

# Does Evolution Have a Purpose? The Theological Significance of William Stoeger's Account of "Nested Directionality"

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## Abstract

William Stoeger, SJ, a highly influential proponent of theistic evolution, maintained that scientific understanding of the three major phases of evolution—cosmic, prebiotic, and biotic—all indicate that the universe is marked by an intrinsic tendency to produce novel kinds of entities, greater and greater organized complexity, intensified interconnectedness between organisms and their environments, and an unimaginable proliferation of life forms. Stoeger's account of this intrinsic directionality can be complemented by recent accounts of bio-cultural and social evolution. People of faith can affirm that the broad directionality of the universe, including its random events, provides the natural context within which God's purposes are achieved.

## Keywords

guided evolution, natural selection, naturalism, niche construction theory, secondary causality, teleology

The recently deceased astronomer William Stoeger, SJ, was an accomplished staff member of the Vatican Observatory Research Group in Tucson, Arizona, and a leading figure in the international dialogue among theologians, philosophers, and natural scientists. His work exemplified the Second Vatican Council's conviction that "investigation carried out in a genuinely scientific manner and in accord with moral norms never truly conflicts with faith."<sup>1</sup> Stoeger's professional accomplishments in

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1. *Gaudium et Spes* (December 7, 1965), 38, [http://www.vatican.va/archive/hist\\_councils/ii\\_vatican\\_council/documents/vat-ii\\_const\\_19651207\\_gaudium-et-spes\\_en.html](http://www.vatican.va/archive/hist_councils/ii_vatican_council/documents/vat-ii_const_19651207_gaudium-et-spes_en.html).

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both science and religion have been widely recognized, so there is no need to rehearse them here.<sup>2</sup> This essay commemorates the work of this seminal thinker by examining his account of the intrinsic directionality and purpose of evolution. The core question, put simply, is whether the natural sciences provide support for the Christian claim that creation reflects God's purposes.

The psalmist proclaims: "The heavens are telling the glory of God; and the firmament proclaims his handiwork" (19:1). Concurring with this sentiment, Stoeger interpreted the findings of contemporary astronomy and the other natural sciences to be consistent with the Christian conviction that the world in which we live is the creation of an omnipotent and providential God. Christians and other theists hold in faith that the purpose of the universe is to manifest the goodness of God. The world and all the creatures in it constitute a vast outpouring of divine goodness.<sup>3</sup> Human beings give glory to God by exercising our distinctive capacities for explicitly knowing and loving God, one another, and the wider created order. This theological conviction encourages us to see the moral life as structured by norms and virtues that promote the intrinsic dignity of human persons, the common good, and the flourishing of all creatures. This article will examine how Stoeger connected the Christian vision of the purpose of creation with a rich scientific account of the intrinsic direction of evolutionary history toward greater complexity.

## Theistic Evolution

Stoeger was a leading figure among scholars and scientists who advance a way of thinking about faith and science known as "theistic evolution." Theistic evolutionists regard the world as God's good creation in a way that is fully consistent with the findings of the natural sciences.<sup>4</sup> Working out of the fundamental conviction that truth

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2. See Guy Consolmagno, "Across the Universe: Big Bang Bill," *The Tablet*, April 26, 2014, 36; John Farrell, "The Vatican Loses a Distinguished Scientist," *Forbes*, April 11, 2014; Robert John Russell, "William R. Stoeger, S.J. (1943–2014): Physicist, Cosmologist, Friend, and Leader in Science and Theology," *Theology and Science* 12 (2014): 293–95, <https://doi.org/10.1080/14746700.2014.954392>; Peter Hess, "An Astronomer for God: William Stoeger, S.J. (1943-2014)," *National Center for Science Education* (blog), May 6, 2014, <https://ncse.com/blog/2014/05/god-astronomy-appreciation-william-r-stoeger-0015569>.
  3. The primary objection to this claim comes from "problem of evil," particularly as it concerns the natural world. Stoeger described the world as "specially ordered to produce life" and at the same time marked by "disappearance, disintegration, and death." The latter play an important role in the emergence of complex systems, including the evolution of species. Stoeger maintains that both play central roles in the working out of God's purposes in the world. See William R. Stoeger, "Scientific Accounts of Ultimate Catastrophes in our Life-Bearing Universe," in *The End of the World and the Ends of God: Science and Theology on Eschatology*, ed. J. Polkinghorne and M. Welker (Harrisburg, PA: Trinity Press International, 2000) 479–92. A more complete discussion of Stoeger's account of divine purpose would have to treat his understanding of the role "natural evil" plays within evolutionary processes.
  4. Scientists who advocate theistic evolution include geneticist Francis S. Collins, *The Language of God* (New York: Free Press, 2006) and astronomer Owen Gingerich, *God's Universe* (Cambridge, MA: Belknap, 2006).

cannot ultimately contradict truth,<sup>5</sup> theistic evolutionists offer an alternative to both biblical literalism and naturalism.<sup>6</sup> They take as their starting point a universe that is approximately 13.7 billion years old, the origin of life on this planet about 3.5 billion years ago, and the appearance of the first anatomically modern human beings (*Homo sapiens*) around 150,000 to 200,000 years ago. Biblical depictions of creation are religiously profound but never intended to provide anything like a reliable scientific account of the origin of the natural world.

Theistic evolutionists hold that God designed the fundamental characteristics of our “fine-tuned” universe in a way that would eventually give rise to conscious beings capable of knowing and loving God and one another.<sup>7</sup> The Creator established the elemental physical features of nature so that, over vast amounts of time and space, they would naturally give rise first to biological organisms, then to conscious animals, and finally to intelligent, affective beings capable of communicating symbolically, being moved by religious awe, and exercising moral responsibility. Unlike evolutionary deists, theistic evolutionists regard the Creator as continually sustaining the ongoing operation of the natural world. God achieves the divine purposes through the undirected unfolding of the potentialities built into the initial framework of creation. This view is “evolutionary” in that it regards divine guidance as working in and through the normal operations of nature—its contingencies and law-like regularities—rather than requiring supernatural interventions that violate the ordinary course of nature.<sup>8</sup>

## The Intrinsic Directionality of Evolution

One of Stoeger’s most significant contributions to theistic evolution is found in his treatment of the intrinsic directionality of nature.<sup>9</sup> He understands “intrinsic directedness” as a characteristic of any system that routinely produces an end or a certain state

5. See John Paul II, “Truth Cannot Contradict Truth,” (address, Pontifical Academy of Sciences, Vatican City, October 22, 1996), [http://www.newadvent.org/library/docs\\_jp02tc.htm](http://www.newadvent.org/library/docs_jp02tc.htm). See also Thomas Aquinas, *Summa Contra Gentiles* 1, chaps. 1–9.

6. See Barbour, *Religion in an Age of Science: Historical and Contemporary Issues* (San Francisco: Harper, 1997); Kenneth R. Miller, *Finding Darwin’s God: A Scientist’s Search for Common Ground between God and Evolution* (San Francisco: Harper, 2007); David Fergusson, *Faith and Its Critics: A Conversation* (New York: Oxford, 2011); and Alister E. McGrath, *Surprised by Meaning: Faith, Science, and How We Make Sense of Things* (Louisville: Westminster John Knox, 2011).

7. See Alister E. McGrath, *A Fine-Tuned Universe? Science, Theology, and the Quest for God* (Louisville: Westminster John Knox, 2009).

8. For a helpful analysis of Stoeger’s understanding of the “laws of nature,” see Denis Edwards, “Toward a Theology of Divine Action: William R. Stoeger, S.J., on the Laws of Nature,” *Theological Studies* 76 (2015): 485–502, <https://doi.org/10.1177/0040563915593478>.

9. William R. Stoeger, “The Immanent Directionality of the Evolutionary Process and Its Relationship to Teleology,” in *Evolutionary and Molecular Biology: Scientific Perspectives on Divine Action*, ed. Robert John Russell, William R. Stoeger and Francisco J. Ayala (Vatican City: Vatican Observatory Publications; Berkeley, CA: Center for Theology and the Natural Sciences, 1998), 163–90. See also, *inter alia*, Stoeger, “Contemporary

of affairs. Stoeger wrote about “evolution” in a very general sense to include not only the origin of species through genetic mutation and natural selection but more generally to processes that led to massive physical and chemical changes within the universe that preceded the emergence of life on our planet. He argues that physics, astronomy, chemistry, geology, biology, and other scientific disciplines provide a massive amount of evidence showing that the universe is marked by an intrinsic tendency to produce novel kinds of entities, greater and greater organized complexity, intensified interconnectedness and relationality between organisms and their environments, and an unimaginable proliferation of life forms.<sup>10</sup>

Stoeger sketched three major phases of evolution—cosmic, prebiotic, and biotic—that point to the intrinsic directionality of the universe. Each phase of evolution produced conditions that made it possible for the next phase to emerge. Over vast amounts of time, the elemental forces of nature inevitably gave rise to more complex entities. Cosmic evolution established the fundamental laws of physics—the essential regularities that enable and constrain all of material reality. On the micro-level, cosmic evolution produced neutrons, protons, electrons, neutrinos, and other fundamental particles; on the macro-level, it led to the formation of galaxies and stars. Over time, these physical conditions made possible the emergence of new and more complex entities that included, on the micro scale, heavier elements (e.g., carbon, oxygen, and copper) and, on the macro level, new kinds of stars.

In the second, prebiotic phase of evolution, planets, asteroids and other novel entities functioned as “laboratories” for the synthesis of new and more complex molecules, including water, ammonia, methane and carbon dioxide, and the “building blocks of life” like amino acids and nucleic acids.<sup>11</sup> The first forms of life emerged when environmental conditions changed, which led to the production of complex molecules that were able to function in novel ways.

In the third phase, the distinctive physical and chemical features of our planet led to the emergence of living entities, “hereditary replicating metabolic systems.” Organisms succeed in evolutionary terms when they possess traits that are adaptive within the environmental niches within which they survive and reproduce; they go extinct when changing environments render their traits no longer adaptive. Biological evolution fueled a vast proliferation of life forms. Single-celled life began on the planet around 3.5 billion years ago. The appearance of multi-cellular life about one billion years ago led to an explosion of different life forms and increasingly diverse species from plants and reptiles to mammals. Humans (*Hominia*) have existed for only

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Cosmology and Its Implications for the Science-Religion Dialogue,” in *Physics, Philosophy, and Theology: A Common Quest for Understanding*, ed. Robert J. Russell, William R. Stoeger, and George V. Coyne (Vatican City State: Vatican Observatory, 1988), 219–47, and Stoeger, “Emergence, Directionality, and Finality in an Evolutionary Universe,” in *Biological Evolution: Facts and Theories*, ed. G. Auletta, M. Leclerc, and R. A. Martínez (Rome: Gregorian and Biblical Press, 2011), 479–571.

10. *Ibid.*, 163–90.

11. *Ibid.*, 171.

about two or three million years, and anatomically “modern” humans (*Homo sapiens*) for only about 150,000 to 200,000 years.

The claim that evolution displays an inbuilt tendency to develop greater complexity overall should not be taken as a steady and irreversible movement toward progress.

Stephen Jay Gould was staunchly opposed to the claim that evolution is an inherently progressive process that culminates in *Homo sapiens*. Because life begins with extremely simple organisms, any change from that base point would have to lead to greater diversity. Gould famously likens evolution to the random walk of a drunk bounding off the wall of a building as he wanders down the sidewalk. Sometimes life returns to simpler states (the wall) and sometimes it moves to more complex states (any state away from the wall). Sometimes greater complexity is adaptive, but at other times greater simplicity is adaptive.<sup>12</sup> Gould rightly intended to debunk naïvely progressivist readings of evolution, but his argument does not undercut Stoeger’s position. Stoeger did not view evolution as a universally progressive dynamism that leads to a steady improvement of organisms. Nor did he see natural history in terms of a “ladder of progress” on the top rung of which stands humanity.

Because adaptive traits confer a relative advantage to their organisms, Stoeger thought adaptation constitutes a kind of relative progress (in contrast to competing organisms that are less adapted to their environments). Stoeger here would have concurred with Richard Dawkins’ complaint that Gould’s polemic against progressivism led him to ignore the fact that adaptation constitutes a kind of relative “short to medium term” progress measured in evolutionary terms, e.g., birds who have slightly better sight have an advantage over others in the search for food. Dawkins maintained that there is a

tendency for lineages to improve cumulatively their adaptive fit to their particular way of life, by increasing the numbers of features which combine together in adaptive complexes ... By this definition, adaptive evolution is not just incidentally progressive, it is deeply, dyed-in-the-wool, indispensably progressive.<sup>13</sup>

The favoring of well-adapted organisms plays a role in the large-scale directionality with which Stoeger was primarily concerned.

## Bio-cultural Evolution: “Niche Construction Theology”

Stoeger suggests that an appreciation of the human significance of the immanent directionality of evolution must include an account of the cultural evolution of *Homo sapiens*, but he considered this topic to lie outside his own expertise as an astronomer.

12. Stephen Jay Gould, *Full House: The Spread of Excellence from Plato to Darwin* (New York: Harmony, 1996).

13. See Richard Dawkins, “Human Chauvinism,” review of Stephen Jay Gould, *Full House: The Spread of Excellence from Plato to Darwin*, *Evolution* 51 (1997): 1015–20, <https://doi.org/10.2307/2411179>.

His account of the intrinsic direction of evolution can be supplemented with biological anthropologist Augustin Fuentes' conception of "niche construction."

Fuentes understands humans and their environments as *mutually interactive participants* in evolutionary processes.<sup>14</sup> Human evolution has benefited by the exercise of a variety of evolved capacities, including our enhanced cognitive capabilities, "extra-somatic manipulations" of the environment, and highly developed communicative abilities. All of these have enabled members of our species to exploit multiple social and structural environments across space and time. Learning and culture played important roles in shaping the ways in which natural selection influenced our remote ancestors.

Fuentes thus provides a functional analogate to Stoeger's "nested possibilities" in the physical, prebiotic, and biotic phases of evolution. Niche construction theory attends to the very complex, nuanced, and powerful ways in which our central nervous systems interact with our social and physical environments. Our earliest ancestors survived because they shared information about habitat, food, and predators. Strong social bonds included but went beyond pair-bonds and led to cooperative activity that supported infants and children in their relatively prolonged cognitive, motor, and social developmental process. The interaction of genes, culture, and environment led to the realization of new possibilities for human social life.

"Nested possibilities" provide the context of more and more complex kinds of human activity. "Multiple inheritance theory" suggests that evolutionarily relevant inheritance can occur at the genetic, epigenetic, behavioral, and symbolic levels.<sup>15</sup> Symbolism and language make possible the development of complex forms of cooperation within social groups. The exercise of these capabilities pushed our ancestors beyond merely functional existence and into the realm of meaning.

Niche construction theory resonates with evolutionary anthropologist Robin Dunbar's "social brain" hypothesis, which holds that increasingly complex social interactions provided a decisive stimulus for the evolution of early humans' outsized, 1,400 cubic centimeter brains.<sup>16</sup> Dunbar discovered that the size of the neo-cortex of monkeys and apes correlates with the size of their social groups, the complexity of their grooming networks, and their facility with deception.<sup>17</sup> The relative size of the

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14. See Augustin Fuentes, *The Evolution of Human Behavior* (New York: Oxford, 2008) and Fuentes, *Race, Monogamy, and Other Lies They Told You: Busting Myths about Human Nature* (Berkeley: University of California, 2012).

15. See also Fuentes, "There Is Nothing Simple about Being Human," *Berfrois*, July 20, 2012, <http://www.berfrois.com/2012/07/agustin-fuentes-humans-being/>.

16. Robin Dunbar, "The Social Brain Hypothesis and Its Implications for Social Evolution," *Annals of Human Biology* 36 (2009): 562–72, <https://doi.org/10.1080/03014460902960289>; Dunbar's thesis was popularized in Malcolm Gladwell's *The Tipping Point* (New York: Little Brown, 2000).

17. Dunbar, "Neocortex Size as a Constraint on Group Size in Primates," *Journal of Human Evolution* 22 (1992): 469–93, [https://doi.org/10.1016/0047-2484\(92\)90081-j](https://doi.org/10.1016/0047-2484(92)90081-j).

human brain in proportion to the human body also correlates with the enormous complexity of our social relationships.

The brain of a typical *Homo sapiens* is only 2 percent of an average person's body weight but uses 20 percent of its caloric intake. Our particularly vulnerable Pleistocene forbears survived, Dunbar maintains, because they learned to defend themselves and hunt in bands with a maximum of 150 members and an "intimate circle" size of around twelve—the size range of hunter-gatherer groups today.<sup>18</sup> Larger groups increase the logistical problems that come with nomadic hunting and foraging. Maintaining social coherence and stability in larger groups requires more regulation of conduct, more restrictive rules, and useful ways of enforcing them. When the large size of a group becomes too unwieldy, it tends to split into two more manageable size groups.

In early humans, close social proximity was facilitated by rudimentary symbolic communication, and especially the use of spoken language, which in turn would have been facilitated by the evolution of larger, more complex brains (and especially increased density of the gray matter that is essential to social cognition). Dunbar's approach reinforces Fuentes's suggestion that social relationships led to cognitive capacities that went far beyond what was functionally necessary for survival and reproduction.

This "social brain" hypothesis thus constitutes a useful addition to Stoeger's notion of inherent directionality as it applies to humans. The "directionality" of "bio-cultural" evolution impelled our predecessors beyond the drive to satisfy their basic needs. The escalating complexity of social interaction among early humans involved more than using tools to manipulate the material world. As "bio-cultural" beings, human biology is "entangled," "fused," and "synthesized" with human culture—language, ritual, art and other symbolic forms of communication. We need to understand our lives as purposeful and bearing significance, and we communicate its meaning through story-telling, the arts, religion, and morality.

This account of early human life leads Fuentes to regard religion and morality as more than either functional tools contrived to promote "fitness goals" or accidental by-products of traits that were themselves adaptive. Niche construction theory underscores ways in which the cultural presuppositions of evolutionary naturalism manifestly shape conventional moral assumptions. How a given people tend to conceive of norms and virtues is profoundly influenced by their particular symbols, rituals, linguistic patterns, and patterns of social interaction. For example, social Darwinians who followed Herbert Spencer assumed that the "survival of the fittest" is a "natural" feature of plant and animal life, when in fact this was a particular cultural expression of a worldview that emerged in nineteenth century industrial society. Viewing selfishness, competition, and aggression as inevitable made it easier to dismiss even apparently altruistic acts as essentially self-serving.

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18. Philip Lieberman argues that the optimal size for a cohesive hunter-gatherer band would be thirty to fifty. See Lieberman, *The Unpredictable Species: What Makes Humans Unique* (Princeton: Princeton University, 2013).

Fuentes's strong understanding of humans as thoroughly "bio-cultural" provides a useful anthropological framework for appreciating the positive ethical and political significance of particular communities, rituals, practices, and traditions for the formation of moral and religious identities. They shape our neurological connections, our physiological constitutions, how we see the world, and what we think is "normal." Churches and other Christian communities do well when they shape their members' ability to develop empathy, seek friendship, care for offspring, protect the vulnerable, feel sexual attraction, engage in pair bonding, and belong to communities.

## From the Directionality to Divine Purpose

Stoeger used a broad notion of directedness. We might think of "directedness" in terms of cars moving in accord with instructions provided by traffic lights and turn signals, or of actors speaking the lines of a play according to their director's wishes, or builders constructing a house according to the architect's blueprint. Direction in these cases is fairly precise, direct, and explicit. Stoeger, however, understood evolutionary "directionality" as a general movement from less to more complex kinds of entities, forms of association, and relationships. Stoeger's position resonates with physicist Howard van Till's account of the "fully gifted" character of creation. Van Till holds that God created the world with "functional integrity," a wholeness in being, and a "formational economy" that contains "all the dynamic capabilities of matter and material, physical and biotic systems that contribute to the actualization of both inanimate structures and biotic forms in the course of the universe's formational history."<sup>19</sup> Van Till, like Stoeger, regards the robust functional integrity of the world as a powerful manifestation of the Creator's creativity and generosity.<sup>20</sup>

We might think of Stoeger's "directedness" in terms of the homespun example of a garden sprinkler. The homeowner uses her sprinkler to irrigate her lawn, but to do so the sprinkler has to be aimed in a way that also sprays water on dandelions, crabgrass, dirt, and sidewalk. The direction of the sprinkler's range is much wider than its intended aim. An alien observer who knows nothing about the practice of watering of lawns might think the sprinkler's purpose is to clean the sidewalk, settle the dust, irrigating the weeds as well as the grass, getting rid of excess water, etc. The sprinkler's purpose is given to it by the homeowner and cannot be discerned without reference to her intentions. Science can tell us a lot about the direction of evolutionary expansion but little to nothing about its purpose.

We would do well to note that the profuse expansiveness of the evolutionary process indiscriminately produces good as well as bad outcomes for various creatures. Stoeger would have agreed with Gould's denial that evolution is a process through

19. Howard van Till, "The Creation: Intelligently Designed or Optimally Equipped?" *Theology Today* 55 (1998): 344–64 at 349, <https://doi.org/10.1177/004057369805500305>.

20. See Howard van Till, "Is the Universe Capable of Evolving?" in *Perspectives on an Evolving Creation*, ed. Keith Miller (Grand Rapids, MI: Eerdmans, 2003), 313–34.



which species inevitably get “better and better.” The survival of some organisms often comes at the expense of others; adaptation in some means the extinction of others. This ambivalence is abundantly clear in the human domain. Greater intellectual culture, including medicine, science and engineering, made it possible for us to eliminate smallpox, discover the human genome, and land on the moon, and but also enabled us to engage in forced sterilization, organize extermination camps in eastern Europe, and use atomic weapons on civilians in Hiroshima and Nagasaki. Expanding our capacity for evil as well as for good, “bio-cultural” directionality is profoundly ambivalent.

The directionality of the universe provides the natural context within which God’s purposes are attained. People of faith understand the purpose of creation to be the glorification of God, i.e., the sharing of God’s goodness in whatever ways are appropriate to creatures. Although it would be foolish to think we know much about how God’s goodness is manifested in all the creatures existing throughout our vast cosmos, we can legitimately claim, on the basis of faith in a God whom we take to be infinitely wise and infinitely loving, that we glorify God to the extent that we act wisely and lovingly.

God has created human beings as creatures who could be brought into friendship with God, to share in divine love, to have “abundant life” (John 10:10). The path to true human fulfillment is opened up to us through the working of grace in our lives. Stoeger was highly attuned to ways in which God is intimately present to us in the modes of inspiration, invitation, and encouragement of the Holy Spirit. The love that flows from life in the Spirit has a Christological foundation. As Sarah Coakley puts it,

God is perpetually sustaining us, loving us into existence, pouring God’s self into every secret crack and joint of the created process, and inviting the human will, in the lure of the Spirit, into an ever-deepening engagement with the implications of the incarnation—its “groanings” for the sake of redemption.<sup>21</sup>

Stoeger rejected the theory of “intelligent design” as poor science, but he did believe that the overall structure of the world reflects God’s design. The world is divinely designed in a macro-sense: God intentionally creates the fundamental structure of the universe in a way that would lead to the fulfillment of God’s purposes. In Van Till’s language, the gradual unfolding and actualization of the resources, potentialities, and capacities built into the universe by its Creator would lead to the accomplishment of the divine purposes. The evolutionary process is divinely governed, but the meaning of divine governance should not be conceived on any human model of governance.

Stoeger showed how cosmic, prebiotic, and biotic phases of large-scale evolutionary developments generate a tendency toward increased complexity. Fuentes and Dunbar provide complementary evidence of this tendency within the domain of bio-cultural evolution. But we need to ask the further question of whether and on what grounds it makes sense to call such a dynamic system “purposeful.” The natural

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21. Sarah Coakley, “Providence and the Evolutionary Phenomenon of ‘Cooperation’: A Systematic Proposal,” in *The Providence of God: Deus Habet Consilium*, ed. F. Murphy and P. Ziegler (New York: T&T Clark, 2009), 179–93 at 189.

sciences show us that evolution is marked by directionality, but Stoeger did not think they inform us about the *purpose* of this directionality.

We typically refer to an activity, process, or artifact as having a “purpose” when it is intentionally made or used by an agent to attain a goal. On the basis of faith in divine revelation, believers affirm not only *that* the creation has a divine purpose but also *what* that purpose is: God makes the world in order to share God’s goodness with creatures. God’s infinite generosity leads God to choose to communicate divine goodness not only *ad intra*, in the perfect love that is the inner life of the Trinity, but also *ad extra*, with finite beings capable of participating in divine goodness.<sup>22</sup>

God is glorified through the functioning of the world and the diverse flourishing of its creatures, and this includes the vast plethora of living creatures vulnerable to being harmed and destined for death. The natural sciences give us tools for understanding the functioning of important features of that world and its inhabitants. God’s purposes are attained in and through the whole sweep of natural history from the first emergence of blue-green algae to the advanced civilizations of *Homo sapiens*. Cosmic, prebiotic, biotic, and bio-cultural phases of evolution eventually give rise to creatures capable of consciously knowing and deliberately loving God and other creatures. The purpose of human existence, then, is the share in God’s goodness by living in ways that embody self-giving love and wisdom.

What does and does not science tell us about divine purposes? First, Stoeger held that divine purpose cannot be simply “read off” nature by scientific observation unaided by a vision grounded in a wider theological or ontological framework. He did not completely reject the claim that indications of divine purposes are present within the natural world, but he denied that unaided reason is equipped to detect them: “Signs of divine purposefulness within creation may be much different and much more subtle than those we associate with human intentionality, and are probably not susceptible to detection by the sciences.”<sup>23</sup> The most that can be said from a purely scientific point of view is that “there *may be* such a divine intention or purpose driving evolution.”<sup>24</sup>

Taken on its own, science is epistemologically neutral with regard to the deeper meaning and purpose of evolution. The methods and concerns of scientists qua scientists provide them with evidence neither for nor against divine purpose. As Josef Ratzinger wrote: “The theory of evolution does not invalidate the faith, nor does it corroborate it.”<sup>25</sup> Stoeger attempted neither to derive his understanding of divine purposes on the basis of findings of the natural sciences alone nor to offer irrefutable proof of religious claims about divine purpose on the basis of evidence from the sciences alone.

Second, Stoeger held that the findings of the natural sciences, properly interpreted in the context of Christian faith, are not only broadly *consistent with* but also *supportive* of a faith-based affirmation of divine purposes. The vast cosmos investigated by

22. See Thomas Aquinas, *Summa Theologiae* 1, q. 47, a. 1.

23. Stoeger, “The Immanent Directionality,” 185.

24. *Ibid*; emphasis original.

25. Cited in *Creation and Evolution: A Conference with Pope Benedict XVI* (San Francisco: Ignatius, 2008), 16.

astronomy can heighten Christian awareness of the power and majesty of God. The growth of scientific knowledge gives us more and more information about the prolific character of evolutionary processes and therefore, to those with eyes of faith, more ways of appreciating the overflowing creativity of God.

We can summarize what has been established so far: the natural sciences give ample evidence that evolution is marked by a directional tendency, faith identifies the purpose of that directional tendency as the expansion of ways in which creatures can glorify God, and we are called to glorify God by growing in our ability to exercise self-giving love and wisdom.

### **Moral Implications of Stoeger's Position**

Christian revelation provides criteria for identifying, at least in a general way, which of the outcomes nature has produced reflect the purposes of the Creator and which do not. We have good reasons for holding that, when properly ordered, our evolved capacities can enable us in limited but real ways to promote the Creator's purposes. If grace perfects aspects of our "bio-cultural" nature, then charity seeks to resist our various in-built biases as well as to cultivate our innate cognitive and affective capacities in ways that enable us to become more healthy, mature, and virtuous human beings. Our ethical and spiritual convictions come not from nature alone, but also from particular strands of our cultural heritage that we identify as revelatory of God's benevolent will.

Charity—the grace-inspired love of friendship with God and neighbor—is the primary theological virtue and lies at the heart of the Christian life. As the "mother" and "form" of the virtues, as Thomas Aquinas put it, charity is the basis of both the virtue of justice whereby we give to each what is his or her due and the virtue of mercy by which we care for those in need.<sup>26</sup> Charity gives justice and mercy an expanding and outward orientation. Stoeger's theistic evolution, especially when enriched by Fuentes's niche construction theory and Dunbar's social brain hypothesis, accents the social character of human nature in a way that corrects the narrowness of merely emotive love and individual rights-focused social contract justice.

Cosmic, prebiotic, biotic, and cultural evolution made it possible for us to strive to live in ways that are self-transcending. God uses the evolutionary process to produce a world that gives rise to intelligent social beings capable of appreciating the goodness of creation and entering into friendship with their Creator and Redeemer. Deliberately cultivated in particular communities, the virtue of charity by its nature generates a commitment to justice and mercy. It pushes us to transcend the moral limits of our own culture and to commit ourselves to working for a more compassionate and just world.

Stoeger's account of theistic evolution is consistent with an ethics of charity that builds upon our altruistic potentialities while constraining our more egoistic potentialities. It also pushes us beyond narrow in-group loyalty and to treat strangers with justice

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26. Aquinas, *ST* 2–2, q. 8.

and mercy. Charity is found not simply in an austere ethic of self-sacrifice, but in any form of self-giving love that moves us rightly to God, neighbor, and other creatures. Charity in familial love orders kin altruism while countering nepotism. Charity in friendship orders reciprocity while countering exploitation of and indifference to others. Charity in solidarity builds upon group altruism while rejecting tribalism, nationalism, and xenophobia. Evolutionary depictions of humans as “ultra-cooperators” underscore our responsibility to nurture multiple forms of empathy and altruism within our particular communities and in relation to our wider societies.

The evolution of our capacity for reciprocity made it possible for cultures to develop norms of justice, and the evolution of our capacity for empathy made it possible for cultures to develop norms of mercy. Moral growth moves from direct reciprocity and parochial empathy to justice and mercy toward out-group as well as in-group members. Fully developed human love favors not only cooperation, fairness, and reciprocity, but also forbearance, compassion, and forgiveness. To use Stoeger’s language, these are the “nested possibilities” for whose realization we ought to be working. In doing so, we come closest to showing our agreement with the divine purposes reflected in the immanent directionality of the created world.

## Naturalistic Objections to Stoeger’s Position

Naturalists hold that the Christian, or more broadly theistic, claim that evolution has a purpose is untenable. They do so by making two fundamental arguments: first, that science has discredited teleology, the appeal to final causes, and second, that the role played by randomness discredits any suggesting that evolution is purposive. Considering each of these in turn will help to clarify how Stoeger did and did not think we ought to talk about evolution as purposeful.

### Teleology

In this section I examine the standard objection to purpose in evolution on the grounds that the natural sciences have completely discredited teleological arguments. Teleology has two fundamental forms: external and internal.<sup>27</sup> We see an example of external teleology when human agents intentionally use an object to attain their goals, e.g., when a person uses a spoon to eat soup. We see an example of internal teleology when an organism engages in goal-directed behavior, e.g., the nut gathering behavior of squirrels in the fall.

Philosophers and scientists reject external teleology because of its association with planning intelligence. We see this kind of teleology in Plato’s *Timaeus*, according to which the universe is the product of a divine “Craftsman” (or Demiurge) who imposed rational order onto preexistent chaos.<sup>28</sup> Plato’s account of nature is

27. See G. J. Lennox, “Teleology,” in *Keywords in Evolutionary Biology*, ed. E. F. Keller and E. A. Lloyd (Cambridge: Harvard University, 1992), 324–33.

28. Plato, *Timaeus* 28a6.

teleological because it regards Intellect (*Nous*) as having deliberately ordered both the universe as a whole and all of its constituent parts for the good of all. He argued that purposes in nature must be caused by a divine Intellect (*Nous*), conceived as an intentionally designing causal agent.

Aristotle proposed a kind of internal teleology. He observed that each member of a natural kind is intrinsically ordered to seek the goods proper to its own nature (or form). Organisms grow by exercising their developing capacities to seek species-typical goals. This ordering to a proper end is immanent—determined by the form of each thing—rather than imposed on it from without by an extrinsic ordering divine intelligence. Aristotle thus held that nature is intelligible in its own right without any appeal to the world of the Forms. He held that every organism has an intrinsic purpose or goal built into its nature. He paid careful attention to the characteristic finalities of particular kinds of organisms rather than to the macro-finality built into the cosmic order as a whole.

Stoeger's position is consistent with internal but not external teleology. He did not hold, as did Plato and Aristotle, for example, that rocks fall for a purpose (to achieve their proper place) or that the sun exists for the purpose of warming the earth. Rocks, mountains, and stars do not exist for specific purposes. Stoeger avoided any reference to (external) teleology that would suggest that the goal-seeking activity of organisms is due to the imposition of order by a planning agent. Neither did he think the functional behavior of animals must have been produced by instructions implanted into the animal by an intelligent designer.<sup>29</sup>

These caveats having been noted, Stoeger did think it appropriate to understand the morphology and behavior of animals as “goal-seeking.” Traits are “selected” *because* they contribute to the inclusive fitness of organisms functioning within particular habitats; Darwin himself often wrote teleologically about animal behavior.<sup>30</sup> The structures of organs and patterns of animal behavior contribute to an animal's reproductive success. The heart is for pumping blood, the lungs for absorbing oxygen, and the liver for filtering blood coming from the digestive system.

To avoid the unhelpful connotations of (external) teleology, Stoeger at times invoked the language of “teleonomy” to talk about goal-directed processes in nature.<sup>31</sup> Biologist Ernst Mayr defines “teleonomy” as a process or behavior “that owes its goal directedness to the operation of a program” rather than intentional guidance (i.e.,

29. Thomas Aquinas held both internal and external versions of teleology. Stoeger's position is consistent with something like Aquinas's internal teleology but not his external teleology, according to which God puts order into creatures the way an archer directs an arrow to its target. See Aquinas, *ST* 1, q. 2, a. 3.

30. Darwin uses teleology through his works, particularly *The Descent of Man*. Lyman A. Page, “Teleology in Biology: Who Could Ask for Anything More?” *Zygon* 41 (2006): 427–34 at 428, <https://doi.org/10.1111/j.1467-9744.2005.00747.x>. See also Phillip Sloan, “The Question of Natural Purpose,” in *Evolution and Creation*, ed. Ernan McMullin (Notre Dame: University of Notre Dame, 1985), 121–50.

31. Stoeger, “The Immanent Directionality,” 183.

internal rather than external teleology). “Teleomatics,” similarly, refers to “processes that reach an end-state caused by natural laws,”<sup>32</sup> but that is not goal-seeking.<sup>33</sup>

Stoeger’s understanding of the functional structure of organisms was consistent with the broadly Aristotelian understanding of species-focused teleology used by some biologists. Biologist Francisco Ayala, for example, argues that it is legitimate to speak of natural selection as “teleological” in the sense that “it produces and maintains end-directed organs and processes, when the function or end-state served by the organ or process contributes to the reproductive fitness of the organisms.”<sup>34</sup> He goes even further when he claims that the whole evolutionary process is teleological in that it is “directed toward the production of DNA codes of information which improve the reproductive fitness of a population in the environment where it lives.”<sup>35</sup> It has “the potentiality of producing end-directed DNA codes of information, and has in fact resulted in teleologically oriented structures, patterns of behavior, and self-regulating mechanisms.”<sup>36</sup>

### Randomness

The objection to purpose in evolution comes more strongly from considerations of randomness than it does from reservations about teleology in the sense just discussed. E. O. Wilson holds that the role of randomness within evolutionary processes is incompatible with claiming they are purposeful. He writes: “Evolution in a pure Darwinian world has no goal or purpose: the exclusive driving force is random mutations sorted out by natural selection from one generation to the next.”<sup>37</sup>

Evolutionary processes are random in several senses. Natural history is shaped by random events like earthquakes, floods, comets, droughts, etc. For example, dinosaurs (and perhaps 70 percent of all other species of plants and animals living at the time) were probably destroyed because a giant asteroid struck the planet 65 million years ago. Natural selection, the engine of evolution, operates on random mutations and in contingent circumstances. Genetic variations are “random” in the sense that they emerge by accident and not in order to meet the specific needs of organisms; there is

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32. Ernst Mayr, “Teleological and Teleonomic: A New Analysis,” in *Evolution and the Diversity of Life: Selected Essays* (Cambridge, MA: Belknap, 1976), 383–405 at 387–90, 403.

33. See D. O’Grady and D. Brooks, “Teleology and Biology,” in *Entropy, Information, and Evolution: New Perspectives on Physical and Biological Evolution*, ed., B. H. Weber, D. J. Depew, and J. D. Smith (Cambridge: MIT, 1988), 285–316.

34. Francisco J. Ayala, “Teleological Explanations in Evolutionary Biology,” in *Nature’s Purposes: Analyses of Function and Design in Biology*, ed. Colin Allen, Marc Bekoff, and George Lauder (Cambridge, MA: MIT, 1998), 29–49 at 41.

35. *Ibid.*, 42.

36. *Ibid.*, 42–43.

37. E. O. Wilson, *From So Simple a Beginning: The Four Great Books of Charles Darwin* (New York: Norton, 2005), 12.

no trait-generating mechanism built into nature to assist organisms threatened by extinction. "Genetic drift," moreover, causes the fixation or elimination of alleles in a purely random way.

Wilson criticizes religious people in particular for failing to acknowledge "the operation of blind chance and the absence of divine purpose implicit in natural selection."<sup>38</sup> Such a claim, of course, is based on tacit assumptions about what constitutes "divine purpose." Wilson does not offer an explanation of what he means by this phrase but he seems to suspect that theistic accounts of evolution presume that God intervenes to produce the mutations that will enable organisms to develop adaptive traits when needed. He seems to think that theists conceive of God as an additional "driving force" operative within nature yet undetectable by the methods of the natural sciences. Although the vast majority of mutations are random, Wilson thinks theistic evolutionists believe that at key points some mutations are the result of divine intervention rather than produced by purely undirected events.

In a strange irony, Wilson's randomness-based objection to purpose in evolution is echoed, on the Christian side, by Cardinal Christoph Schönborn, who argued that the role neo-Darwinism gives to randomness and contingency places it at odds with the Christian vision of the world as governed by a providential God.<sup>39</sup> The cardinal counter-posed Christian belief in creation as designed by a benevolent Creator to evolution as an "unguided, unplanned process of random variation and natural selection." Schönborn blurs the line between neo-Darwinism as a theory of evolution and neo-Darwinism as a naturalistic ideology. Aggressive neo-Darwinians like Richard Dawkins sometimes write as if these two agendas are inseparable, but one can in fact, as Stoeger did, accept the scientific work of neo-Darwinian evolutionary biologists without embracing naturalism. Whereas the cardinal assumed that "randomness" means "falling outside divine providence," Stoeger understood divine providence as working in and through the randomness as well as the law-like regularities of nature. The process does reflect God's plans and purpose in the general sense discussed above, but it has not overridden the contingencies inherent in the evolutionary process.

Stoeger acknowledged the significance of "blind chance" within a larger purposive process. The Creator brings the entirety of creation into being and operates on it in and through the behavior of particular creatures in their interaction with one another. Stoeger's position draws on Thomas Aquinas's distinction between the primary causal action of the Creator sustaining every creature in being from the secondary causal action of creatures operating upon one another in the temporal order.<sup>40</sup> He wrote,

38. Ibid.

39. Christoph Schönborn, "Finding Design in Nature," *The New York Times*, July 7, 2005, <http://www.nytimes.com/2005/07/07/opinion/finding-design-in-nature.html>. For an excellent analysis, see Patrick H. Byrne, "Quaestio Disputata: Evolution, Randomness, and Divine Purpose: A Reply to Cardinal Schönborn," *Theological Studies* 67 (2006): 653–65, <https://doi.org/10.1177/004056390606700308>.

40. On secondary causes, see Thomas Aquinas, *Quaestiones Disputatae de Potentia Dei*, q. 3, a. 7. Stoeger also invokes primary and secondary causality in "Describing God's Action in

If we put this [account of secondary causality] in an evolutionary context ... we can conceive of God's continuing creative action as being realized through the natural unfolding of nature's potentialities and the continuing emergence of novelty, of self-organization, of life, of mind and spirit.<sup>41</sup>

Stoeger's position accords with that of the International Theological Commission:

the Catholic understanding of divine causality [holds that] true contingency in the created order is not incompatible with a purposeful divine providence. Divine causality and created causality radically differ in kind and not only in degree. Thus, even the outcome of a truly contingent natural process can nonetheless fall within God's providential plan for creation.<sup>42</sup>

Stoeger's use of Thomistic secondary causality, then, positioned him to acknowledge that God's purposes are achieved through the interaction of "chance and necessity." The entire natural world, including its randomness, has been created to serve the divine purposes. Chance events play a major role in biological evolution from the molecular level (e.g., point mutations) to the organismic level (e.g., disease), but, Stoeger insists, they always take place within the natural "regularities, constraints, and possibilities" of the wider natural world. Teleonomic structures are "open" in that they constitute "a flexible determinism relative to a given set of conditions and to given laws of nature as we have imperfectly formulated them."<sup>43</sup> Chaotic events, even highly disruptive events, contribute to the directedness of nature because they create conditions that allow for the realization of "intrinsic possibilities of the whole system."<sup>44</sup> "Though its actual course is indeterminate," Stoeger writes, "its general course towards complexity, self-organization, and even the emergence of self-replicating molecules and systems, given the hierarchies of global and local conditions which are given, can be interpreted as inevitable in the universe in which we live."<sup>45</sup>

Stoeger's account of "flexible determinism" suggests that "directedness" pertains to the *overall* orientation of the totality of the material world and not to "any one

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the World in Light of Scientific Knowledge of Reality," in *Chaos and Complexity: Scientific Perspectives on Divine Action*, ed. Robert John Russell, Nancey Murphy, and Arthur R. Peacocke (Vatican City: Vatican Observatory; Berkeley, CA: Center for Theology and the Natural Sciences, 1989), 239–61. See also *Catechism of the Catholic Church*, 308, [http://www.vatican.va/archive/ccc\\_css/archive/catechism/p1s2c1p4.htm](http://www.vatican.va/archive/ccc_css/archive/catechism/p1s2c1p4.htm): "God is the first cause who operates in and through secondary causes."

41. William Stoeger, "Describing God's Action in the World in the Light of Scientific Knowledge," in *Chaos and Complexity: Scientific Perspectives on Divine Action*, ed. R. J. Russell et al. (Vatican City: Vatican Observatory, 1998), 239–61 at 249.
42. International Theological Commission, *Communione e Stewardship: Human Persons Created in the Image of God* (2004), 9, [http://www.vatican.va/roman\\_curia/congregations/cfaith/cti\\_documents/rc\\_con\\_cfaith\\_doc\\_20040723\\_communione-stewardship\\_en.html](http://www.vatican.va/roman_curia/congregations/cfaith/cti_documents/rc_con_cfaith_doc_20040723_communione-stewardship_en.html).
43. Stoeger, "Immanent Directionality," 168.
44. *Ibid.*, 173.
45. *Ibid.*, 180.



interaction, relationship, or condition.”<sup>46</sup> “Directionality” thus includes the orderly realization of “proximate and more remote possibilities” that unfold as evolutionary forces give rise to new entities, processes, and relationships.<sup>47</sup> The material world is properly described as a “nested set of directionalities which gradually emerge with ever greater specificity in certain locales within the overall evolutionary manifold.”<sup>48</sup>

### “Guided Evolution?”

Having considered two naturalistic objections, we can now turn to likely criticisms of Stoeger coming from Christians who hold that evolution must be marked by what we can call “guided directionality.”

Stoeger argues that large-scale evolutionary directionality can be interpreted in a way that supports rather than undermines a Christian view of creation as purposeful. What we can call common-sense Catholic evolutionary theism accepts the workings of natural selection throughout the evolutionary process generally (say, on the vast majority of species from tree frogs to rattle snakes) but insists that *Homo sapiens* cannot have been produced by purely natural processes, subject as they are to so many contingent factors. They do so on theological and moral grounds, not because they think the human race is too “irreducibly complex” to have evolved. The suggestion that human beings are nothing more than an evolutionary accident runs strongly against the Christian message that we are willed by God. As then-Cardinal Ratzinger put it, “Human beings are not a mistake but something willed; they are the fruit of love.”<sup>49</sup> The question is: can the evolution of the human species be willed and the product of love in and through the evolutionary process? Can God’s love imbue the evolutionary process with meaning?

Catholic magisterial authorities typically speak of God as guiding the evolutionary process, especially when it comes to human beings. *The Catechism of the Catholic Church* teaches:

Creation ... did not spring forth complete from the hands of the Creator. The universe was created ‘in a state of journeying’ toward an ultimate perfection yet to be attained, to which God has destined it. We call ‘divine providence’ the dispositions by which *God guides his creation* toward this perfection.<sup>50</sup>

The *Catechism* does not provide an account of what it means by “divine guidance,” but this passage reassures believers that God has not left us alone. This theme overlaps with Pope Francis’s image of God as the one who accompanies us.

46. *Ibid.*, 169.

47. *Ibid.*, 183.

48. *Ibid.*

49. Joseph Ratzinger, *In the Beginning: A Catholic Understanding of the Story of Creation and Fall*, trans. B. Ramsey (Grand Rapids, MI: Eerdmans, 1995), 56–57.

50. *Catechism*, 302, [http://www.vatican.va/archive/ccc\\_css/archive/catechism/p1s2c1p4.htm](http://www.vatican.va/archive/ccc_css/archive/catechism/p1s2c1p4.htm); emphasis in original.

Divine intervention is posited at two senses: macro and micro. God guides the evolutionary process from mammals to primates to hominids. Pope John Paul II insisted that each individual human soul is a special creation of God alone, and not the evolutionary process. The soul is not purely the product of natural processes. Continuing the approach of Pope Pius XII in *Humani Generis*,<sup>51</sup> John Paul II insisted that at some distinct point God created the first human soul suitable to the first human body:<sup>52</sup> “if the human body takes its origin from pre-existent living matter, the spiritual soul is immediately created by God.”<sup>53</sup> Every human will is free and responsible because created directly by God rather than merely produced by nature.

John Paul II judged that

theories of evolution which, because of the philosophies that inspire them, consider the mind as emerging from the forces of living matter, or as a mere epiphenomenon of this matter, are incompatible with the truth about man. Nor are they able to ground the dignity of the person.<sup>54</sup>

The Pope’s view of human origins is tightly connected to his desire to provide an unassailable foundation for human dignity. The “truth about man” is that every human being possesses free will, moral responsibility, and intrinsic dignity as created in the image of God.

Stoeger’s work prompts us to ask whether we might think about the emergence of mind from “the forces of living matter” in ways that do not in fact undercut the “truth about man.” We can understand emergence in a way that avoids implying that the human mind is nothing more than an arrangement of “the forces of living matter.” The human mind can take on a life of its own and the human will can choose to engage in acts that run contrary to reproductive fitness. The intrinsic dignity of the person depends not on where we come from but on our natural capacities for knowing and loving God and our neighbor.

“Guided evolution” has the advantage of supporting a strong account of the *imago Dei* because it envisions us as, unlike all other species, deliberately created by God. It assumes that a strong respect for human dignity is inconsistent with viewing the emergence of our species within the natural world as nothing more than a lucky accident. Starting with Stoeger’s perspective, someone could argue that our dignity lies in the fact that evolution has bequeathed us with cognitive, affective, and social capacities that enable us to participate in uniquely human ways to divine love.

51. Pius XII, *Humani Generis* (August 12, 1950), 5, 6, 37, [http://w2.vatican.va/content/pius-xii/en/encyclicals/documents/hf\\_p-xii\\_enc\\_12081950\\_humani-generis.html](http://w2.vatican.va/content/pius-xii/en/encyclicals/documents/hf_p-xii_enc_12081950_humani-generis.html).

52. John Paul II, “Address to the Pontifical Academy of Sciences: On Evolution” (lecture, Vatican City, October 22, 1996), <https://www.ewtn.com/library/PAPALDOC/JP961022.HTM>.

53. *Ibid.*, 5; also *Catechism*, 366, [http://www.vatican.va/archive/ccc\\_css/archive/catechism/p1s2c1p6.htm](http://www.vatican.va/archive/ccc_css/archive/catechism/p1s2c1p6.htm).

54. *Ibid.*

On first blush, this theologically motivated account of guided intervention seems to take evolution more seriously than do Christian attempts to explain the origin of species through appeals to either biblical creationism or intelligent design.<sup>55</sup> Yet once Christians begin to make special appeals to divine intervention or some other kind of divine interference, it is hard to see where they will stop. If God made sure that *Homo sapiens* would appear, it is hard to resist the claim that God also arranged the earlier phase of evolution to ensure the appearance of ancestral humans, *Homo erectus* and *Homo habilis*. This stage would in turn have required God to arrange for the evolution of australopithecines, their predecessor species, etc. If we follow this evolutionary slippery slope to its logical conclusion, this process would have to be tracked back all the way to LUCA, the “last universal common ancestor,” a single cell organism that came to life some four billion years ago.<sup>56</sup> While we know that natural selection and random mutation are responsible for the origin of all other species, evolutionary forces *do not apply in our case*. Advocates of “guided evolution” suggest that human beings are not really the product of natural selection and other physical forces but rather of divine action. This position is hard to square with the church’s strong emphasis on the relative autonomy of the natural sciences and the sufficiency of secondary causes in accounting for the phenomena they seek to explain.

Stoeger argued against such anti-scientific construal of human origins. His approach to human evolution seems consistent with the recent words of Pope Francis when he addressed the Pontifical Academy of Sciences:

When we read the account of Creation in Genesis we risk imagining that God was a magician, complete with an all-powerful magic wand. But that was not so. He created beings and *he let them develop according to the internal laws* with which He endowed each one, that they might develop, and reach their fullness.<sup>57</sup>

The Christian Creator, unlike the Watchmaker of deism, is present as the sustainer of every creature in existence: “*He gave autonomy to the beings of the universe* at the same time in which He assured them of *his continual presence*, giving life to every

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55. For theological replies to biblical creationism, see David Fergusson, *The Cosmos and the Creator* (London: SPCK, 1998). For a scientific reply to creationism, see Kenneth Miller, *Finding Darwin’s God: A Scientist’s Search for Common Ground between God and Evolution* (Harper, New York, 1999).

56. See Douglas L. Theobald, “A Formal Test of the Theory of Universal Common Ancestry,” *Nature* 465 (2010): 219–22, <https://doi.org/10.1038/nature09014>; Nicholas Wade, “Meet Luca: The Ancestor of All Living Things,” *The New York Times*, July 26, 2016, <https://www.nytimes.com/2016/07/26/science/last-universal-ancestor.html>.

57. Pope Francis, “Address of His Holiness Pope Francis on the Occasion of the Inauguration of the Bust in Honor of Pope Benedict XVI” (lecture, Pontifical Academy of Sciences, Vatican City, October 27, 2014), [https://w2.vatican.va/content/francesco/en/speeches/2014/october/documents/papa-francesco\\_20141027\\_plenaria-accademia-scienze.html](https://w2.vatican.va/content/francesco/en/speeches/2014/october/documents/papa-francesco_20141027_plenaria-accademia-scienze.html); emphasis added.

reality.”<sup>58</sup> This notion of the relative autonomy of the natural world suggests that the Creator allows the evolutionary process to go where it will.

The evolutionary process eventually led to human beings who possess cognitive, social and affective traits that afford us an unprecedented capacity for free choice. Francis wrote: “When, on the sixth day in the account of Genesis, comes the moment of the creation of man, God gives the human being another autonomy, an autonomy different from that of nature, which is freedom.”<sup>59</sup> Biblical symbols do point to the centrality of freedom and responsibility to human existence. Working through nature, the Creator has bequeathed us with a capacity to make choices that transcend the elemental “dictates” of nature. We are capable, under the right circumstances, of sacrificing lower goods for the sake of higher goods striving for the common good and denying ourselves for the sake of our neighbors.

The language of *intrinsic* directionality puts Stoeger’s position at a distance from those who hold that evolutionary processes are at decisive points *externally* steered by the hidden hand of a divine guide. He held that the intrinsic directionality of evolution leads to certain end-states (particularly greater complexity, including that found in our own species) but that these end-states are the product of natural processes alone rather than attained by the special operation of divine agency. The Creator, in other words, is at work in and through all of these natural processes but does not act as one among other efficient causes in the world.

## Conclusion

William Stoeger maintained that the natural sciences inform us about the “underlying structure of reality” and therefore about God’s universal creative activity.<sup>60</sup> The weight of properly scientific evidence, including its recognition of the role played by unpredictability, chance, and contingency within evolution, is fully consistent with claiming that God created the universe so that the gradual unfolding of its own inner potentialities would eventually give rise to beings capable of acting in ways that could actively, intelligently, and creatively participate in divine love. But the Christian conviction that cosmic, prebiotic, biotic, and cultural evolution are ultimately meaningful comes from religious faith in the providential God of Jesus, not from either natural theology or philosophical speculation based exclusively on the findings of science.

While the natural sciences point to “nested directionalities,” they do not, by themselves, demonstrate that nature has an intrinsic purpose, moral order, or spiritual meaning. Evidence from the sciences does not unambiguously testify to the presence of divine intention, let alone to the operation of the personal, providential, and omnipotent Triune God. Stoeger taught us not to expect science to provide empirical justification for a truth that Christians accept on the basis of revelation. This Jesuit astronomer

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58. *Ibid.*, emphasis added.

59. *Ibid.*

60. Stoeger, “The Immanent Directionality,” 163.

insisted that scientific evidence is consistent with and even subtly conforms to the Christian conception of creation as purposive, but not in a way that provides reasons that would be convincing to people who do not share a prior religious commitment. He believed fair-minded and well-informed observers would agree on the universal directionality of evolutionary processes, but that faith alone is what enables Christians to regard the deep structure of the entire cosmos—past, present, and future—as created by God to serve his loving purpose.

### **Author biography**

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