. Stump, and Hugh Ross, "Death, Predation, and Suffering," in *Old-Earth or Evolutionary Creation?*, ed. Kenneth Keathley, J. B. Stump, and Joe Aguirre (Downers Grove, IL: InterVarsity Press, 2017), 74, 77, 84.

[12]Thomas Jay Oord, *The Uncontrolling Love of God: An Open and Relational Account of Providence* (Downers Grove, IL: InterVarsity Press, 2015), 64.

[13]Bethany N. Sollereder, *God, Evolution, and Animal Suffering: Theodicy without a Fall* (New York: Routledge, 2019), 3.

[14]Sollereder, *Why Is There Suffering?* (Grand Rapids, MI: Zondervan, 2021), 138–41.

[15]A Christocentric, or Christological, interpretative key is not exclusive to Anabaptist hermeneutics. For example, New Covenant Theology shares this distinctive. See A. Blake White, *What Is New Covenant Theology? An Introduction* (Frederick, MD: New Covenant Media, 2012). A reviewer of this article recommended including quotes or examples of how a Christological approach was used in early Anabaptist thought and praxis. However, because a Christological approach is not restricted to Anabaptism and because I am not attempting to present *the* Anabaptist perspective on theodicy, such a historical analysis is beyond the scope of this article.

[16]Eric A. Seibert, *Disturbing Divine Behavior* (Minneapolis, MN: Fortress Press, 2009), 185–86; Erv Wiens, "An Overview of Anabaptist Hermeneutics: A Summary of Stuart Murray's book *Biblical Interpretation in the Anabaptist Tradition*," Mennonite Church Canada, accessed May 31, 2022, https://www.commonword.ca/FileDownload/13623/An_Overview_of_Anabaptist_Hermeneutics.pdf; and Becker, "What Is an Anabaptist Christian?" The common alternative hermeneutic to a Christocentric hermeneutic is a *flat* view of the Bible, where all portrayals of God are considered equally authoritative. The choice of hermeneutic has tremendous consequences. For example, Christians often say we should desire a more biblical world. If biblical means "flat" as defined above, a totally flat reading of scripture describes a world in which war, genocide, women as property, slavery, polygamy, concubinage, bizarre death penalties, and other violent actions are all accepted as normative. Rather, our desire should be for a more Christlike world where such violence is discerned as a distortion of God's will. See Keith Giles, *Jesus Unbound: Liberating the Word of God from the Bible* (Orange, CA: Quoir, 2018), 26.

[17]Michael Lloyd, "Theodicy, Fall, and Adam," in *Finding Ourselves after Darwin: Conversations on the Image of God, Original Sin, and the Problem of Evil,* ed. Stanley P. Rosenberg et al. (Grand Rapids, MI: Baker Academic, 2018), 249–50; and Michael Lloyd, "The Fallenness of Nature," in *Finding Ourselves after Darwin*, 262, 271, 279.

[18]Gijsbert van den Brink, *Reformed Theology and Evolutionary Theory* (Grand Rapids, MI: Eerdmans, 2020), 131–32.

[19]Sollereder, *God, Evolution, and Animal Suffering*, 45–46; and van den Brink, *Reformed Theology and Evolutionary Theory*, 106–110.

[20]Sollereder, *God, Evolution, and Animal Suffering*, 47; and van den Brink, *Reformed Theology and Evolutionary Theory*, 132.

[21]Sollereder, *Why Is There Suffering?*, 45–47.

[22]Van den Brink, *Reformed Theology and Evolutionary Theory*, 110–19.

[23]Lloyd, "Theodicy, Fall, and Adam," 251–52.

[24]Oord, *The Uncontrolling Love of God,* 94–95, 167–75; Thomas Jay Oord, "An Open Theology Doctrine of Creation and Solution to the Problem of Evil," in *Creation Made Free: Open Theology Engaging Science*, ed. Thomas Jay Oord (Eugene, OR: Wipf and Stock Publishers, 2009), chapter 2, 101; and Thomas Jay Oord, *God Can't Q & A* (Grasmere, ID: SacraSage Press, 2020), 134.

[25]Boyd, "An Enemy Did This," 196–97.

[26]Ibid., 197.

[27]Van den Brink, *Reformed Theology and Evolutionary Theory*, 132.

[28]Boyd, "An Enemy Did This," 199.

[29]Lloyd, "Theodicy, Fall, and Adam," 254.

[30]Van den Brink, *Reformed Theology and Evolutionary Theory*, 119.

[31]Lloyd, "Theodicy, Fall, and Adam," 253–54.

[32]Dew, Stump, and Ross, "Death, Predation, and Suffering," 72, 73, 81.

[33]John Polkinghorne, *Quarks, Chaos and Christianity: Questions to Science and Religion* (London, UK: The Crossroad Publishing Co., 2005), 59.

[34]Ibid., 60–61.

[35]Van den Brink, *Reformed Theology and Evolutionary Theory*, 119–23.

[36]Lloyd, "Theodicy, Fall, and Adam," 249–50. Lloyd employs a three-part classification of approaches to accounting for pre-Adamic natural evil (PANE): PANE as *instrumental* where PANE is built into creation as a design feature in order to accomplish God's purposes for creation, PANE as *inevitable* where God does not want PANE to be in creation but God cannot unilaterally remove or prevent it, and PANE as *inimical* to God's purposes where PANE is due to the choices of creatures given free-will as part of their God-given purpose. Ibid., 248–55.

[37]Lloyd, "The Fallenness of Nature," 269.

[38]Polkinghorne, *Exploring Reality: The Intertwining of Science and Religion* (New Haven, CT: Yale University Press, 2005), 143.

[39]Lloyd, "The Fallenness of Nature," 270.

[40]Gregory A. Boyd, *God at War: The Bible and Spiritual Conflict* (Downers Grove, IL: InterVarsity Press, 1997); Gregory A. Boyd, *Satan and the Problem of Evil: Constructing a Trinitarian Warfare Theodicy* (Downers Grove, IL: InterVarsity Press, 2001); Dan Kent, "Must We Believe in Satan? As a Personal Agent?," ReKnew, March 15, 2022, accessed May 31, 2022, https://reknew.org/2022/03/must-we-believe-in-satan-as-a-personal-agent/?utm_source=Website+Signup&utm_campaign=5b53093a53-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm

_term=0_0de6226b5c-5b53093a53-52352921; Lloyd, "The Fallenness of Nature," 270–79; C.S. Lewis, *The Problem of Pain* (New York: Macmillan, 1962); and Robert Wennberg, "Animal Suffering and the Problem of Evil," *Christian Scholar's Review* 21, no. 2 (1991): 120–40.

[41]All scripture quotes in this article are taken from the New Revised Standard Version (NRSV) of the Bible.

[42]Boyd, *Satan and the Problem of Evil*, 318.

[43]Boyd, "An Enemy Did This," 205.

[44]C.S. Lewis, *Christian Reflections* (1967; reprint, Grand Rapids, MI: Eerdmans, 2014), 41.

[45]C.S. Lewis, *Mere Christianity* (New York: Macmillan, 1952), 38.

[46]Boyd, *Satan and the Problem of Evil*, 169–73.

[47]Lewis, *The Problem of Pain*, 134.

[48]Gregory A. Boyd, "Why Creation Groans," in *All Creation Groans*, 216.

[49]Boyd, *God at War*, 63.

[50]Denis O. Lamoureux, "Beyond the Cosmic Fall and Natural Evil," *Perspectives on Science and Christian Faith* 68, no. 1 (2016): 46, https://www.asa3.org/ASA/PSCF/2016/PSCF3-16Lamoureux.pdf.

[51]Luke J. Janssen, "Are Global Disasters the Result of Original Sin or Part of Our Training as Co-regents?," *Perspectives on Science and Christian Faith* 73, no. 4 (2021): 208–19, https://www.asa3.org/ASA/PSCF/2021/PSCF12-21Janssen.pdf; John R. Wood, "An Ecological Perspective on the Role of Death in Creation," *Perspectives on Science and Christian Faith* 68, no. 2 (2016): 74–86, https://www.asa3.org/ASA/PSCF/2016/PSCF6-16Wood.pdf; and George L. Murphy, "Necessary Natural Evil and Inevitable Moral Evil," *Perspectives on Science and Christian Faith* 68, no. 2 (2016): 111–18, https://www.asa3.org/ASA/PSCF/2016/PSCF6-16Murphy.pdf.

[52]Keith B. Miller, "'And God Saw That It Was Good': Death and Pain in the Created Order," *Perspectives on Science and Christian Faith* 63, no. 2 (2011): 85–94, https://www.asa3.org/ASA/PSCF/2011/PSCF6-11Miller.pdf; David Snoke, "Why Were Dangerous Animals Created?," *Perspectives on Science and Christian Faith* 56, no. 2 (2004): 117–25, https://www.asa3.org/ASA/PSCF/2004/PSCF6-04Snoke.pdf; Christopher Southgate, "God's Creation Wild and Violent, and Our Care for Other Animals," *Perspectives on Science and Christian Faith* 67, no. 4 (2015): 245–53, https://www.asa3.org/ASA/PSCF/2015/PSCF12-15Southgate.pdf; Christopher Southgate, "Explorations of God and COVID-19," *Perspectives on Science and Christian Faith* 73, no. 1 (2021): 23–32, https://www.asa3.org/ASA/PSCF/2021/PSCF3-21Southgate.pdf; Bethany Sollereder, "Evolution, Suffering, and the Creative Love of God," *Perspectives on Science and Christian Faith* 68, no. 2 (2016): 99–109, https://www.asa3.org/ASA/PSCF/2016/PSCF6-16Sollereder.pdf; Loren Haarsma, *When Did Sin Begin? Human Evolution and the Doctrine of Original Sin* (Grand Rapids, MI: Baker Academic, 2021), 69; Sollereder, *God, Evolution, and Animal Suffering*, 18–19, 67; and Jon Garvey, *God's Good Earth* (Eugene, OR: Cascade Books, 2019), 13, 21, 59.

[53]C.S. Lewis, *The Screwtape Letters* (New York: Macmillan, 1961), 3.

[54]Lewis, *The Problem of Pain*, 134–35.

[55]Boyd, "Why Creation Groans," chapter 19.

[56]J. H. Walton, *The Lost World of Genesis One: Ancient Cosmology and the Origins Debate* (Downers Grove, IL: InterVarsity Press, 2009), 149–50.

[57]Lloyd, "The Fallenness of Nature," 275.

[58]Seibert, *Disturbing Divine Behavior*, 151–64.

[59]Ibid., 161.

[60]Boyd, *God at War*, chapter 6.

[61]Sollereder, *God, Evolution, and Animal Suffering*, 67, 81.

[62]Ibid., 5.

[63]Anna Gibbs, "Gory Footage Confirms Orca Pods Can Kill Adult Blue Whales," *ScienceNews* 201, no. 4 (February 26, 2022), https://www.sciencenews.org/sn-magazine/february-26-2022.

[64]Boyd, *Satan and the Problem of Evil*, 265.

[65]Boyd, "An Enemy Did This," 205.

[66]Sollereder, *God, Evolution, and Animal Suffering*, 67.

[67]Karl W. Giberson and Francis S. Collins, *The Language of Science and Faith* (Downers Grove, IL: InterVarsity Press, 2011), 133.

[68]Boyd, "An Enemy Did This," 209.

[69]Boyd, *Satan and the Problem of Evil*, 179.

[70]Michael S. Heiser, *Demons: What the Bible Really Says about the Powers of Darkness* (Bellingham, WA: Lexham Press, 2020); Michael S. Heiser, *The Unseen Realm: Recovering the Supernatural Worldview of the Bible* (Bellingham, WA: Lexham Press, 2015); and Michael S. Heiser, *The World Turned Upside Down: Finding the Gospel in Stranger Things* (Bellingham, WA: Lexham Press, 2019).

[71]Heiser, *The World Turned Upside Down*, 2.

[72]Ibid., 105.

[73]Heiser, *Demons: What the Bible Really Says about the Powers of Darkness,* 198.

[74]Nicola Hoggard Creegan, *Animal Suffering and the Problem of Evil* (New York: Oxford University Press, 2013), 93.

[75]Ibid., 148.

[76]Boyd, *Satan and the Problem of Evil*, 46–48.

[77]Meghan Larissa Good, *The Bible Unwrapped: Making Sense of Scripture Today* (Harrisonburg, VA: Herald Press, 2018), 19–20.

[78]John C. Lennox, *Determined to Believe: The Sovereignty of God, Freedom, Faith, and Human Responsibility* (Grand Rapids, MI: Zondervan, 2018), 99.

[79]Ibid., 54–55.

[80]Ibid., 53, 68.

[81]Ibid., 24–25, 53; and Boyd, "Why Creation Groans," 224–28.

[82]John Piper, *Coronavirus and Christ* (Wheaton, IL: Crossway, 2020), 42.

[83]John C. Lennox, *Where Is God in a Coronavirus World?* (Charlotte, NC: The Good Book Company, 2020), 36–37.

[84]Tom Wright, *God and the Pandemic: A Christian Reflection on the Coronavirus and Its Aftermath* (London, UK: SPCK, 2020), 14.

[85]C.S. Lewis, *Perelandra* (New York: Scribner, 1944). *Perelandra* is the second book of Lewis's *Space Trilogy*. Perelandra is a planet unmarred by sin. Death was unknown, animals ate vegetation and had no fear of humans or each other.

[86]Boyd, *Satan and the Problem of Evil*, 302–5.

[87]Gregory A. Boyd, *Cross Vision: How the Crucifixion of Jesus Makes Sense of Old Testament Violence* (Minneapolis, MN: Fortress Press, 2017), 110; Lloyd, "Theodicy, Fall, and Adam," 244–45; J. Richard Middleton, *A New Heaven and a New Earth: Reclaiming Biblical Eschatology* (Grand Rapids, MI: Baker Academic, 2014), 106; and Greg Boyd, "A Non-Violent Creation," ReKnew, December 17, 2015, accessed May 30, 2022, https://reknew.org/2015/12/non-violent-creation/.

[88]N.T. Wright, *Simply Christian: Why Christianity Makes Sense* (New York: HarperCollins, 2006), 126. See also N.T. Wright, *Surprised by Hope* (New York: HarperOne, 2008), page 103 for Wright's discussion of Romans 8 and the image of birth pangs as a metaphor for the emergence of God's new age for creation itself, as well as the church.
[89]Wright, *Simply Christian*, 69, 85; and Wright, *Surprised by Hope*, 104, 184.
[90]Wright, *Simply Christian*, 86; and Wright, *Surprised by Hope*, 161.
[91]N.T. Wright, *Evil and the Justice of God* (Downers Grove, IL: InterVarsity Press, 2006), 52.
[92]Van den Brink, *Reformed Theology and Evolutionary Theory*, 125.
[93]Lewis, *The Problem of Pain*, 135.
[94]Caroline Fraser, "The Crucial Role of Predators: A New Perspective on Ecology," *Yale Environment E360* newsletter (September 15, 2011), https://e360.yale.edu/features/the_crucial_role_of_predators_a_new_perspective_on_ecology.
[95]Sy Garte, "New Ideas in Evolutionary Biology: From NDMS to EES," *Perspectives on Science and Christian Faith* 68, no. 1 (2016): 3–11, https://www.asa3.org/ASA/PSCF/2016/PSCF3-16Garte.pdf; and Creegan, *Animal Suffering and the Problem of Evil,* chapter 8.
[96]J. B. Stump, "Did God Guide Our Evolution?," *Perspectives on Science and Christian Faith* 72, no. 1 (2020): 15–24, https://www.asa3.org/ASA/PSCF/2020/PSCF3-20Stump.pdf; Randy Isaac, "Does Complementarity Explain Anything?," *Perspectives on Science and Christian Faith* 72, no. 2 (2020): 126, https://www.asa3.org/ASA/PSCF/2020/PSCF6-20Isaac.pdf; and Chris Barrigar, "The *Agape*/Probability Proposal Is Not Deist," *Perspectives on Science and Christian Faith* 72, no. 2 (2020): 126–27, https://www.asa3.org/ASA/PSCF/2020/PSCF6-20Barrigar.pdf; and J. B. Stump, "Response to Randy Isaac and Chris Barrigar," *Perspectives on Science and Christian Faith* 72, no. 2 (2020): 127–28, https://www.asa3.org/ASA/PSCF/2020/PSCF6-20Stump.pdf.
[97]Peter J. Bussey, "How Might God Have Guided Evolution? Scientific and Theological Viewpoints," *Perspectives on Science and Christian Faith* 73, no. 2 (2021): 97, https://www.asa3.org/ASA/PSCF/2021/PSCF6-21Bussey.pdf.
[98]Ibid.
[99]Ibid., 98.
[100]The importance of imagination reminds me of the 1884 book "Flatland: A Romance of Many Dimensions" by Edwin A. Abbott, a fanciful story of beings occupying worlds of different numbers of dimensions. In it, Sphere (a being occupying Spaceland, a 3D world) attempts with great difficulty to convince Square (a being occupying Flatland, a 2D world) of the reality of a world with three dimensions. Sphere eventually succeeds but then, itself, cannot imagine a fourth dimension, claiming it to be "utterly inconceivable." The importance of faith reminds me of Christian belief in a supernatural realm that exists all around us, seemingly in another dimension beyond empirical detection, populated by intelligent, immaterial spirit-beings that interact with us. These beings have intelligence, will, and emotion and yet lack organic brains with all the associated neuronal connections which we associate with personhood. God is one of these beings.
[101]Rau, *Mapping the Origins Debate,* chapter 2.
[102]Philip Yancey, "God, Science, and the Pandemic: With Lessons from John Donne," American Scientific Affiliation Winter Symposium, January 29, 2022. Yancey's quoted statement, which he says he adapted from C.S. Lewis, is found at minute 14:50 on the video. The video is available to ASA members only.
[103]Boyd, *God at War*, 191.
[104]Boyd, *Satan and the Problem of Evil*, 18.
[105]Boyd, "An Enemy Did This," 210.

Janel M. Curry

Call for Papers

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Science, Faith, and Feminism

Janel M. Curry

Call for Papers

Readers are encouraged to take up an insight or question in the following invitation essay, and draft an article (typically about 5,000–8,000 words) that contributes to the conversation. These can be sent as an attachment to janel.curry1@gmail.com. An abstract should be included in the text of the email. The best essays will go on to peer review and the potential for publication in a Science, Faith, and Feminism theme issue of *Perspectives on Science and Christian Faith,* or independently in a variety issue of *PSCF.*

The lead editorial in the December 2021 issue of *PSCF* outlines what the journal looks for in the articles we publish. For best consideration for inclusion in the theme issue, manuscripts should be received electronically before March 31, 2023.

Looking forward to learning from your contributions,

James C. Peterson, *Editor-in-Chief*

The American Scientific Affiliation lives at the intersection of science and faith. Founded in 1941, the eighty years of the organization have spanned great change in society in the waves of feminism that have gone from calls for equity in the 1960s to the introduction of the Equal Rights Amendment in 1972 and Title IX of the Education Amendments of 1972, to discussions about power dynamics after the Anita Hill incident of 1991, to organization structural analysis that has come with the starting of the "Me Too" movement in 2006.[1] Research and discussion about the role of women in science have been present in these waves.

Margaret Rossiter, in her three volumes on *Women Scientists in America*, traces the struggles of women over time across multiple disciplines.[2] The recent NOVA film, *Picture a Scientist*, depicts the challenges that continue, along with the added barriers for women of color.[3] The theological reflection in North America among Christians on the role of women has been extensive and increasingly shaped by women themselves. These years have involved extensive theological work on the role of women in church, home, and society. Attention to this in *PSCF* has been limited.[4]

More recently, several works have gained prominence that particularly focus on the context within the evangelical community, to which ASA has traditionally belonged, has viewed women. *Jesus and John Wayne: How White Evangelicals Corrupted a Faith and Fractured a Nation* by Kristin Kobes Du Mez has remained on the *New York Times* Best Seller list for weeks.[5] Likewise, in her book *The Making of Biblical Womanhood: How the Subjugation of Women Became Gospel Truth*, historian and theologian Beth Allison Barr brings the scholarly lens of her insights from medieval history to reflect on her own experiences.[6]

Another area of discussion since the 1980s has been that of a feminist

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epistemology of knowledge. One of the first books to reflect on the role of gender in being a scientist was *Reflections on Gender and Science* by physicist Evelyn Fox Keller.[7] This work, and many that followed, argued that women's experiences brought creative and different ways of approaching research and knowledge-creation.

If one searches epistemology, gender, and science today, one finds a myriad of books and articles. Most recently, research has even shown that the physical presence of women influenced research results; an example of this involves a recent study of ketamine's effects on mice.[8] Caroline Perez, in her book *Invisible Women: Data Bias in a World Designed for Men*, addresses both the absence of women in constructing research approaches and the resulting narrowing of the accuracy of data from scientific studies in terms of its application.[9]

This call for papers then is focused on concerns and perspectives that might draw these strains together: How do different approaches to science and faith interact with the roles of women? How have science-related Christian organizations understood the intersectional areas of women and science? Do questions related to epistemology and faith have parallels with epistemology and gender? Can a sociological understanding of society help us understand the ways that faith, science, and different feminist traditions interact? How does our understanding of each of these—science, faith, and feminism—enrich the others? ►

Notes

[1]Karen A. Foss, Sonja K. Foss, and Alena Amoto Ruggerio, *Feminism in Practice* (Long Grove, IL: Waveland Press, 2022).

[2]Margaret W. Rossiter, *Women Scientists in America: Before Affirmative Action* 1940–1972 (Baltimore, MD: Johns Hopkins University Press, 1995); Margaret W. Rossiter, *Women Scientists in America: Struggles and Strategies to 1940* (Baltimore, MD: Johns Hopkins University Press, 1982); and Margaret W. Rossiter, *Women Scientists in America: Forging A New World since 1972* (Baltimore, MD: Johns Hopkins University Press, 2012).

[3]NOVA, *Picture a Scientist,* Uprising Production, 1:37 (2020), accessed August 9, 2022, https://www.pictureascientist.com/.

[4]A few examples include Rodney J. Scott and Raymond E. Phinney Jr., "Relating Body and Soul: Insights from Development and Neurobiology," *PSCF* 64, no. 2 (2012): 101–2, https://www.asa3.org/ASA/PSCF/2012/PSCF6-12Scott.pdf; Jerry Bergman, "The History of Evolution's Teaching of Women's Inferiority," *PSCF* 48, no. 3 (1996): 164–79, https://www.asa3.org/ASA/PSCF/1996/PSCF9-96Bergman.html; James C. Peterson, "Feminism, Ethics, Science, and Technology," *PSCF* 47, no. 3 (1995): 196, https://www.asa3.org/ASA/PSCF/1995/PSCF9-95Peterson.html.

[5]Kristin Kobes Du Mez, *Jesus and John Wayne: How White Evangelicals Corrupted a Faith and Fractured a Nation* (New York: Liveright Publishing, 2020).

[6]Beth Allison Barr, *The Making of Biblical Womanhood* (Grand Rapids, MI: Brazos Press, 2022).

[7]Evelyn Fox Keller, *Reflections on Gender and Science* (New Haven, CT: Yale University Press, 1986).

[8]Shawna Williams, "Sex of Researcher Influences Ketamine's Effects in Mice: Study," *The Scientist: Exploring Life, Inspiring Innovation*, September 8, 2022, accessed September 18, 2022, https://www.the-scientist.com/news-opinion/sex-of-researcher-influences-ketamine-s-effects-in-mice-study-70468#:~:text=The%20team%20reported%20in%20an,to%20work%20as%20an%20antidepressant.

[9]Caroline Criado Perez, *Invisible Women: Data Bias in a World Designed for Men* (New York: Abrams Press, 2019).

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Essay Book Review

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Discussions about Dispersals: Questions Rising from the Search for Historical Adam

Sara M. Koenig and Cara M. Wall-Scheffler

IN QUEST OF THE HISTORICAL ADAM: *A Biblical and Scientific Exploration* by William Lane Craig. Grand Rapids, MI: Eerdmans, 2021. 439 pages. Hardcover; $38.00. ISBN: 9780802879110.

Keywords: behavioral modernity, allele frequency, *Homo heidelbergensis*, primogenitor, atonement, ḥaṭa'

In his book, *In Quest of the Historical Adam: A Biblical and Scientific Exploration*,[1] William Lane Craig splits his time between arguing for the importance of Adam to "orthodox" Christianity, and the inability of science to falsify the notion of two humans being the progenitors of all living humans (and Neanderthals and Denisovans). We have thus also split our review into these two areas, contextualizing the importance of Eve and Adam to orthodox Christianity, and considering the evolutionary anthropological evidence of our lineage's evolution during the mid-Pleistocene; however, we want to start with a few points about which our reviews clearly overlap.

While we don't share Craig's concerns about orthodox Christianity needing a historical couple, it doesn't bother us that he is worried about this. Could Jesus have died for all "hominins"? Of course! Could God love all of God's creation? We are pretty sure the Bible says that God does. We are also confident, as were the Wesleys, that both of our dogs will be in heaven (sorry, Richard Middleton!), so it does not bother us to think that Neanderthals will be there too. But precisely because we believe that God's love "covers" everyone, we don't need a historical Eve (or Adam) to trust in the truthfulness of scripture, or to know that God is interested in the salvation of the world, or to affirm that humans have sinned and need atonement. Simultaneously, we do have some concerns with the ramifications of Craig's analysis of the situation as it impacts biblical hermeneutics, biological anthropology, and people of faith.

Craig begins with a chapter titled, "What Is at Stake," in which he seeks to answer that question. He then proceeds to discuss the topic, Biblical Data Concerning the Historical Adam, in a series of chapters which include fairly robust conversations about the nature of myth, the classification of Genesis 1–11 as myth or "mytho-history," and the relationship between myth and truth. This section concludes with a chapter on Adam in the New Testament.

After setting the table by considering "biblical data," Craig writes about

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Scientific Evidence and the Historical Adam, including chapters on "The Evidence of Palaeoneurology" and "The Evidence of Archaeology" in two parts. His final chapter is titled, "Putting It All Together."

At several points in the book, Craig allows room for readers who do not believe in a literal, historical Adam. For example, he acknowledges early on that the question of the historicity of Adam was never addressed by any ecumenical council (p. 3), and that the theological truths taught in Genesis 1–11 "do not depend on reading the narratives literalistically" (p. 202).

However, Craig ultimately argues for the existence—and importance—of a historical Adam. And, we should note that he means a historical Adam who is also the genetic primogenitor of all humans—in contrast to people who believe in a historical Adam who, with Eve, act together as the spiritual origins of God's relationship with humankind. Craig connects belief in the historical, primogenitor Adam to believing in (1) the truthfulness and reliability of scripture (p. 6); (2) the doctrine of atonement, especially as presented by Paul (pp. 4–6); and (3) the person and reliability of Jesus Christ, asserting, "Thus, as crazy as it sounds, denial of the historical Adam threatens to undo the deity of Christ and thus to destroy orthodox Christian faith" (p. 8). In the concluding chapter, Craig makes a similar move, writing:

> While these narratives [Genesis 1–11] need not be read as literal history, the ordering presence of genealogies terminating in persons who were indisputably taken to be historical and the teaching of Paul in the NT about Adam's impact on the world, which bursts the bounds of a purely literary figure, oblige the biblically faithful Christian to affirm the historicity of Adam and Eve. (p. 363)

In other words, lest a Christian wants to find themself outside the group of "biblically faithful," that Christian is *obliged* to affirm the historicity of Adam and Eve, based on certain names within genealogies in Genesis 1–11, and Paul's teaching about Adam.

Craig is an apologist, and his website includes several articles and videos about the persuasive nature of historical truths in Christianity and the Bible. Yet in this volume, despite a lengthy discussion about the literary genre of myth, it seems that he defaults to an Enlightenment understanding of "truth" that equates it with historical fact. Moreover, Craig seems to make certain assumptions without interrogating them. For example, Craig spends chapters 2–6 contextualizing the narratives of Eve and Adam within the larger literary context of the book of Genesis, as well as in the historical and cultural world of the Ancient Near East. After discussing similarities and differences between the creation accounts in Genesis and those from ancient Mesopotamia and Egypt, he concludes that much of the material in Genesis can fruitfully be read without insisting on its literal nature. But then, in chapter 7, he makes a pivot, arguing that when Adam appears in Jewish literature as a theological example, "all the texts concur in assuming Adam to be a historical person" (p. 204). Is this accurate? How would we know? These Jewish authors need not assume Adam as a literal historical person in order to write about him theologically.

The same is true about Paul; Craig himself acknowledges that only three texts—Acts 17:26; 1 Corinthians 15:20–23, 40–49; and Romans 5:12–19—seem to require a historical Adam (p. 224). Two recent articles in *Perspectives on Science and Christian Faith* demonstrate that the word "Adam" does not actually occur in Acts 17:26: "Acts 17:26: God Made of *One [Blood]*—Not of *One Man*—Every Ethnic Group of Humans," by Fred S. Cannon, reviews the textual evidence from early manuscripts;[2] and "From One Person? Exegetical Alternatives to a Monogenetic Reading of Acts 17:26," by William Horst, explains that the verse does not present a problem vis-à-vis polygenism.[3] It could be that the existence of just one text in the New Testament is enough to convince a person about the historicity of Eve and Adam, but it is surprising that whereas Craig seems to allow that someone can read the narratives in Genesis in nonliteral ways, he insists that the Pauline texts must be read literally. Craig seems to be either conflating Paul's theological arguments about humans with a historical and literal reading of "Adam," or making Paul's theology dependent on the historicity of a literal Adam. In doing so, he ties Christian belief to unnecessarily improbable and even problematic assumptions.

Interestingly, Craig's own preference for the genetic primogenitor status of Adam and Eve limits other theological possibilities for the first two created humans. For example, Eastern Orthodox traditions about Adam and Eve emphasize their role and function as priests in creation. One could argue for

a literal Adam and Eve whose vocation it is to be mediators of God's grace for the created world, a role that would not be solely focused on their genetic ancestry for all humans and/or other closely related species.

There are further tensions in this volume between what is falsifiable from a scientific perspective and what is likely. For example, on the one hand, Craig somewhat belittles anthropologists for his own expectation that biological species concepts should work for fossils while simultaneously suggesting that it doesn't matter what we call mid-Pleistocene *Homo*; he will just use *Homo heidelbergensis* as a place keeper for the population which wrought historical, primogenitor Eve and Adam. All fossil species' names are place keepers while we apply living morphological variation to guide our expectation for breeding in extinct species. For example, we reject the name *Homo heidelbergensis* to explain what is happening in Africa during this time, following instead Robin Dennell's exhortation that we should return to using *Homo rhodesiensis* for this group; Mirjana Roksandic prefers *Homo bodoensis*. However, we also do not think it is good science to say that Neanderthal brains have essentially the same function and functional properties as our brains. This is an intense misunderstanding of how evolution works.

Neanderthals do not have an expanded frontal and prefrontal cortex. They have an expanded occipital lobe. In all vertebrates, this is the area of the brain in which visual processing occurs, not executive functioning or creativity: large brains are not all created equal, and it hurts our understanding of evolution to conflate size with function. It is useful for us to understand that Neanderthals have enlarged sinuses, eye sockets, nasal passages, and occipital lobes; that their inner ear has a different shape and pattern during development than ours; and that they practiced a different form of bipedalism than we do.

If we really want to understand God's creation, understanding the evolutionary processes that created these creatures with whom we had numerous interactions is imperative. Calling everyone a good-enough human is not appropriate. In addition, homoplasious convergence is clearly at play all over the place, and assuming the similarities are homologous prevents new discoveries.

Furthermore, using the evidence we have is not "self-contradictory." There is accumulating evidence that the terrestrial bipedalism that characterizes hominins of our lineage evolved from arboreal bipedalism that was diverse and plentiful during the Miocene. As we learn more about these creatures, we will be able to fine-tune our definition of hominin, our definition of bipedalism, and our definition of our lineage. These are all decisions we make to better frame our research questions and to guide our discussion of the patterns and processes of evolutionary mechanisms. We are not trapped by the definition of hominin as being a bipedal ape with certain pelvic and dental characterizations. Defining the hominin helps us quantify a niche, and then a population, and then a set of relationships with other species around it, in order to understand how evolution may have happened in the past. If one is going to make a claim that these questions are scientifically testable, then simultaneously one has to make a commitment to follow this through to the mechanisms that are also taking place.

This is exactly true in the chapter about "locating the historical Adam" and obviously Eve (who could use a few more mentions, in that she is giving birth to quite a few future species in this model). For example, in the section on genetic problems with a historical couple, Craig gives Dennis Venema a hard time for "fixating" on the genetics. But, the entire section and justification for two genetic ancestors is about genetics. If you want to discount genetics entirely and say humanness is not in the genes, then theoretically, that is fine, but the chapter should be arguing that genes don't matter for humanness. It makes no sense to accuse the people testing the allele hypothesis for focusing too much on alleles. It is further confusing to say that Eve and Adam are *Homo heidelbergensis sensu lato*, but then say that they completely replaced all other *H. heidelbergensis* members without any death: people died without passing on their alleles; that is what descending from only two people living in a giant population means.

On a more functional note, and as an idea for a sequel written by Craig or someone else who wants to take up this argument, why and how would Eve and Adam's descendants immediately spread throughout the world without behavioral modernity to diversify into all these different niches in such a short amount

of time? Why didn't all of Eve and Adam's descendants reach behavioral modernity at the same rate, and some not at all? Complete and total replacement of a substantial number of very successful hominin species with a few individuals who look remarkably like the hominins who have been in those areas for a million years is driven by what evolutionary mechanisms and pressures?

We have elegant hypotheses for what causes dispersal, and nearly all of them rely on population pressure. If the *H. heidelbergensis* population is down to two reproducing individuals and their immediate offspring at 750kyr (when we have an excellent fossil record for lots of things happening all over the world at the same time), what evolutionary pressures drive the expansion of *H. heidelbergensis* populations? Why is the takeover of all other species by this *H. heidelbergensis* population invisible in the fossil record? Since *H. heidelbergensis* is "not-modern" without any obvious behaviors or features that might explain such a rapid takeover, what evolutionary pressures might explain this hypothesis? This definitely requires an additional explanation and would be a worthy focus of the next text. Such a sequel could include theological implications about the descendants of Eve and Adam as well. For example, Genesis 4 contains the first occurrence of the word "sin" in Hebrew (*ḥaṭa'*), through Cain's choice to murder his brother Abel. Is there a historical Cain? And if so, what do his moral choices suggest about the choices Christians can and do make today? ▶

Notes

[1]This book is available through the ASA Virtual Bookstore at: https://convention.christianbook.com/Christian/Books/easy_find?Ntt=in+quest+of+a+historical+adam&N=0&Ntk=keywords&action=Search&Ne=0&event=ESRCG&nav_search=1&cms=1&ps_exit=RETURN%7Clegacy&ps_domain=convention.

[2]Fred S. Cannon, "Acts 17:26: God Made of *One [Blood]*—Not of *One Man*—Every Ethnic Group of Humans," *Perspectives on Science and Christian Faith* 74, no. 1 (2022): 19–38, https://doi.org/10.56315/PSCF3-22Cannon.

[3]William Horst, "From One Person? Exegetical Alternatives to a Monogenetic Reading of Acts 17:26," *Perspectives on Science and Christian Faith* 74, no. 2 (2022): 77–91, https://doi.org/10.56315/PSCF6-22Horst.

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Culture and the Big Questions

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WHAT'S EATING THE UNIVERSE? And Other Cosmic Questions by Paul Davies. Chicago, IL: University of Chicago Press, 2021. 208 pages. Hardcover; $22.50. ISBN: 9780226816296.

I could not have foreseen Paul Davies's latest book appearing. It is distinctively different from his previous books. Once again, it is beautifully written, as only a renowned physicist with a gift for explaining highly abstract concepts in understandable terms could accomplish. Yet this book is much shorter, much more concise, and lacks the long philosophical musings that made Paul Davies's previous books so enjoyable. It contrasts with his earlier work, *The Goldilocks Enigma: Why Is the Universe Just Right for Life?*, a brilliant ten-chapter work over three hundred pages long. That book covers the physics of a universe just right for human life and pursues many different philosophical questions and answers. In contrast, *What's Eating the Universe?* has thirty truly short chapters with just 165 pages of material. Nevertheless, this book is highly recommended, especially for the novice who just wants an overview of the present state of our understanding of physics and cosmology, and a brief foray into some of the big questions.

Davies takes the reader on a journey beginning with the COBE (Cosmic Background Explorer) findings of ripples in the microwave radiation coming to us from every direction. These slight variations in temperature supported the Big Bang model of the universe by connecting the nearly uniform radiation background to galaxy formation with slight "hot spots" necessary to seed the gravity wells, allowing matter to grow from a nearly uniform state to the galaxies we see today. This is just one outstanding example of how scientific investigation has succeeded in explaining our universe.

Davies then presents a historical overview of the major ideas that have contributed to our growing understanding, moving from Copernicus to Einstein. He uses delightful analogies to help the reader grasp the ideas. For example, he uses the analogy of a trained marksman (sharpshooter) to explain how precise the initial expansion of the universe had to be for it to avoid either quickly collapsing or expanding too fast to form stars and galaxies. The many questions addressed by Davies include the speed and shape of space as it expands, the source and nature of matter, including dark matter, and the enigma of dark energy, the cause behind the accelerating expansion of the universe. Davies is a wonderfully gifted writer, and his descriptions are extremely helpful in clarifying these matters.

The title suggests that there are deeply troubling questions about our present understanding of the universe and its governing laws, leaving us with puzzling inconsistencies or paradoxes. And though there are some paradoxes, Davies is the first one to admit that the real story is that our present understanding of the universe via scientific investigation is an overwhelming success. The universe is understandable in terms of elegant mathematical laws that go astonishingly far in explaining and describing what we observe. And this is what's eating Paul Davies, not the universe. Most of his scientist friends have rejected the idea of meaning or purpose intrinsic to this universe, simply accepting the success of science without the need to question why it works. But Davies cannot leave it alone. He writes:

> A universe that "just exists" for no reason, with specific properties that "just are," is correctly described, in formal logic, as "absurd." But if there is no rational coherent scheme beneath the surface phenomena of nature, if things "just are," if the universe is absurd, then the success of the scientific enterprise is totally enigmatic. It cannot be pursued with any expectation that the methods adopted hitherto will continue to work, that we will go on uncovering new mechanisms and processes that make sense, for how can sense be rooted in absurdity? (pp. 158–59)

However, for a Christian scientist, the universe is not absurd. It has meaning and purpose because it was created with meaning and purpose by a transcendent Creator God. Its basis of mathematically elegant laws is no accident, but rather a clear case of design, regardless of how God chose to create it. Davies knows this and is quite willing to acknowledge that this avoids the absurdity of a rational universe without a rational cause. Yet Davies persists, in the hope that science itself will one day uncover that deeper layer required to explain it. Davies personally experienced a journey from a Christian upbringing to atheist scientist, finally to agnostic scientist in which the deeper questions arising from science keep eating at him.

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THE SCIENTIFIC SPIRIT OF AMERICAN HUMANISM by Stephen P. Weldon. Baltimore, MD: Johns Hopkins University Press, 2020. 285 pages. Hardcover; $49.95. ISBN: 9781421438580.

The Scientific Spirit of American Humanism by Stephen Weldon recounts with approval the rise of non-theistic, and even antitheistic, thought in modern science. At the outset, I will confess to being a biased reviewer (perhaps, even, an antireviewer). If I were to tell this story, I would lament, rather than celebrate, the seemingly antireligious stance lauded in this history. I must

also confess to being an active participant in this history, both as an amateur student in the fundamentalist/modernist controversy in the Presbyterian churches and in my own active involvement in faith-science discussions among evangelicals in the American Scientific Affiliation (ASA). No historical account is objective—it will always reflect its author's perspective. This is true of this book and of this review.

Weldon tells the history episodically highlighting key people who contributed to this story. He begins in chapter 1, "Liberal Christianity and the Frontiers of American Belief," with Unitarians (theists/deists who reject the deity of Christ), liberal Protestants, and atheistic freethinkers. After a few chapters, he turns to a largely secular story dominated by philosophers rather than ministers. Chapter 12 presents charts that show how the 1933 Humanist Manifesto had 50% signatories who were liberal and Unitarian ministers, while the 1973 Humanist Manifesto II had only 21%. By the end of book, humanism becomes secular/atheistic humanism. Weldon describes humanism as "a view of the world that emphasizes human dignity, democracy as the ideal form of government, universal education, and scientific rationality" (p. 5). While not explicitly mentioned, but likely included in the phrase "scientific rationality," is atheism. The 1973 Humanist Manifest II begins with this theme in its opening article about religion:

> We find insufficient evidence for belief in the existence of a supernatural; it is either meaningless or irrelevant to the question of survival and fulfillment of the human race. As non-theists, we begin with humans not God, nature not deity.

Chapter 2, "The Birth of Religious Humanism," tells the early 1900s story of ministers John Dietrich, Curtis Reese, and philosopher Roy Wood Sellers, all who were or became Unitarians. "'God-talk' was no longer useful." Unitarianism ends up being a haven for religious humanists, even for those who have eliminated traditional religious language. These are the roots of today's secular humanism.

In many ways, this era is the other side of the religious history of America that this journal's readers may know. The ASA has roots in the more conservative and traditional end of American Protestantism. The old Princeton Presbyterians, Charles Hodge, A. A. Hodge, and B. B. Warfield, represent a strictly orthodox Christianity, but one open to the advances of modern science. One did not have to be theologically liberal to be proscience. The phenomenon of young-earth creationism is a relatively recent development. Conservative Protestants were not as opposed to conventional science as Weldon's treatment suggests.

The Humanist Manifesto (1933) is the subject of chapter 3, "Manifesto for an Age of Science." It was written by Unitarian Roy Wood Sellers and spearheaded by people associated with Meadville Theological School, a small Unitarian seminary, originally in Pennsylvania; after relocating, it had a close association with the University of Chicago. The Manifesto begins with the words, "The time has come for widespread recognition of the radical changes in religious beliefs throughout the modern world. The time is past for mere revision of traditional attitudes." The first affirmation is "Religious humanists regard the universe as self-existing and not created."

"Philosophers in the Pulpit" (chap. 4) highlights the University of Columbia philosophy department and John Dewey, in particular. Dewey was one of the more prominent signers of the Humanist Manifesto and a leading advocate of philosophical pragmatism. This chapter also tells the story of Felix Adler, also associated with Columbia, and the founder of Ethical Culture, an organization with nontheistic, Jewish roots.

"Humanists at War" (chap. 5) and "Scientists on the World Stage" (chap. 6) recount the increased secularization of humanism. Humanists in the 1940s increasingly struggled with the religious character of humanism. Should the category of religion be used at all? During this era, natural scientists, such as evolutionary biologist Julian Huxley and *Drosophila* geneticist Hermann Muller, rather than philosophers, led the most prominent forms of humanism. This humanism was increasingly secular, scientific, and even atheistic.

Weldon is not hesitant to expose the foibles of this movement. Chapter 7, "Eugenics and the Question of Race," traces how selective population control became part of the conversation. In addition to Huxley and Muller, Margaret Sanger is also part of this story. Philosopher Paul Kurtz makes his first appearance in this chapter and continues to be a significant player in the rest of the book. He was the editor of the Humanist Manifesto and used its pages to explore the question of race and IQ.

Chapter 8, entitled "Inside the Humanist Counterculture," describes a period dominated by questions of human sexuality and psychology. Weldon's use of the word "counterculture" is apt. In the 1960s, the feminist Patricia Robertson and lawyer/activist Tolbert McCarroll expressed the zeitgeist of the sexual revolution. The psychology of Carl Rogers, Erich Fromm, and Abraham Maslow moved humanism from a more objective/scientific focus to a more experiential one. They are representatives of the third force (or humanistic) school of psychology, in contrast to Freudian psychoanalysis or Skinnerian behaviorism. Although agreement was rare, by the end of the decade, under Paul Kurtz (influenced by B.F. Skinner), the public face of humanism returned to a more scientific leaning.

Chapter 9, "Skeptics in the Age of Aquarius," is one chapter where I found myself, as a traditional evangelical, to be in nearly complete agreement. This chapter describes how New Age beliefs, along with an ascending occultism, came under fire from the scientific humanists under the leadership of Paul Kurtz. Weldon even cites a *Christianity Today* article that makes common cause with the secular humanists in their resistance to the growing occultism of western culture. I found this chapter to be a useful critique of New Age thinking.

"The Fundamentalist Challenge" (chap. 10) and "Battling Creationism and Christian Pseudoscience" (chap. 11) recount the clash between secular evolutionists and fundamentalist creationists, especially regarding the public-school science curriculum and the teaching of evolution. Here the author clearly demonstrates his prosecularist/anti-fundamentalist inclinations. On a more personal note, the mention of Francis Schaeffer, R. J. Rushdoony, and Cornelius Van Til, strikes at my own history. While some elements of this conservative Presbyterianism were clearly anti-evolutionist, others in the conservative Reformed camp were open to the proscience (including evolutionary biology) views of Warfield and Hodge, even in the early days of anti-evolutionism among fundamentalists. While some in the ASA would count themselves among young-earth creationists or flood geologists, the majority are open to old-earth geology and even to evolutionary biology. The reaction of Weldon himself, and other critics of this era, seems more akin to a religious fundamentalism of its own—albeit a fundamentalism of naturalism. Fundamentalists are not the only ones engaging in a culture war. My own view is that old-earth geology, old universe (big bang) cosmology, and evolutionary biology should be taught as the mainstream scientific consensus even in private religious schools. But dissent and disagreement should be allowed among teachers and students alike. Sometimes it seems to me that these fundamentalist creationists and atheistic evolutionists are all more interested in indoctrination than education.

Embedded in chapter 10 is the history of the Humanist Manifesto II (coauthored by Paul Kurtz). It clearly espouses positions antithetical to traditional Christian orthodoxy, especially in the explicit anti-theistic and prosexual revolution statements. But it is striking to me how much agreement I can find with people who so strongly disagree with traditional Christian faith. This tells me two things: while fundamental religious differences may exist between people, there is something about being human in this world that brings Christians and non-Christians together on many very fundamental questions such as liberty, human dignity, friendship, and peaceful co-existence. Such values are not the unique provenance of humanists or Christians or other religious groups. The second thing is that we are much better at emphasizing differences and seeking to force others to conform to our way than we are at tolerating differences and persuading those who disagree.

The opening of chapter 12, "The Humanist Ethos of Science and Modern America," brought me once again to a personal reflection that is relevant in reviewing this book. My own love of the natural sciences can be traced to Sagan, Asimov, Clarke, Gould, Dawkins, and others who brought the wonder of science to the broader public. Without denying their a-religious, and even antireligious posture, it is noteworthy that the truths about the natural world are independent of who discovered them or communicates them. And they are wondrous whether or not you acknowledge the hand of God in creating them. The process of science works whether the world was created by God or is the result of properties of the universe that just are. It is interesting to me that a brief discussion of post-modernism appears in this chapter. Postmodernism's undermining of the objectivity of natural science leads one to wonder whether this undermines the whole book by hinting that a postmodernist perspective is the consistent nonreligious/atheist view. In contrast, the ASA's faith statement states: "We believe that in creating and preserving the universe God has endowed it with contingent order and intelligibility, the basis of scientific investigation." According to Christians, natural science is possible because creation is orderly and intelligible. Atheists and skeptics simply assert the world's orderliness and intelligibility.

Like myself, readers of this journal are likely to have a different perspective on the events traced in Weldon's book. Nevertheless, the history recounted here helps us to see why there is such a divide between science and those who continue to be influenced by more conservative religious views. As such, it is a worthwhile read and of interest to those who follow the science-faith literature.

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SCIENCE UNDER FIRE: Challenges to Scientific Authority in Modern America by Andrew Jewett. Cambridge, MA: Harvard University Press, 2020. 356 pages. Hardcover; $41.00. ISBN: 9780674987913.

John William Draper and Andrew Dickson White's role in fueling popular ideas about conflict between the primarily natural sciences and religion has been often studied. It is now well known that their claims were erroneous, prejudice laden (in Draper's case against Roman Catholicism), and part of broader efforts to align science with a liberal and rationalized Christianity. In *Science under Fire*, Boston College historian Andrew

Jewett recounts a similarly important but lesser-known tale: twentieth-century criticism of the primarily human sciences as promoting politically charged, prejudice laden, and secular accounts of human nature.

Jewett is an intellectual historian who focuses on the interplay between the sciences and public life in the United States. *Science under Fire* follows up on his 2012 *Science, Democracy, and the American University*, which explored the role of science (or, more precisely, science-inspired thinking associated with the human sciences) as a shaper of American culture from the mid-nineteenth through the mid-twentieth century. As with that previous work, *Science under Fire* illustrates how science can be practiced as a form of culture building and leveraged for sociopolitical ends. While *Science, Democracy, and the American University* explored how various ideas about science came to displace the then-dominant Protestant understandings of morality in the late nineteenth century, *Science under Fire* considers how a variety of critics reacted to the growing influence of those sciences.

Throughout both historical periods, members of the public, politicians, and many social scientists did not view science as offering a neutral or unbiased account of the nature of humans and their behavior. Rather, they practiced, appropriated, and criticized various accounts in order to advance particular visions about how society should be organized. These visions were not primarily driven by scientific data but by philosophical precommitments, including some which led their proponents to deny the validity of the Protestant and humanist values which previously anchored American public life. So, *Science under Fire* addresses religious and politically conservative apprehension over "amoral" psychology and the teaching of evolution in schools. However, its story is much broader. The secular and religious liberals and conservatives, libertarians and socialists, humanities scholars and social scientists all at times lamented the dehumanizing effects of technology or worried that scientists were unduly influenced by selfish motives.

Science under Fire begins with a twenty-three-page summary of the book's main themes. This is followed by two chapters that explain the cultural developments which fostered apprehension about science's role in society. By the 1920s, some thinkers were calling on Americans to adopt "modern" scientific modes of thought, in part by dismissing religion as a source of objective values (chap. 1). Their efforts were resisted by humanities scholars, Catholics, and liberal Protestants, who focused on lambasting naturalist approaches in psychology (e.g., by Freud and John Watson) as pseudoscientific and offering classical or religious values as a bulwark against the excesses of capitalism and consumerism (chap. 2).

In the 1930s and 40s, these critiques were given new impetus as worries arose over social scientists' role in shaping Roosevelt's New Deal as well as mental associations between amoral science and Japanese and German totalitarianism (chap. 3). Post-World War II fears over science grew to encompass concerns about "amoral" scientists such as B.F. Skinner, Benjamin Spock, and others engaging in "social engineering" by training children to value social conformity at the expense of traditional religious or humanist moral guidance (chap. 4). The increasingly vehement religious opposition to scientists' attempts to address questions of morality was partly driven by opposition to "atheist" communism and featured a broad coalition of Protestant and Catholic critics decrying the effects of "scientism" (chap. 5).

There was also a postwar resurgence in interest in the humanities, as well as efforts by thinkers such as C.P. Snow, to position the social sciences as a humanist bridge between "literary" and "scientific" cultures (chap. 6). In the United States, Snow's call for greater prominence for the sciences was challenged by New Right conservatives, who regarded it as dangerously opening the door for liberal academic social scientists to portray their ideologically charged views as objectively scientific. Their efforts included supporting conservative social scientists' research, intervening in academic politics and research funding, and, somewhat justifiably, complaining about the persecution of conservative scholars (chap. 7).

Nevertheless, postwar criticism of scientism was couched in flexible enough terms to appeal to politically and theologically diverse thinkers associated with various institutes and literary endeavors (chap. 8), ultimately including many in the iconoclastic New Left counterculture of the 1960s and 70s (chap. 9). By that time, movements critical of science included religious opposition to evolution and psychology; neoconservative criticism of the "welfare state"; and feminist, Black, and indigenous critiques of science as a tool for justifying an oppressive status quo (chap. 10).

In the Reaganite era, science was targeted by pluralist, postfoundationalist, poststructuralist, and postmodern thinkers; religious conservative challenges to evolution and "secularism" in science; tighter budgets and a downgrading of blue-sky research; and worries over the implications of artificial intelligence and genetic engineering (chap. 11). After a short evaluative conclusion, sixty-two pages of endnotes help flesh out Jewett's argument.

Science under Fire helps illuminate how science and religion have interacted as culture-shaping forces in American public life. Readers will learn how debates

that are *prima facie* about science and religion are really about values and cultural authority, and will discover the origins of some of the assumptions and strategic moves that shape popular science-faith discourse. They will also be invited to enlarge their repertoire of science-faith thinkers (e.g., John Dewey, Reinhold Niebuhr, B.F. Skinner) and topics (behaviorism, debates over Keynesian economics as a backdrop, and how science's value-free ideal was invented and leveraged).

Nevertheless, readers should be aware that Jewett's near-exclusive focus on sweeping intellectual tendencies and the social sciences (with occasional forays to reflect on genetic technology and the atomic bomb) means that *Science under Fire* is not an entirely balanced account of science, politics, and religion in America. Some chapters focus on major streams of thought to the point that the story of individual movements, thinkers, and their interactions with one another is lost. Fundamentalist and conservative evangelical reactions to scientism are treated relatively perfunctorily compared to liberal Christian responses (e.g., the Institute for Religion in an Age of Science is mentioned while the American Scientific Affiliation is not). A bias toward sociological explanations occasionally leads to a degree of mischaracterization. For example, Thomas Kuhn is mentioned only in connection with the 1960s counterculture, and the Vietnam-era Strategic Hamlet Program is characterized as an attempt to "make proper citizens out of Vietnamese peasants" rooted in modernization theory (p. 181), without mentioning it as a counterinsurgency strategy inspired by Britain's successful use of "New Villages" in the Malayan emergency. Finally, although most of the book is lucid, it is occasionally meandering, repetitive, and convoluted. This is particularly true for the introduction, which readers might consider skipping on the first read.

These criticisms are not meant to be dismissive. *Science under Fire* is a unique and uniquely important book. Those who are willing to mine its depths will be rewarded with a treasure trove of insight into the social and political factors that continue to shape conversations about science, technology, and faith in the United States today.

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CREATING CONSPIRACY BELIEFS: How Our Thoughts Are Shaped by Dolores Albarracín et al. New York: Cambridge University Press, 2022. 308 pages. Paperback; $39.99. ISBN: 9781108965026.

Conspiracy thinking is a prominent topic of discussion in American life today—and Christians, with their concern for truth, should not only be informed about, but contributing to, this discussion. This includes awareness of how scholars in the neuro-psychological and social sciences are contributing to our understanding of the nature of conspiracy thinking.

This book investigates the causes of conspiracy thinking in the United States. Its authors draw their findings from existing social scientific literature on conspiracism, general social psychology research, and six empirical statistical studies conducted during the last two years of the Trump presidency (2019–2021): three cross-sectional online surveys, a longitudinal phone panel survey on "deep state" conspiracy claims, a "manipulation" of fear experiment on the alleged relationship between the COVID-19 virus and 5G technology, and a social media study of Twitter hashtags and "fear words."

This book shares many similarities with previous academic works on conspiracy thinking—for example, Hofstadter (1965), Pipes (1997), Robins and Post (1997), Sunstein and Vermeule (2008), Barkun (2013), and Uscinski and Parent (2014)—but distinguishes itself by relying extensively on recent polling data and statistics instead of interviews, case studies, newspaper op-eds, or conspiracist media. Indeed, the authors consciously dispute psychological works that scrutinize the personality traits and life experiences of conspiracy believers, and political science works that link conspiracy fears to power asymmetries. Such approaches, they contend, insufficiently explain the process through which conspiracy beliefs are spread. They argue, instead, that psychological and political factors are themselves shaped by a mixture of personal, media, and social media contacts.

Their central aim is thus to examine how patterns of media consumption shape conspiracy beliefs, habits that are themselves affected by one's pre-existing feelings of anxiety, which is herein defined as a nonspecific

> perception of threat [that] depends on relatively stable psychological motivations of *belief defense* [the desire to maintain a coherent set of beliefs], *belief accuracy* [the desire to maintain a realistic view of the world], and *social integration* [the desire for trust, status, and acceptance within a group], as well as sociopolitical factors and situational factors like communications and media exposure. (p. 163)

When these needs are not met, anxiety rises. But whereas desire for belief accuracy produces, on its own, an increase in critical discernment—and hence a decrease in false conspiracy beliefs—the combination of pre-existing anxiety (e.g., feelings of ostracism) with shared conspiracy narratives increases one's predisposition to believe conspiracy claims. When one's need for closure and community trumps their need for belief accuracy, new information will be interpreted in ways

that justify their emotional state and existing beliefs. The emotional turmoil and social discomfort of anxious individuals make them more prone to accept conspiracist interpretations for troubling situations, drawing them into an alternative "media ecosystem."

Assent to conspiracy claims occurs when anxiety is assuaged by theories that offer plausible and unfalsifiable "proofs" of "hidden hand" driving events. Plausibility is achieved when a theory offers the believer historic similarity (similar plots occurred in the past), psychological similarity (the enemy's alleged motive is conceivable), and normative plausibility (other members of one's community share the same belief). The unfalsifiable nature of conspiracy claims lies in their assertion that proofs of a nefarious plot have been hidden or destroyed by the conspirators; such claims dovetail with the believer's existing distrust of authoritative sources of information. The repetition of conspiracist messages by like-minded others (friends, social networks, etc.), and by popular media (e.g., Fox News) reinforces these beliefs. The believer's wounded ego can further elicit schizotypy, paranoia, and narcissism, which serve as means of self-defence against debunkers and skeptics.

The influence of various media is proportional to time spent with, and trust placed in, these sources of information, along with the consumer's prior levels of neuroticism, suspiciousness, and impulsivity. Online media have an additional influence via their use of bots, individually tailored algorithms, and various forms of "information laundering" in reply threads and chatrooms. Heavy media consumption aligns the consumer's view of the world with the one shown in their preferred media.

The prime contribution of this book is its postulation that anxiety precedes conspiracy thinking (rather than the inverse), a psychological explanation for conspiracy belief that does not lead its authors to conclude, as others have, that conspiracism is inherently a form of neurosis. However, its heavy use of statistics, jargon, and unduly complicated flowcharts renders the text onerous, especially for those without statistical training. Given that this is meant to be the book's most important new input into the literature, it is also its greatest weakness.

Despite the great efforts made by its authors to produce a detailed empirical study of the effects of media on conspiracy beliefs, the book's conclusions are somewhat underwhelming as they echo the findings of many previous studies and offer few new insights into the topic. For instance, their claim that social interaction is the "proverbial elephant in the room" (pp. xiii, 205) is hardly convincing. The media consumption habits of conspiracy believers are a recurring theme throughout the literature, and none make the claim that conspiracy beliefs develop in an information vacuum. The book's conclusion that anxiety serves as an "intervening mechanism" (p. 87) between conspiracy claims and a person's needs for closure and social integration in not particularly revelatory either. That humans are social animals is an argument as old as Aristotle, and that conspiracy myths help insecure individuals improve their sense of social cohesion is at least as old as Karl Popper's "conspiracy theory of society."[1]

The book's statistical data also exhibits several flaws, leading its authors to wrongly conclude, as Hofstadter did in 1965, that the phenomenon of conspiracy thinking is essentially a product of conservative angst[2]—a claim that has been powerfully disproven by many of Hofstadter's critics. This may be due to the timeframe of the authors' research studies, which were conducted mostly during and after President Trump's first impeachment trial (in 2019–2020), which elicited a massive conservative media backlash. It could also be due to their failure to examine long-term patterns of conspiracy chatter, which would have shown (see Uscinski and Parent, 2014) that conspiracy ideation ebbs and flows along political lines over longer periods of time. Their data also contains some unrepresentative samples, namely, the overrepresentation of low-wage earners, the unemployed, and the highly educated, and the underrepresentation of working-class high school graduates and Hispanics (pp. 243–44).

One could surmise that such flaws are due to an extraordinary historical context (the Trump presidency and COVID-19 restrictions), but they are also likely attributable to the implicit political biases of current social psychological research, which, as Duarte et al. demonstrated,[3] is strongly skewed to the political left. This is made evident in the authors' clearly stated opinion that conservative media is the primary cause of conspiracy beliefs and related violence (pp. 224, 169–70) from which its audience—akin to cultists and terrorists—should be deprogrammed with "corrective alternatives" and ridicule (p. 215). This seems to contradict their primary claim that anxiety is the underlying cause (and not the product) of conspiracy beliefs, which should presumably be allayed with kinder methods than these. By identifying conspiracy theories as both a product of right-wing media and, simultaneously, as a "type of misinformation" (p. 11), the authors leave themselves open to the charge of circular reasoning. Indeed, their political bias is shown in their frequent use of contested progressive concepts and phrases such as "racialized," "Latinx," "pro-social behavior to reduce [one's] carbon footprint," and by connecting peaceable conservative media such as Focus on the Family to the use of gun violence by Edgar Maddison Welch in a Washington pizzeria (p. 219).

The small number of conspiracy theories on which the authors based their surveys is another example of skewed sampling. Most of these represent themes that cause far more anxiety to conservatives than liberals (for example, the "deep state," COVID-19 restrictions, illegal immigration, President Obama's birth certificate), while little attention is given to conspiracy theories that traditionally appeal to the political left (for example, JFK, 9/11, GMOs, "BigPharma," CIA malfeasance, Hurricane Katrina) or to progressives' fears about policing, systemic racism, abortion rights, or gender identity, making it all the more likely that their research subjects who displayed conspiracist thinking stood on the right side of the political fence.

Finally, the book spends too much time discussing tangentially pertinent psychological research (for example, the influence of music on pain and imitative suicide) and too little detailing the content and origins of the few conspiracy theories their research is based on (with the exception of the 2016 "Pizzagate" panic). This makes the book difficult for the layperson to follow, when it is compared to academic works such as those of Barkun[4] or Uscinski and Parent,[5] which are accessible to a non-specialized audience. Few details are given, for instance, of the Tuskegee syphilis experiments, which are mentioned frequently but never in detail as an example of a genuine government conspiracy (rather than a significant but nonsinister breach of medical ethics). In the end, the book complements the rest of the literature but falls short of providing significant new insights, and is unlikely to elicit interest among laypersons, especially those who hold conspiracy beliefs.

Notes

[1]Karl R. Popper, *Conjectures and Refutations: The Growth of Scientific Knowledge* (New York: Routledge & Kegan Paul, 1963).

[2]Richard Hofstadter, *The Paranoid Style in American Politics, And Other Essays* (New York: Knopf, 1965).

[3]José L. Duarte et al., "Political Diversity Will Improve Social Psychological Science," *Behavioral and Brain Sciences* 38 (2015): e130, https://doi.org/10.1017/S0140525X14000430.

[4]Michael Barkun, *A Culture of Conspiracy: Apocalyptic Visions in Contemporary America* (Berkeley, CA: University of California Press, 2013).

[5]Joseph E. Uscinski and Joseph M. Parent, *American Conspiracy Theories* (Oxford, UK: Oxford University Press, 2014).

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Technology

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12 BYTES: How We Got Here, Where We Might Go Next by Jeanette Winterson. New York: Grove Press, 2021. 336 pages. Hardcover; $27.00. ISBN: 9780802159250.

Throughout a set of twelve essays, Jeanette Winterson explores computing through history, culture, and philosophy. She focuses on the values and stories built into technology. She begins with a section titled "The Past" which refers to Ada Lovelace and Mary Shelley, explaining the origins of computing. The section that follows is about "superpowers" and computing. This second section is the most philosophical of the four parts of the book, navigating relationships between current and past philosophies, and explaining how technology influences the way people will think about the world. The third section is called "Sex and Other Stories," which discusses sex and gender and sexism. The concluding section of the book titled "The Future" comprises three concluding essays.

Though I certainly did not agree with all of Winterson's claims, the book felt like one side of a respectful dialogue rather than imposing a singular view of the world. She does not directly state her current religious beliefs, but shares that she grew up as a Christian. Although her current view of the Bible is not clearly stated, she brings it into the discussion frequently and uses a respectful tone to discuss religion. For leaders in faith and technology, *12 Bytes* provides thoughtful insights on many different aspects of the assumptions, history, and future of technology and how it shapes society.

Chapter 4: "Gnostic Know-How" is a discussion of religions, AI, and the religion of AI. Winterson compares the faith that many people place in technology to the Christian hope of the resurrection. She is far more critical of the Church of Big Tech than she is of any traditional religion. She very clearly states that faith placed in AI is misplaced, saying, "We could create a god (AI) in our own image—warlike, needy, controlling. It isn't a good idea" (p. 113).

In addition to religion, women are a recurring theme of the book. She starts by introducing the author Mary Shelley and the computing pioneer Ada Lovelace, who are mentioned in later essays as well. In other essays she focuses on women as a group, with trademark sass: "Why wouldn't we want an able, considerate, smart helper who is always available, and mostly free? That used to be called a wife. But then feminism spoiled the party" (p. 78). Multiple essays focus primarily on women, as in "Hot for a Bot," which discusses sex bots as encouraging the objectification of women by building actual objects as replacements. She also discusses

women and discrimination in STEM fields in the essay "The Future Isn't Female."

Another significant theme is the economy. Starting with the history of workers' rights and the industrial revolution, she discusses the future of our economy, considering the rapidly changing role of technology. She expresses many concerns about Big Tech and the economy. At one point she writes, "Did you imagine you owned your face? Owning is so last century. This is a sharing economy. We share. Big Tech collects" (p. 61). She suggests that describing the new economy as the "sharing economy" is ironic since sharing is not a financial transaction, but we are moving in the direction of increased transactions. Using history and descriptions of present-day business practices, all the way through to Big Tech's COVID-19 profits, she argues that companies should be forced to be more responsible. In envisioning a new economy, she has as many questions as answers, but she lays out principles that may guide reformation.

I have read many books about AI, but I have not found another book that engages with modern AI and technology alongside philosophy in the way that *12 Bytes* does. It respectfully and thoughtfully considers the relationships between religion, philosophy, and technology; I would recommend it for those interested in exploring these connections. The primary question posed by the book is not one about the direction of technology, but rather it asks, *Where does humanity go from here?*

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THEOLOGY

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THE LOGIC OF THE BODY: Retrieving Theological Psychology by Matthew A. LaPine. Bellingham, WA: Lexham Press, 2020. 363 pages. Paperback; $26.99. ISBN: 9781683594253.

In this book, the author seeks a theological and biblical response to contemporary neuropsychology, stemming from a need for more effective pastoral care and faith-based counseling.[1] LaPine seeks to address a perceived gap between a theological understanding of human agency, and current neuroscience and psychology that leaves pastors and faith-based counselors under-equipped to meet the real mental health and counseling needs they encounter. Although the ultimate purpose is to provide much-needed support for applied pastoral or counseling care, the book is written as a theological reflection to inform a practitioner's theology of practice.

Anchored in the Reformed tradition, LaPine provides an overview of pre-Reformation and Reformed theological history in relation to the historical evolution of the field of psychology. Given the scope of these fields, the task of a thorough theology of psychology would take volumes. As a classical Reformed theologian, LaPine uses almost four hundred pages to narrow down the conversation to the theological basis for emotions and neurobiology, specifically through the relationship between the body and mind or spirit. The relationship of will, emotion, biology, spirit, and soul forms the core pieces of this book, around which the chapters revolve.

In his introduction, LaPine presents his "straw man" conflict: the rich spiritual position of faith, against "the modern, reductionist tendency to explain our emotional life exclusively in terms of brain function" (p. xix). At the same time as he points to a distance between (secular) psychology and theology, LaPine also highlights two opposing streams of theology: one that makes the spirit or the spiritual superior to the body or biology, and one that does not. LaPine shows that neuropsychology values the body and integrates it with the biological facts of emotion and volition (will), whereas mainstream Reformed theology does not, valuing the spiritual in primacy. LaPine notes that this dualism leaves Reformed counselors and pastors without a theology for a more holistic account of human psychology. He states that the Reformed mainstream shows a "lack of psychological nuance" (p. 4), leading to "emotional volunteerism," or the position that people have moral culpability for emotions. In other words, an experience like anxiety becomes a moral sin, to be addressed by prescriptive spiritual re-orientation. The risk here is either a moralistic approach to mental health and human pain, or else abandonment of theology in an attempt to align counseling to contemporary psychological science in practice. Both these options undercut holistic care by undervaluing or ignoring either the body or spirit respectively.

LaPine argues, rightly in my view, that "sufferers simply cannot repent and believe their way out of anxiety" (p. 36); this begs a need for a more robust and nuanced theology, particularly given the current scientific evidence for the neurobiology of emotion. LaPine describes what he calls a "tiered psychology," for which he finds a better grounding in Thomistic theology. The first three chapters of the book are dedicated to a history of theological attempts to account for psychology, in dialogue with the medical scientific understandings of those times. Chapter four explores the theology of Calvin, covering roots in theology for the current Reformed mainstream demotion of the body, as well as nuances of interpretation that LaPine sees as evidence of threads of Reformed theology that instead carried on the earlier holism. In chapter five, he continues the history of Reformed theology in respect of the debate of the seat of the soul, the place of the will, and the question of the

influence of the body's impulses on moral or cognitive control.

The overall picture in this historical review is of an emerging dualism and hierarchy in which reason is morally obligated to control the inherently sinful impulses of the "flesh." Chapters six to nine alternate between explorations of natural law, science, and biblical reference to show that a more biblical and authentic (to Calvinism) theology comes closer to Thomas Aquinas's views, as well as to contemporary neuroscience (accepting psycho-emotional struggle as a human phenomenon without inherent moral culpability).

LaPine's Reformed-style writing (dense discussion with heavy footnotes, discussion spiraling around the same theme in different ways for several hundred pages) is admirable for its integrity. He has done his homework on both theological history and many aspects of psychology and neuroscience. As well, he is addressing very important issues in the context of a history of inadequacy in faith-based responses to mental health and counseling across Christian denominations. LaPine's work fills a critical gap at a timely moment in history, when the church needs a better response to human needs, and practitioners need tools for a more robust theology of practice.

At the same time, the author's deep dives into highly technical theological language and footnoted minutiae make a commitment to reading the whole book difficult for anyone who is unfamiliar or uncomfortable with the dense writing style of Reformed theology. There are also inconsistencies in the central arguments. For example, LaPine's opening section pits faith approaches against biological materialism as the current mainstream view, but draws on nonmaterialist views and resources in other areas without acknowledging that materialism is only one among the current views, many of which are more inclusive of spirituality. Materialist determinism is more confined to the medical model, which governs only a fraction of the practice of counseling psychology, most of which has embraced either existential, psychodynamic, or humanistic approaches.

LaPine does an interesting job of trying to pry Reformed theology from a particular tradition of Reformed thought, showing this particular tradition to be just one among many options consistent with core Reformed commitments. The book, however, can't quite get unstuck from its initial strategy of attaching its arguments to highly specific and selective theological and psychological parameters. A therapist or pastor wishing to better anchor their counseling approach in their theology might do well to select from the range of neuropsychotherapeutic theories and approaches in the dialogue between their theology and psychology, rather than start with defining the task as a conversation with materialist determinism.

The theological treatment sometimes loses "the forest for the trees." The discussion of interpretive nuances in Jesus's embodied experience of anguish in Matthew 26 (chap. 7) is a nugget. LaPine's arguments ground the issues well in scripture and in the heart of the Christian faith (the life and death of Jesus), as well as in its roots of Jewish understanding. Nonetheless, the reader loses track of the key salient points in the main theology chapters that lay out the "chess pieces" of the debate—Aquinas (chap. 2), Calvin (chap. 4), Reformed tradition (chaps. 7–8)—after slogging through the tangents and lengthy footnotes. Shortening the book by 200 pages would have been a worthwhile editorial exercise and would also have made the book comprehensible to more readers.

LaPine's neuropsychology discussion sometimes gives an impression of romping loosely through a broad field that never shakes the overgeneralized straw-man role set at the beginning, despite some interesting and pertinent references (such as Panksepp's emotional systems). It is difficult to see the precise connection between the theology and contemporary psychology, despite the enduring relevance of the central debate about moral choice, spirituality, and emotional health. Nevertheless, professionals with psychology training will find interesting points and connections. LaPine's book is a worthwhile exercise in wrestling with one's beliefs about the interactions between body, mind, and soul, and with the place of human agency in mental health and moral life. For this, the book provokes a discussion that is much needed. The book is a worthwhile resource for any faith-based Christian (any denomination) student of counseling or chaplaincy, or for clergy or divinity students who want to take their responsibility for counseling and pastoral care seriously. The cost of the book is very reasonable, and well worth it for the segments a reader may find most useful. As well, the questions addressed (relationship of spirit/soul and body, moral choice vs. mental health) are central to the task of counseling. The church is long overdue for supporting practitioners toward a theology of practice in counseling psychology that integrates current science.

Generally, I give the book a thumb's up. I recommend it for therapists, though those who haven't read theology in a while, will find it hard slogging. I also recommend it for counseling and psychology training in faith-based institutions because LaPine addresses many of the core issues and difficult questions of agency and moral responsibility. The structure of the book could provide a nice framework for a course on topics such as the history of "theology of psychology," development of a theology of practice, or theories of change in pastoral counseling. Readers, however, do need to supplement the contemporary psychology references with further reading for a first-hand understanding of the nuances

of the field, rather than relying on LaPine's brief and oversimplified summaries.

Note

[1]This book is available through the ASA Virtual Bookstore at: https://convention.christianbook.com/Christian/Books/easy_find?Ntt=THE+LOGIC+OF+THE+BODY%3A+Retrieving+Theological+Psychology&N=0&Ntk=keywords&action=Search&Ne=0&event=ESRCG&nav_search=1&cms=1&ps_exit=RETURN%7Clegacy&ps_domain=convention.

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Letters

The Data of Gender Dysphoria

There was so much said, and there was so much not said, in "An Attempt to Understand the Biology of Gender and Gender Dysphoria: A Christian Approach" (*PSCF* 74, no. 3 [2022]: 130–48) by Tony Jelsma.

The crucial claim, "Mental health usually improves after transition, particularly over time" cites one study.[1] Its conclusion was overturned.[2] After receiving publicity,[3] letters to the editor raised concerns, including its omission of suicides. Upon reanalysis, as Richard Bränström and John Pachankis' study had also found for hormones,[4] surgery's impact was not statistically significant.[5]

Correcting only one data error, the article of the study was reposted. Clicking "View Correction," top left, finds the correction. It calls the conclusion, "too strong."[6] To hunt down exactly what "too strong" means, click "Archive," "2020," "August," scroll to "Letters to the Editor" to click and read the editor's comment, the seven letters, and the authors' response—especially table 1.[7]

Today, this nonlongitudinal study still suggests it found a "longitudinal association between gender-affirming surgery and reduced likelihood of mental health treatment"[8]—while the truth—that the study's design "is incapable of establishing a causal effect of gender-affirming care on mental health treatment utilization"[9]—remains fourteen clicks away. So, "too strong" means "wrong"—"*so* wrong," that it's meme-worthy: Did you know a perpetual motion machine solved the mystery of dark matter? Oops: That statement is "too strong."

Welcome to the world of transgender science. Commonplace are "small studies with cross-sectional designs, nonprobability samples, and self-reported treatment exposures and mental health outcomes."[10]

Jelsma's reference (p. 136) reporting high satisfaction with genital surgery, used a nonrandomized sample of 71 people. The reference (p. 137), that reported the regret rate is 1%, included studies with short follow-ups. Jelsma noted WPATH (World Professional Association of Transgender Health) standards. If WPATH doesn't meet standards for evidence-based medicine[11] and for conflicts of interest consistent with issuing "Standards of Care,"[12] why follow them?

I'm not saying Jelsma's research is poor. I'm saying the evidence is poor. Statistics are not science. Jelsma attempted a challenging, controversial topic, adding insights about body perception, and importantly, raised good questions.

By contrast, despite highly uncertain evidence, gender activists, certain they are right, push "affirmation,"[13] herding people—like cash cows—onto the WPATH ("WrongPATH") toward sterilization. Their claim that experimental puberty blockers are reversible is "increasingly implausible."[14]

- If a boy bullied by boys, who begins to identify with girls, is better supported by solving his root problems than by "affirmation" toward castration,[15] why denounce it as "conversion therapy"?
- If the unprecedented spike in gender dysphoria among adolescent girlfriends is from influencers like social media,[16] how will double mastectomies solve it? "Affirmation" can be a Pied Piper.

Activists' "When-the-only-tool-is-a-hammer-every-problem-looks-like-a-nail" ideology first cuts off people's options, then cuts off their organs. People are being hammered. The number is unknown.

One part of a Christian response, is to seek and speak truth. Healthy sex organs, better futures, and even lives are being sacrificed on the altar of gender ideology. And that statement is not "too strong."

Notes

[1]Richard Bränström and John Pachankis, "Reduction in Mental Health Treatment Utilization among Transgender Individuals after Gender-Affirming Surgeries: A Total Population Study," *American Journal of Psychiatry* 177, no. 8 (2020): 727–34, http://dx.doi.org/10.1176/appi.ajp.2019.19010080.

[2]"Correction to Gender-Affirming Surgery and Use of Mental Health Services," *Medscape* (October 13, 2019), https://www.medscape.com/viewarticle/919822. *Medscape* removed their news article about the study in note 1 above after the *American Journal of Psychiatry* issued a correction invalidating the results.

[3]"Correction of a Key Study: No Evidence of 'Gender-Affirming' Surgeries Improving Mental Health," *Society for Evidence Based Gender Medicine* (August 30, 2020): Table 1. Table 1 is found under the heading, "Original Study by Bränström and Pachankis (2019)" and shown by clicking "Click here for more," https://segm.org/ajp_correction_2020.

[4]Bränström and Pachankis, "Reduction in Mental Health," 727, 730, 731.
[5]Richard Bränström and John Pachankis, "Toward Rigorous Methodologies for Strengthening Causal Inference in the Association between Gender-Affirming Care and Transgender Individuals' Mental Health: Response to Letters," *American Journal of Psychiatry* 177, no. 8 (2020): 769–72, https://doi.org/10.1176/appi.ajp.2020.20050599.
[6]"Correction to Bränström and Pachankis," *American Journal of Psychiatry* 177, no. 8 (2020): 734, https://doi.org/10.1176/appi.ajp.2020.1778correction.
[7]Bränström and Pachankis, "Toward Rigorous Methodologies." Click to expand Table 1, found under "Response to concern 2."
[8]____, "Reduction in Mental Health," 727.
[9]____, "Toward Rigorous Methodologies," 772.
[10]Ibid., 770.
[11]"WPATH Explained," *Genspect* (October 1, 2022), https://genspect.org/wpath-explained/.
[12]@LisaMacRichards, "Bias, Not Evidence Dominates WPATH Transgender Standard of Care," *Canadian Gender Report* (October 1, 2019), https://genderreport.ca/bias-ot-evidence-dominate-transgender-standard-of-care/.
[13]Dana Kennedy, "Anguished Parents of Trans Kids Fight Back against 'Gender Cult' Trying to Silence Them," *New York Post* (May 11, 2022), https://nypost.com/2022/05/11/meet-the-parents-of-trans-kids-fighting-gender-cult/.
[14]Michael Biggs, "The Dutch Protocol for Juvenile Transsexuals: Origins and Evidence," *Journal of Sex & Marital Therapy* (September 19, 2022), https://doi.org/10.1080/0092623X.2022.2121238.
[15]Ryan Anderson, *When Harry Became Sally* (New York: Encounter Books, 2019), 134–44.
[16]Abigail Shrier, *Irreversible Damage* (Washington, DC: Regnery Publishing, 2020), 25–77.

Brenda Miller
ASA Member

Author Response to Brenda Miller

I thank Brenda Miller for her careful reading of my article and her response. Indeed, much was said and even more would have been said if I had submitted it six months later. Even then, it would be incomplete! However, more nuance is needed on this topic than Miller provides. I am well aware of the controversy and incomplete data about the benefits of transitioning for people with gender dysphoria. Transitioning is not a magic bullet. On the one hand, there is the relief of the dysphoria, but it is replaced by the stress of constant medication and expensive surgeries, not to mention the strain in relationships with family and loved ones. Which wins out?

I suspect that much of the disagreement lies in a conflation of the two types of gender dysphoria, early- and late-onset. Numerous studies before 2017,[1] many more than I cited in the article, indicate beneficial effects of transitioning. Because these are earlier studies, these cases were before the recent surge in gender dysphoria and are likely primarily early-onset cases, which I believe are caused by a hormonal imbalance *in utero*.

I am more concerned about the recent rise of late-onset gender dysphoria, which has a high incidence of comorbidities. These comorbidities can weaken the development of the mind-body connection, leaving one susceptible to suggestions of gender dysphoria. I described this in more detail in a recent talk.[2] One can imagine a scenario where an adolescent is suffering from one or more of these comorbidities, then incorrectly decides, perhaps prompted by social media, that they are transgender. Immediately, they would have a "reason" for their problems, they would have an identity and sympathy. Affirmative counseling would further solidify this misconception, and hormone treatments will change the way they feel—all leading to the misconception that they have identified the problem. However, if their comorbidities have not been properly addressed, transitioning will not help.

Unfortunately, the scientific literature I have read does not distinguish these two types of gender dysphoria when studying the impacts of transitioning. I have not seen evidence to support this, but I suspect that while the earlier studies are of predominantly early-onset cases, there hasn't been time for long-term studies of the benefits of transitioning in late-onset gender dysphoria. It will be interesting to see whether future longitudinal studies with sufficient statistical power will find any differences from these earlier findings.

Yarhouse and Sadusky, in their latest book *Gender Identity and Faith*,[3] urge counselors first to address the comorbidities before addressing the question of gender, not so much to "prove" that the dysphoria was not real but to clear the way to address the question of gender in the absence of these confounding variables.

It is my hope that Christians will show love and care to those suffering from gender dysphoria, regardless of their position on this issue. Support and concern do not imply agreement, and if we want to win (or keep) these people for Christ, a confrontational approach will not help.

Notes

[1]"What Does the Scholarly Research Say about the Effect of Gender Transition on Transgender Well-Being?," The "What We Know" Project, Cornell University, accessed October 31, 2022, https://whatweknow.inequality.cornell.edu/topics/lgbt-equality/what-does-the-scholarly-research-say-about-the-well-being-of-transgender-people/.
[2]*Gender Dysphoria: A Christian Biologist's Perspective.* A Lecture by Tony Jelsma, 2022, https://www.youtube.com/watch?v=YZhyK91SBts.
[3]Mark A. Yarhouse and Julia A. Sadusky, *Gender Identity and Faith: Clinical Postures, Tools, and Case Studies for Client-Centered Care* (Downers Grove, IL: IVP Academic, 2022).

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