"He Fathers-Forth Whose Beauty Is Past Change," but "Who Knows How?": Evolution and Divine Exemplarity

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Writing rapidly in pencil in 1842, Charles Darwin produced a sketch of ideas that would grow to become his *The Origin of Species*.[1] Much that would revolutionize our understanding of biology was already present, not least his conclusion that "specific forms are not immutable."[2] In this article, I consider how that mutability bears upon the theological conviction that every creature is related to God as a likeness to its exemplar, drawing particularly on the work of Thomas Aquinas. It is clear from a letter dated January 11 of 1844 that Darwin saw his insight as a disruptive one, writing to his friend Joseph Dalton Hooker that "I am almost convinced (quite contrary to opinion I started with) that species are not (it is like confessing a murder) immutable."[3]

Theologians before Darwin had little reason to doubt that species, or kinds, were fixed and stable, created by God alongside one another at the beginning. Aquinas expresses such assumptions, writing that, in nature, "like is produced from like," proceeding right back to "the first production of corporeal creatures," when "the corporeal forms

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1 First edition 1859

2 The 1842 sketch, along with an expanded version from 1844, can be viewed, with a transcription by John van Wyhe, at darwin-online.org.uk/manuscripts.html.

3 Letter DCP-LETT-729, image and transcript at darwinproject.ac.uk/letter/DCP-LETT-729.xml.

that bodies had . . . came immediately from God."[4] In the same section of the *Summa theologiae*, however, we find the suggestion of a dynamism in relation to specific kinds that we should also consider.[5]

At the very least, Aquinas was willing to entertain that the earth was only gradually populated with living things, with God having first created the fixed forms of organisms as "seeds" that were later realized, not all at once.[6] In his discussion of the work of the third day, Aquinas notes two contrasting Patristic perspectives without choosing one over the other. One looks more like what we might imagine as the classic pre-Darwinian view: "The first constitution of species belongs to the work of the six days, but the reproduction among them of like from like, [belongs] to the [subsequent] government of the universe." The alternative perspective is of creatures having been produced only latently to start with, in their underlying causes: "The earth is said to have then produced plants and trees in their causes, that is, it received then the power to produce them. . . . They were not produced in act on the third day, but in their causes only."[7]

Even according to that second perspective God ceased from making new sorts of things after the six days of creation,[8] although even that rule admits partial exceptions, such as putrefaction and

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4 Thomas Aquinas, *Summa theologiae* [*ST*] I, q. 65, a. 4, resp., trans. Fathers of the English Dominican Province, 2nd ed., 22 vols. (London: Burns, Oates and Washbourne, 1912).

5 Claims that pre-Darwinian understandings of species were intrinsically and primitively hostile to variety or change is increasingly recognized as a recent and ill-founded interpretation of history (see Mary P. Winsor, "The Creation of the Essentialism Story: An Exercise in Metahistory," *History and Philosophy of the Life Sciences* 28, no. 2 [2006]: 149–74). Aristotle especially seems to have been more subtle on both points (as discussed by James G. Lennox, "Are Aristotelian Species Eternal?" and "Kinds, Forms of Kinds, and the More or Less in Aristotle's Biology," in *Aristotle's Philosophy of Biology: Studies in the Origins of Life Science* [Cambridge: Cambridge University Press, 2001], and in contributions by D. M. Balme in *Philosophical Issues in Aristotle's Biology*, ed. Allan Gotthelf and James G. Lennox [Cambridge: Cambridge University Press, 2011]). Nonetheless, it is fair to say that the default assumption among Christian thinkers was of fixity of species, at least for those who eschewed nominalism (see Richard A. Richards, *The Species Problem: A Philosophical Analysis* [Cambridge: Cambridge University Press, 2010], 39–48).

6 *ST* I, q. 74, a. 2, resp., following Augustine, *De Genesi ad litteram* 5.4.7–5.16 and 8.3.6 and *De Trinitate* 3.8.13.

7 *ST* I, q. 69, a. 2, resp.

8 *ST* I, q. 74., a. 2, resp.; and see *ST* I, q. 73, a. 1, ad 3.

hybridization, of which Aquinas writes about "species, also, that are new, if any such appear." He goes on to provide examples: "Animals, and perhaps even new species of animals, are produced by putrefaction," and "animals of new kinds arise occasionally from the connection of individuals belonging to different species, as the mule is the offspring of an ass and a mare."[9] Here, effects (such as the mule) are manifested that nonetheless "existed previously" in causes produced "in the works of the six days." Overall, then, we encounter a balance between some admission of novelty in later history and the sense of an unfolding of what was conferred "causally" beforehand.

Both novelty and unfolding are found in a discussion in *De potentia*: "The universe in its beginning was perfect as regards the species of things, but not as regards all individuals: or [it was perfect] as regards nature's causes from which afterwards other things could be propagated, but not as regards all their effects."[10] Approached in terms of species and individuals, the emphasis is on a fixed number of unchanging species, but analysis in terms of causes that unfold in their effects is considerably more open to an evolutionary interpretation and to developing species.

In summary, the least evolutionary perspective in Aquinas aligns with his statement that "the first members of the species were immediately created by God, such as the first man, the first lion, and so forth."[11] Divine exemplarity would then come through the initial creation of the first examples: "[At] the first production of corporeal creatures . . . the corporeal forms that bodies had when first produced came immediately from God."[12] We can no longer say, however, that a certain species of rabbit, for instance, has its own limited likeness to God because a chain of rabbits can be traced back to the first rabbits, whose form was imposed by God on the initial clay. To put it succinctly, the evolutionary mutability of species then raises the question of how the divine likeness "got into" each thing.

There are hints of a greater openness to development in Aquinas's writings, and today, knowing that species are mutable, we need to

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9 *ST* I, q. 73, a. 1, ad 3.

10 Aquinas, *De potentia*, q. 3, a. 10, ad 2, in *Disputed Questions on the Power of God*, trans. English Dominican Fathers (Westminster, MD: Newman Press, 1952).

11 Aquinas, *In* II *sent.*, d. 1, q. 1, a. 4, in *Aquinas on Creation: Writings on the "Sentences" of Peter Lombard, Book 2, Distinction 1, Question 1*, trans. Steven E. Baldner and William E. Carroll (Toronto: Pontifical Institute of Mediaeval Studies, 1997), 85.

12 *ST* I, q. 65, a. 4, resp.

revisit our account of how divine exemplarity operates. At his most open to evolutionary dynamism, we find Aquinas writing about "the earth" (or, we might say, creaturely being) having "received [at the beginning] . . . the power to produce," as a cause produces effects.[13] I explore that perspective in this article, asking how divine exemplarity functions once the easier option of saying simply that God imposed "corporeal forms" upon an initial set of creatures is ruled out.

Divine Exemplarity in Christian Theology

Accounts of divine exemplarity have taken a variety of forms within Christian theology. An article seeking to reconcile an exemplarist position with evolution will therefore do well to work with some particular representative example. I remain with Aquinas, first because exemplarism is integral to his philosophical and theological vision and thoroughly worked through in his writings, second because of the significant body of literature on his treatment of this question,[14] and third because of his profound influence on later theology. Having chosen a particular representative of an exemplarist approach, aspects of what follows will be specific to Thomas's particular theological outlook. The task of considering the differences and the alternative strengths of other exemplarist accounts will remain. Bonaventure stands as an obvious candidate, since exemplarism is also integral to his own scheme.[15]

Proposals of divine exemplarity have been as significant for some strands of Christian theology as they have been insignificant for others. The continued place of exemplarism in Catholic theology

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13 *ST* I, q. 69, a. 2, resp.

14 Mark D. Jordan, "The Intelligibility of the World and the Divine Ideas in Aquinas," *Review of Metaphysics* 38, no. 1 (1984): 17–32; Vivian Boland, *Ideas in God according to Saint Thomas Aquinas: Sources and Synthesis* (Leiden: Brill, 1996); John F. Wippel, "Thomas Aquinas on Divine Ideas," in *Gilson Lectures on Thomas Aquinas*, ed. James P. Reilly (Toronto: Pontifical Institute of Mediaeval Studies, 2008); Gregory Doolan, *Aquinas on the Divine Ideas as Exemplar Causes* (Washington, DC: Catholic University of America Press, 2008).

15 Jean Marie Bissen, *L'Exemplarisme Divin Selon Saint Bonaventure*, Etudes de Philosophie Médiévale 9 (Paris: J. Vrin, 1929); Etienne Gilson, *The Philosophy of St. Bonaventure*, trans. Illtyd Trethowan and F. J. Sheed (London: Sheed and Ward, 1938), 139–237; Leonard J. Bowman, "The Cosmic Exemplarism of Bonaventure," *Journal of Religion* 55, no. 2 (1975): 181–98; Christopher M. Cullen, *Bonaventure* (Oxford: Oxford University Press, 2006), 71–77; Ilia Delio, *Simply Bonaventure: An Introduction to His Life, Thought, and Writings* (Hyde Park, NY: New City Press, 2013), 59–62.

rests, in part, simply on the continuing influence of Aquinas. It has also featured in Anglican writing. An example is the *Exposition of the Creed* by John Pearson (1613–1686), which was the standard text for doctrinal instruction in the Church of England for 250 years.[16] Pearson takes it as "the unquestionable doctrine of the Christian faith" that not only the existence but also the essence of creatures comes from God, as "framed" by him: "[Creation] hath not its essence from or of itself, nor is of existence absolutely necessary; but what it is . . . was made, framed and constituted by another."[17] The character, or goodness, of each thing comes from God "by way of emanation."[18] As we would expect, Pearson associated the origin of kinds with the creation of originals: "All things were created by God, in the same manner, and at the same time, which are delivered unto us in the books of Moses by the Spirit of God."[19]

Exemplarism also features in the writings of Reformed Protestantism. The Belgic Confession of 1561 serves as an example: "The Father by the Word . . . has created of nothing the heaven, the earth, and all creatures, . . . giving unto every creature being, shape, form, and several offices to serve its Creator."[20] Among later Protestant writers, however, the idea faded in importance,[21] perhaps in line with

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16 First edition: John Pearson, *An Exposition of the Creed* (London: R. Daniel, 1659).

17 John Pearson, *An Exposition of the Creed*, 2nd ed. (London: George Bell and Sons, 1893), 77.

18 Pearson, *Exposition of the Creed*, 2nd ed., 88.

19 Pearson, *Exposition of the Creed*, 2nd ed., 97. Anglican examples after the wane of Pearson's influence include Francis Joseph Hall, who stressed that both the substance and the *form* of things were "divinely created," since God is "the sole cause and condition of the first origin of finite being" (*Theological Outlines*, 3rd ed. [Milwaukee, WI: Morehouse, 1933; originally 1892–1895], 112), and Darwell Stone, who wrote that, "in creation, all things were made by God in accordance with the type which already existed in His own mind, so that the angels and the world and man, from having been as divine ideas, were made to be in fact under the limitations of time and space" (*Outlines of Christian Dogma* [London: Longmans and Green, 1903], 31).

20 James T. Dennison, *Reformed Confessions of the 16th and 17th Centuries in English Translation*, vol. 2, *1552–1566* (Grand Rapids, MI: Reformation Heritage Books, 2010), 431 (article 12). It is notable that the Lutheran confessions deal with creation in what today might be called a human and existential register and do not typically address (positively or negatively) such doctrinal points as divine exemplarity.

21 Charles Hodge, for instance, interpreted the idea that everything is "from God" in his *Systematic Theology* in terms only of God as efficient cause, making

an emphasis on divine volition in creation over divine wisdom or intellect. Where we do find a sense of exemplarism, it is typically in relation to creation as a whole and to its overall properties, rather than in relation to each particular creature, and it therefore bears primarily upon general characteristics, rather than specific ones.[22]

Two Possible Theological Responses

Accounting for divine exemplarity within an evolutionary scheme is not a trivial matter, and it deserves greater attention than it has received in theological discussions of evolution. What treatment there is of exemplarity is typically limited to asking whether evolutionary theory undermines the idea that human beings are in the *imago dei* (or are alone in the image, in contra-distinction to other animals). In relation to evolution, exemplarity should no doubt count as a greater problem for theology than it currently does.

Where the tension is to be faced, two solutions would be worth considering as simple but ultimately unsatisfying shortcuts. One is to adopt what has been the general trend in Protestant theology and to downplay the role of divine exemplarity entirely, or at least with

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no reference to formal or exemplary causation: Scripture teaches that "the universe (τὰ πάντα) is ἐκ θεοῦ of God. . . . [It] is 'of Him' as its efficient cause" (*Systematic Theology*, vol. 1 [New York: Scribner and Armstrong, 1873], 559).

[22] For instance, despite having written that he wishes to move beyond the sense of only a "general dependence of the created world on the Creator for its being," the Lutheran Philip J. Heffner goes no further than applying exemplarity to creation as a whole: "The nature of God as one and good, together with the conviction that God has created the world intentionally and freely, leads inescapably to the assertion that the created world is a unity, that it is good, and that it has a purpose and meaning" ("The Creation," in *Christian Dogmatics*, ed. Carl E. Braaten and Robert W. Jenson, vol. 1 [Philadelphia: Fortress, 2011], 306). From a more conservative evangelical perspective, the closest that Louis Berkhof comes in his *Reformed Dogmatics* to attributing the origin of specific form to God is to write that "the glorious perfections of God are manifested in His entire creation" (*Reformed Dogmatics*, vol. 1 [Grand Rapids, MI: Eerdmans, 1932], 122 [section III.A.6.b]). Berkhof also upholds the immutability of specific form, taking it to be one of the principal reasons to oppose evolution on scriptural grounds: "The Bible teaches that plants and animals and man appeared on the scene at the creative fiat of the Almighty. . . . The Bible represents God as creating plants and animals after their kind, and yielding seed after their kind, that is, so that they would reproduce their own kind; but the theory of evolution points to natural forces, resident in nature, leading to the development of one species out of another" (1:148 [section III.C.6.a]).

respect to specific creatures. The other is to make a rapid recourse to the doctrine of providence.

Giving up on divine exemplarity diffuses the tensions with evolution, but from the perspective of Christian systematic theology, it risks ignoring an under-discussed aspect of a nonetheless prominent doctrine: that creation is *ex nihilo*. The basic contention of divine exemplarity is that creaturely form comes from God. To deny or ignore this risks contravening the central contention of *creatio ex nihilo*, that nothing about creation lacks a divine origin (except for evil), although in a different manner from what was at stake when the *ex nihilo* position was first formulated. As it was worked out in antiquity, the point was typically to stress that the materiality of creatures is part of what God had created. To speak of creation as *ex nihilo* was to deny that God relied upon pre-existent matter. Following Aristotle, however, we can identify in creatures not only matter but also form: not only the physical substrate but also that which the physical substrate embodies or happens concretely to be.[23] This too is part of creation, and it is therefore also from God. Such an emphasis on the significance of form is, in fact, supported by the first chapter of Genesis, where the story is of matter, initially considered as "a formless void" (Gen 1:1), being shaped, or formed, by God into creatures of every kind.

To deny a divine exemplarity for form, or simply to pass it over, risks rejecting the force of *creatio ex nihilo*, which is to say of *creatio omnium*, only not now by assuming matter to have an existence

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[23] Aristotle, *Metaphysics* 7.7–9; see Aquinas, *De principiis naturae*, ch. 1. With its focus on exemplarity, the present article considers evolution from a Thomist perspective in relation to form. An equally promising avenue for thinking about evolution relates to materiality, although not primarily with exemplarity in mind. There is, for instance, the role of matter (through "indisposition") in the less-than-perfect propagation of form, which relates to mutation as a central part of evolution (Aquinas, *In* VI *metaphys.*, lec. 3, no. 1210; *Summa contra gentiles* [*SCG*] III, ch. 10, no. 8, trans. Anton C. Pegis et al., 5 vols. [New York: Hanover House, 1955]). More speculatively, there is a question that follows from matter not being incidental to material things, but entering into their definition: "In things composed of matter and form the essence or nature is not the form alone but the composite of matter and form" (Aquinas, *Quodlibet* II, q. 2, a. 2, in *Quodlibetal Questions 1 and 2*, trans. Sandra Edwards [Toronto: Pontifical Institute of Mediaeval Studies, 1983]). If it is integral to such a form to be the form *of a material thing*, we can ask whether the inherent mutability of materiality also passes into the definition of the specific form of material things.

separate from God, but rather by imagining that the form or characterfulness of creatures could have an origin other than in God. The doctrine of *creatio ex nihilo* insists that one must "trace back" the materiality of all things to God, but its force is *also* that one must trace back the *forms* of all things to a divine source. In the words of Augustine, "in every mutable thing, the form that makes it what it is, in whatever measure and of whatever nature it is, can only have its existence from him who truly *is* because he exists immutably."[24] This is also Aquinas's position:

> It is manifest that things made by nature receive determinate forms. This determination of forms must be reduced [or led back] to the divine wisdom as its first principle. . . . Therefore we must say that in the divine wisdom are the types of all things, which types we have called ideas—i.e. exemplar forms existing in the divine mind.[25]

On similar grounds, Aquinas interprets the precise meaning of *creatio ex nihilo* in terms of God being the creator of the "whole substance" of the thing, which would again entail form as well as matter.[26]

A first theological evasion of the task of thinking about evolution and exemplarity, then, is simply to ignore exemplarity or to mention it only in terms of the large-scale order of the universe.[27] The second

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[24] Augustine, *De civitate Dei* 8.6, in *The City of God (Books 1–10)*, trans. William S. Babcock (Hyde Park, NY: New City Press, 2012), 249. In *On True Religion*, Augustine wrote that no material creature could exist without the internal concord of its particular form, calling God the bearer of all form (*omnium formosissima* and *omnium speciosissimus*), from whom all form proceeds (11.21; parts of this translation are based on that in Augustine, *Earlier Writings*, trans. John Henderson Seaforth Burleigh [London: SCM Press, 1953)] 235–36). Discussing this passage, Mark Clavier cites its parallel in *Eighty-Three Disputed Questions* 43.2, where Augustine writes that creatures receive from God both being (*esse*) and their form, which he stresses by using four words: *ideas*, *formas, species*, and *ratione* (*Eloquent Wisdom: Rhetoric, Cosmology and Delight in the Theology of Augustine of Hippo* [Turnhout, BE: Brepols, 2014], 115–17).

[25] *ST* I, q. 44, a. 3, resp. Aquinas considered a creaturely "likeness" to God as universal in scope, but he generally calls it an "image" only for human beings and angels, using "vestige"/"trace" (*vestigium*) for other creatures (*ST* I, q. 93, a. 6, resp.).

[26] *ST* I, q. 45, a. 1, ad 2; a. 2, ad 2; a. 3, sc.

[27] Jan Lever offers an unusual example of Protestant attention to exemplarity in relation to evolution and fixity of species. To square theology with mutability, he writes, we should abandon exemplarity: "We should eliminate from our

evasion would be to invoke the doctrine of divine providence to perform the task required here, thus short-circuiting the discussion and closing it down.[28] Our question concerns how one can say that creatures have their forms as similitudes to a divine exemplar once we appreciate that those forms emerged gradually, by evolution. The "providential" short circuit would say that creatures come to be as they are by the outworking of the divine will, and that is that. Certainly, from a Thomist perspective, an all-prevailing providence is perfectly compatible with acceptance of evolution, and of fortune and process within creation. For Aquinas, God not only achieves *what* he chooses, but also *in the manner* that he chooses.[29] His providential purpose is worked out in part by way of internal creaturely necessity (of which the laws of nature would be examples) and, in part, as the result of internal contingencies. That dead sparrows *fall* would be a matter of a "necessity" woven into creaturely reality; that this or that sparrow dies at this or that moment would be a matter of contingency, although no less open to providence because of that. Contingent events—events that, from the internal perspective of creaturely history, turned out one way but could have turned out another—fall as squarely for Aquinas under divine providence as does what happens by worldly necessity: those things that could not have happened otherwise, God having created the world in this particular way.

Aquinas belongs to a time-honored perspective within Christian

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thinking the scholastic notion about 'ideas of creation'" (*Creation and Evolution* [Grand Rapids, MI: International Publications, 1958], 138). He criticises Aquinas and Albert the Great for having associated the forms of creatures with exemplars in God (103).

[28] Attention to accounts of providence is vital for a theological account of evolution, which requires a robust sense of secondary causation. This is the aspect of a Thomist approach to evolution where the most headway has been made, for instance by Armand Maurer, "Darwin, Thomists, and Secondary Causality," *Review of Metaphysics* 57, no. 3 (2004): 491–514, and Fáinche Ryan, "Aquinas and Darwin," in *Darwin and Catholicism: The Past and Present Dynamics of a Cultural Encounter*, ed. Louis Caruana (London: T&T Clark, 2009), 43–59.

[29] *SCG* III, ch. 70, no. 8; ch. 94, no. 11; *De veritate*, q. 23, a. 5; *ST* I, q. 105, a. 5, resp.; *Expositio libri Peryermeneias* I, lec. 14, no. 22, as discussed by William E. Carroll, "After Darwin, Aquinas," in *Darwin in the Twenty-First Century: Nature, Humanity, and God*, ed. Gerald P. McKenny, Phillip R. Sloan, and Kathleen Eggleson (Notre Dame, IN: University of Notre Dame Press, 2015), 327n8. "Necessity" here is not akin to *divine* necessity. It is a "necessity *given* something else": it is the internal necessity to the universe given that God wished to create a universe of a certain sort, often called "hypothetical" or "suppositional" necessity.

theology that holds that the bearing of providence on contingencies does not rob those contingencies of their contingency at their own level. Consequently, this theological perspective can be as little disproved by the investigations of the natural sciences as it can be proven by them. Nor does it require us to look for ways in which God might *intervene* in order to achieve his providential will.[30] To speak of intervention here—at least for the sort of "participatory" theology especially associated with exemplarism—is already to accord too much independence to creation, as if it stood sufficiently over and against God that God's action would then need to find a way to enter into it, rather than saying that the whole of creation's being already derives from God at every moment.

Just as I find a theological dismissal of divine exemplarity problematic, so with too hasty a recourse to providence. I will, again, limit my argument here to a Thomist perspective. Within it, as I have said, providence certainly bears upon creaturely contingencies as well as necessities. Yet, in that, there is also an insistence on the integrity of the created order. Providence does not abolish the sense that creatures have proper, natural, reasonable operations in keeping with their particular forms.[31]

While the story of the unfolding of creation's history is squarely a topic for the doctrine of providence, that should not be taken—at least for the Thomist—as undermining the sense of there being a properly creaturely integrity to that story, which we can examine in theological terms. In this article, that examination involves asking how exemplarism might play out in relation to evolution.[32]

A Thomist vision, we might add, has traditionally aligned with a sense of the world as ordered according to the divine intellect and wisdom, rather than primarily or only by the divine will. Also on those grounds, then, any invocation of providence that truncates discussion of divine exemplarity by means of a solve-all invocation of the determination of all things by the divine will sits incongruously

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30 In the worlds of Carroll: "God does not need a metaphysical intermediary in nature [such as "quantum divine action" or the chaotic complexity of non-linear systems] so that His actions would not collide, so to speak, with other causes" ("After Darwin, Aquinas," 308). I discuss this in my Participation in God: A Study in Christian Doctrine and Metaphysics (Cambridge: Cambridge University Press, forthcoming 2019).

31 *ST* I, q. 105, a. 5, resp.

32 In any case, since God's providential knowledge of creation is practical, that practical knowledge is intrinsically already a matter of exemplarism.

within a theological outlook that otherwise stresses the coherence of a creation founded on intellect and wisdom. Since the Thomist approaches the world as fashioned after the pattern of the Logos, it would be incongruous to say that the world has turned out as it has *just* because of the providential divine will, with no more to add about creation's internal pattern or logic.

Aquinas addressed the compatibility of providence with natural processes throughout his works, but we might pay particular attention to an account in *Summa contra gentiles* [*SCG*] III, ch. 97 (on "how the disposition of providence has a rational plan"), not least because we will return to that chapter below. It closes with a defense of the place of secondary causes against the "double error," either "that all things follow, without any rational plan, from God's pure will," and therefore without any internal logic (either in God or in the created order), or that "the order of causes comes forth from divine providence by way of necessity."[33] According to Aquinas, we must say instead that there is a proper "proximate cause" for every "natural effect." We can trace these back (*reducamus*) to "the divine will as a first cause," but we would do so "inappropriately" if ascription of divine causation were taken "to exclude all other causes."[34] The question of how evolution relates to exemplarity, as discussed in this article, is precisely a question about the role of the evolving creaturely process as a "proximate cause" in the divinely willed production of the "natural effects" of creaturely form.

That of Which God is the Exemplar

As we have seen, Darwin's theory swept away the possibility of saying that God had bestowed particular forms upon creatures in some direct way at the beginning by creating a set of first creatures in each kind whose forms were subsequently perpetuated by reproduction without change. Our appreciation of evolution has both removed any such initial moment and complicated the notion of species, rendering it a moving, and indeed somewhat blurred, category. We might well then imagine that evolution undercuts an exemplarist scheme. The detail of any such judgement, however, should rest on the detail of some particular exemplarist proposal (which, in this article, is that of Aquinas), rather than on any such general assumptions. We therefore turn to some of the detail in Thomas's account. In doing so, the recent work of Gregory Doolan

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[33] *SCG* III, ch. 97, no. 15.

[34] *SCG* III, ch. 97, no. 17.

on divine exemplarism in Aquinas will be of particular use.[35] As a first question, we can ask *what it is about the creature* of which God is said to be the exemplar. Aquinas's startling reply gives the obviously Platonic idea of exemplarism a distinctively Aristotelian shape.

Plato (and what we might reasonably call a broadly Platonic subsequent tradition) identified the truest meaning of form with the *transcendent* archetype of the *species*. Aristotle, however, held that specific form does not exist other than as it is instantiated in *individuals*.[36] While he would uphold the idea of a common substantial form in all wolves, for instance, he did not suppose the lupine form to exist outside them. While Thomas departed from Aristotle in holding to a transcendent origin for form (namely, in God), he nonetheless followed Aristotle in doing away with the separate transcendent Forms found in Plato.[37] As an Aristotelian, rather than identifying God primarily as the exemplar of *specific* form, Aquinas saw God as primarily the exemplar of *individual* creatures. As he put it, in a characteristic interweaving of the Platonic and the Aristotelian: "Singulars have acts of existence more truly than universals do, because the latter subsist only in singulars. Therefore, it is more necessary for singulars to have exemplars than it is for universals."[38] Vivian Boland calls this account of divine exemplarism an example of Aquinas's "radical Aristotelian ontology," with the emphasis placed on the individual rather than on the common specific form.[39] That might be granted, although the fact that Aquinas talks so much of exemplarity could be said to be evidence of an equally radical Platonism. The important point for what follows is that Aquinas roots exemplarity in the correspondence of *individuals* to their divine archetypes.[40]

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35 Doolan, *Divine Ideas*.

36 Aristotle, *Metaphysics* 7.16: "Clearly no universal exists apart from its individuals" (trans. William D. Ross [Oxford: Oxford University Press, 1924]).

37 *ST* I, q. 15, a. 1, resp.

38 *De veritate*, q. 3, a. 8. Aquinas relates his belief in divine exemplar ideas for *individuals* to God being the cause of the matter of a thing as well as of its specific form, whereas he attributes to Plato a belief only in the exemplars of form and species (see Doolan, *Divine Ideas*, 124–33, and *Quodlibet* VIII, q. 1, a. 2, and *De veritate*, q. 3, a. 5, resp.).

39 Boland, *Ideas in God*, 226.

40 Although Aquinas's language developed over his lifetime, we can say that he distinguished between three different ways in which the pattern of creatures can be found in God: first as the productive exemplar (*exemplum*) of something

With this observation in place, a good deal of what may have seemed to be central to the problem posed by evolution for exemplarism is removed. We could see a conflict between evolutionary change across generations and a supposition that nothing can change among species only if *species* were what is foundational to divine exemplarity. If, instead, the divine ideas relate primarily to individuals, the change of species over time is no longer a problem. Nor, for that matter, is the sense that a biological species is somewhat blurred, not only over time but even at any given time. God's single, perfect knowledge of his essence includes, first of all, knowledge of all the modes under which he can be imitated by individual creatures. Being perfect, it also includes knowledge of what those individuals share in common, to varying degrees—both at any given time and over time—but secondary to the knowledge of individuals. It is therefore a knowledge that can readily take in the variety and changes of evolution. So complete, indeed, is this aspect of a reply to evolutionary concerns about divine exemplarity that the opposite question might now come into view from what had been imagined at first, the question of whether such a Thomist account of divine exemplarity does not in fact begin to look like nominalism.

A response to that question would call for a more involved discussion of the place of specific form in Aquinas's thought (and in that of other exemplarist thinkers) than space will allow here.[41] It is clear that he held individuals of a certain kind to share something deter-

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actually created; second in the broader sense of an "idea" (*idea*), which includes God's knowledge of possible creatures that are not realized; and third as a "notion" (*ratio*), which refers to something knowable about a creature (actual or potential) that could not exist in abstraction from concrete individuals, such as matter, form, genus or species (Doolan, *Divine Ideas*, 123–55).

[41] In *Quodlibet* VIII, q. 2, Aquinas addresses the sense in which the divine ideas *are* related first of all to the specific nature of a creature. The first in God's intention is that which is most perfect, and specific form has the perfection of determining (and therefore perfecting) both the form of the genus, from one angle, and the matter of the individual, from another. In the *sed contra*, Aquinas argues that creatures are more fully related to God as divine exemplar according to form, which relates to the specific nature, than they are as to matter, which relates to the individual. That said, what is posterior in the order of intention (the individual) is prior in the order of execution, where singulars come first (Doolan, *Divine Ideas*, 129). In any case, as Doolan points out, this discussion ultimately serves to address how an *individual* creature is related to the idea of that *individual*: individual exemplarity is the foundation (Doolan, *Divine Ideas*, 129–30).

minative in common, and he was right to do so. A theologian can be committed to notions of specific form in the mind of God in part because she recognizes the stability of something like specific form, or kinds, in the world. Here, alongside Aristotle, Augustine, and the author of Genesis 1, Aquinas remains more right than wrong.[42] The diversity and mutability of species, even within an evolutionary perspective, is secondary to what the individuals of a species share. A set of interbreeding organisms and their offspring are far more alike than different: a common form or *ratio* far exceeds variation between them. Indeed, given the potential for evolutionary change that we now appreciate, the stability and persistence of particular species for long periods of biological time is at least as worthy of comment as is adaptive change, when we see it. All that said—and this is the vital point for our question—in aligning divine exemplarity primarily with the individual creature, Aquinas very considerably opened the scope for relating that exemplarity to the variation of species over time. God's knowledge of the modes under which he can be imitated by individual creatures can take in both similarities and differences within individuals and need not imply fixity of species. That this aspect of Aquinas's metaphysics of creation is open to the ongoing development among species is, it perhaps goes without saying, quite independent of his own biological assumptions, as a thirteenth-century thinker, about a basic fixity among species.

Evolution and Moving Images

Since Aquinas's exemplarism does not place the species before the individual, it does not face the challenges that might be expected from the evolutionary insight that species are mutable. A problem is diffused, but we can go further than that. Not only does today's Darwinian developmental view of species poses no threat to an exemplarist vision of the relation of creatures to creator, it is in particularly positive accord with that theological vision. There is a place for evolutionary change and succession in Christian theology—here going beyond Thomas in a Thomist fashion—not *in spite* of exemplarism, but *because* of it. As notable an exponent of exemplarity as Augustine had written in the early fifth century that it is precisely through change and mutability

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[42] In the words of Augustine: "Beans are not produced from grains of wheat or wheat from beans, nor human beings from cattle or cattle from human beings" (Augustine, *De Genesi ad litteram* 9.17.32, in *On Genesis*, trans. Edmund Hill [Hyde Park, NY: New City Press, 2002], 394).

that the goodness of creation is fully achieved: "By the succession and decession of things is the beauty of the ages woven."[43]

For Aquinas also, some degree of change and succession plays a proper and significant part within creation because of what it adds to the breadth of creation's expression of divine perfections by means of variety. When it comes to forming a likeness to God, Aquinas's conviction is that finitude goes hand-in-hand with multiplicity. If the perfection that in God is one and simple is to find expression in a world of finite things, it will be by refraction into variety. Multiplicity is the nearest approach that finite things can make to displaying the plenitude of divine perfection. "For this reason, then," Aquinas wrote, "is there distinction among created things: that, by being many, they may receive God's likeness more perfectly than by being one."[44]

Aquinas stressed that a plurality of *species* adds more to the perfection of creation—they add more to creation's likeness to God through participation in divine perfection—than does a plurality of individuals within a species.[45] This is significant when it comes to thinking how an exemplarist picture can mesh with evolution. It suggests that developments down biological history that diversify species would add more to the display of divine perfection in creation than would ones that diversify creatures only by the multiplication of individuals within a certain number of fixed species. Following Aquinas's logic further than he was able to follow it himself, we can posit that an evolving succession of species would add more to creation's display of divine likeness than would a succession of individuals within a certain number of unchanging species. Exemplarism does not compel the theologian to imagine something like evolution—Aquinas did not hold to it, nor did his peers—but from an exemplarist position, evolution is fitting: it exhibits *convenientia*.

All the same, if such means to engage with an evolutionary perspective are latent in Aquinas's writing, they are no more than latent. While he saw an important place for multiplicity and difference in creation, for him, divine plenitude is nonetheless reflected more by diversity side-by-side than by change over time.[46] There are

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[43] Augustine, *De Genesi ad litteram* 1.8.14 (my translation).

[44] *SCG* II, ch. 45, no. 3. See also: *SCG* II, ch. 45, no. 5; III, ch. 97, no. 2; *ST* I, q. 75, a. 5, ad 1.

[45] *SCG* II, ch. 93, no. 5.

[46] *ST* I, q. 47, a. 1, resp.

creatures of a kind that do not die, and there are creatures of a kind that come and go. That is not to suggest kinds that develop as kinds. There is an element of dynamism to his vision, but the expansion of diversity added by changeable creatures is not that of one species developing into another. It comes rather from the presence of creatures that are born and die and are mutable and change, alongside unchangeable creatures such as angels.[47]

Today, however, Aquinas's account of exemplarity must be considered in light of evolution, where we find an expansive outworking of his conviction that creation pays homage to divine plenitude through its diversity. That diversity is now expanded to include the motion that is the evolution of species. We might recall Plato's famous maxim that "time is the moving image of eternity."[48] Evolution possesses its own form of motion, and in that way, it extends the capacity of creation to be a moving image. By evolving over time, species trace a fuller outline of divine plenitude than if they were static.

In Aquinas, we find an enigmatic parallel to Plato's description of the relationship of time to eternity in an aside where he writes that creatures bear God's image "though movingly."[49] It comes in the Christological opening of the third part of the *Summa theologiae*, in an article that asks whether it was most suitable that the Son, or Word, should become incarnate, of the Persons of the Trinity. Aquinas laid his response out squarely in terms of divine exemplarism, beginning from the principle that "such as are similar are fittingly united." He then associates divine exemplarity with the Son in particular, who, as "the Word of God" and God's "eternal concept," is "the exemplar likeness of all creatures." At this point, Aquinas makes his suggestion about a moving likeness to God:

> And therefore as creatures are established in their proper species, though movably, by the participation of this likeness

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47 Changeability adds the variety of "the contingent" alongside "the necessary" (*SCG* III, ch. 72, no. 3), the corruptible alongside the incorruptible (ch. 72, no. 5), the moving alongside the immobile (ch. 72, no. 6), and the freely choosing alongside the determined (ch. 73), as also what is contributed by creaturely fortune and chance (ch. 74, no. 5) and by having "accidental beings" alongside "substantial" ones, where "accidental beings" are "things that do not possess ultimate perfection in their substance [and which on that account] must obtain such perfection through accidents" (ch. 74, no. 5).

48 Plato, *Timaeus* 37d. See also Plotinus, *Enneads* 1.5.7.

49 *ST* III, q. 3, a. 8, resp.

> [*per participationem huius similitudinis creaturae sunt in propriis speciebus institutae, sed mobiliter*], so by the non-participated and personal union of the Word with a creature [the hypostatic union], it was fitting that the creature should be restored in order to its eternal and unchangeable perfection; for the craftsman by the intelligible form of his art, whereby he fashioned his handiwork, restores it when it has fallen into ruin.[50]

Aquinas obviously did not have an evolutionary picture in mind when he wrote this passage. Indeed, it is difficult to know exactly what he *did* have in mind, since he simply describes creatures as moving images of God's perfection in passing and moves on. Perhaps he was thinking of the generation, flourishing, and passing of individuals. Such a sense of individual development and of human flourishing as something achieved only over time is certainly central to his account of human nature, and therefore also central to his ethics. Rooted in a virtue approach, with the virtues as habits—as "had" or acquired things, as an accumulation of accidental determinations of substantial form—his ethics and theological anthropology are built on a robust sense of human development, to the extent that the human being is seen, to a peculiar degree, as born a work in progress.[51] In the words of Aristotle: "Neither by nature, then, nor contrary to nature do the virtues arise in us; rather, we are adapted by nature to receive them, and are made perfect by habit."[52]

Aquinas would not have had a change to specific form in mind, but an exemplarist or participatory thinker today can creatively take his words to suggest more here than he could have meant at the time. This accords with the recent work of some contemporary Thomists. Commenting on a participatory relationship of the creator to God, although not necessarily with evolution in view, Jacob Sherman has written that "movement itself is understood as the means by which

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[50] Two further exemplarist arguments follow.

[51] *ST* I-II, q. 55, a. 1, resp.; see also q. 49, a. 4, esp. ad 1 and ad 2.

[52] Aristotle, *Nicomachean Ethics* 2.1.1103a24, ed. Lesley Brown, trans. David Ross (Oxford: Oxford University Press, 2009). Josef Pieper wrote that ""nature" implies growth, which means that we are born not as static entities but as unfinished products, a "rough draft" whose realization is demanded by that same nature "by virtue of creation"" (*The Concept of Sin*, trans. Edward T. Oakes [South Bend, IN: St. Augustine's Press, 2001], 36). On this, see also Étienne Gilson, *Being and Some Philosophers*, 2nd ed. (Toronto: Pontifical Institute of Mediaeval Studies, 1952), 184.

finite beings most properly participate and therefore image the perfection of the eternal."[53] For Catherine Pickstock, every creature is what it is by "borrowing" from God, and since God stands in infinite excess to the creature, that suggests that creatures therefore also stand over time in excess of the "snapshot" of any particular moment.[54]

Fran O'Rourke has considered how this principle of creaturely development and diversification fulfills, rather than abolishes, an Aristotelian account of form and matter.[55] As Jacques Maritain put it, writing in 1966, creatures have a tendency to become "better than they are or than they were."[56] Here, he draws into an evolutionary frame what he had written earlier in relation to aesthetics: "[Things] are not only what they are. They constantly pass beyond themselves, and give more than they have, because from every side they are pervaded by the creative influx of the first cause."[57] A similar intuition is found in Josef Pieper, whose sense of an inexhaustibility to every finite thing he attributed to its participation in God as its source.[58]

Movement and change are far from being inimical to divine exemplarism. Indeed, they are readily compatible, and exemplarist thinking can naturally expand in that direction once the straightjacket of

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53 Jacob H. Sherman, "The Genealogy of Participation," in *The Participatory Turn: Spirituality, Mysticism, Religious Studies*, ed. Jorge N. Ferrer and Jacob H. Sherman (Albany: State University of New York Press, 2008), 85.

54 Catherine Pickstock, "The Game of the Stone: A Sermon on 1 Peter 2.1–8," *Theology* 115, no. 3 (2012): 192.

55 Fran O'Rourke, "Aristotle and the Metaphysics of Evolution," *Review of Metaphysics* 58, no. 1 (2004): 3–59.

56 The phrase, and close parallels, is found in Jacques Maritain, "Toward a Thomist View of Evolution," in *Untrammeled Approaches: Collected Works of Jacques Maritain*, vol. 20 (Notre Dame, IN: University of Notre Dame Press, 1997), 115–18. The language of "better" here would be controversial for many evolutionary biologists, although less so if understood as meaning "better adapted to a new or changed environment." Maritain has an only intermittently strong grasp of the science involved, seeming to imply, for instance, that evolution has ceased: "The world of living beings was subjected (I say, *was*, because I think . . . that this immense adventure was a thing of the past, completely finished today), was subject in primitive times, during the millions of years of the genesis of the universe, to a long evolution" (111).

57 Jacques Maritain, *Creative Intuition in Art and Poetry* (New York: Pantheon, 1953), 127.

58 Josef Pieper, *The Silence of St. Thomas: Three Essays* (South Bend, IN: St Augustine's Press, 1999), 60, 67.

fixed species is loosened. Aquinas grasped this principle with respect to the development of each material creature over a lifetime, but he was held back from seeing it played out in the evolution of substantial form itself. We suffer no such inhibition today, and his thought provides models for how this might be approached in terms of theological metaphysics.

What in God the Creature Imitates

The most significant question we have asked so far concerns what it is about the creature that finds its exemplar in God. We might imagine that, for Aquinas, the reply would primarily be that it is the creature's specific form. However, as Doolan has shown, among others, Aquinas held that it is the whole substance of the *individual* creature that has its exemplar in God. We can understand specific form as a secondary generalization from that: a sense of what a group of creatures hold in common at any particular time, which is determinative but also admits of variety and is open to change.[59] This observation opened the way for us to find room, indeed capacious room, for an evolutionary understanding of species within Aquinas's exemplarist framework. We then developed the idea that the change and development of creatures over time is far from inimical to a participatory, exemplarist perspective. Indeed, it integrates seamlessly.[60]

All that said, the question remains as to what the theologian might say, after an appreciation of evolution, about *how* it is that a likeness to God comes to be in the creature, given that we no longer suppose that it was imparted directly by God to a set of first specimens of each kind, created together, at the beginning. As we have seen, one option would simply be to say that these forms were determined to be as

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[59] Indeed, the specific essence of creatures is the basis for that change, both as its starting point and in providing the mechanism: creatures have evolved evolvability (see: Marc Kirschner and John Gerhart, "Evolvability," *Proceedings of the National Academy of Sciences of the USA* 95, no. 15 [1998]: 8420–27; John F.Y. Brookfield, "Evolution and Evolvability: Celebrating Darwin 200," *Biology Letters* 5, no. 1 [2009]: 44).

[60] In this article, I am leaving observations aside concerning ambiguities within biology over the meaning of species. See: James Mallet, "Darwin and Species," in *The Cambridge Encyclopedia of Darwin and Evolutionary Thought*, ed. Michael Ruse (Cambridge: Cambridge University Press, 2013); Richards, *The Species Problem*; John S. Wilkins, *Species: A History of the Idea* (Berkeley: University of California Press, 2011), 197–225; and Wilkins, *Defining Species: A Sourcebook from Antiquity to Today* (New York: Peter Lang, 2009), especially 193–98.

they are by dint of divine providence. I argued in response that, while I would wish to uphold the sense that divine providence extends (non-competitively) to contingencies, that need not, and perhaps should not, preclude exploration of how divine exemplarity works out at a creaturely level. After all, when Aquinas, among others, set out an account of providence along these lines, he sought precisely to preserve the logic of creation's unfolding story.

A balance is to be preserved here, and both sides of it feature in the discussion to be found in *SCG* III, ch. 76, quoted above. On the one hand, providence extends to contingencies; on the other, that is not incompatible with mediation. As Aquinas puts it, it is "in agreement with the Catholic faith" to hold that divine providence works "through certain intermediary causes."[61] The problem would only be to suppose that providence is limited to general mediating creaturely causes and does not also extend to individuals themselves.[62] In what remains of this article, the focus will be on this mediation of a divine likeness through creaturely processes, without wishing to deny the place of providence with respect to individuals. I will explore how it might be said that "all perfections come to other things from God by way of descent," through evolutionary mediation, without wishing in that to deny that "the ordering of singulars" is "under the control of divine providence."[63] To address that mediation, I turn from the earlier question of what in the creature finds it exemplar in God to the question of what it is in God that the creature imitates.

To that question, Aquinas gave not one but two responses, and while they are related, they are also properly different. One reply is that creatures imitate the divine ideas, which may be the more expected answer. Strictly speaking, however, Aquinas counted this as the secondary and subsidiary response. More properly, he wrote, what the creature imitates is God himself: creatures primarily imitate the divine essence. Again, a significant feature of Doolan's 2008 book has been to explore this material in Aquinas.

These two angles on exemplarity are closely related: Aquinas understood the divine *ideas* as God's knowledge of the modes under which his *essence* could be imitated by creatures. That definition of

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61 *SCG* III, ch. 76, nos. 1–2.

62 *SCG* III, ch. 76, no. 4.

63 "By descent" (*per modum descensus*) refers to an effect achieved through mediation, not to evolution by descent. The point under discussion here, however, is whether the latter could be a means for the former.

the divine ideas recurs across his corpus[64] and is important for allowing him to reconcile two significant aspects of his thought that might otherwise have been in tension: divine simplicity, on the one hand, which will not admit multiplicity to God, and divine exemplarity, on the other, according to which God understands his essence as the wellspring of many creatures. Aquinas was able to square these perspectives by understanding the divine ideas as an aspect of God's simple, single knowledge of himself. That knowledge, he held, being perfect, would necessarily include a complete knowledge of all the modes under which God could be imitated by creatures.[65] To speak about the divine ideas in this way is already to concede a secondary place to them. It places imitation of the divine essence at the foundation of divine exemplarity.

Aquinas lays this out in terms of the distinction between imitation according to divine ideas and imitation according to the perfections of the divine essence. Discussions of this distinction are somewhat rare in the secondary literature.[66] George Klubertanz, however, distinguishes between the exemplarity of "the divine ideas" and the exemplarity "of the divine nature as a model."[67] He quotes a treatment from the *Commentary on the Sentences*:

> The exemplar cause of things [*exemplar rerum*] exists in God in two ways. First, it is present as something in his intellect; thus, according to its ideas the divine intellect is the exemplar of all things which come from it [*secundum ideas est exemplar intellectus divinus omnium quae ab ipso sunt*], just as the intellect of the artisan, through his art, is the exemplar of all his artifacts. Secondly, it is present as something in his nature [*in natura sua*]; thus, according to the perfection of that goodness by which he himself is good, God is the exemplar of all goodness.[68]

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64 A detailed treatment is given in Doolan, *Divine Ideas*, 83–122.

65 *ST* I, q. 15, a. 2, resp.

66 See Doolan, *Divine Ideas*, 219–28. Louis-Bertrand Geiger identifies the distinction between these two "radically diverse" forms of participation but devotes little more than a footnote to them, calling their relation a "difficult problem" (*La Participation Dans La Philosophie de S. Thomas d'Aquin* [Paris: J. Vrin, 1942], 233n1), cited by Doolan, *Divine Ideas*, 219.

67 George Peter Klubertanz, *Saint Thomas Aquinas on Analogy: A Textual Analysis and Systematic Synthesis* (Chicago: Loyola University Press, 1960), 26.

68 Aquinas, *In* I *sent.*, d. 19, q. 5, a. 2, ad 4 (translation from Klubertanz, *Saint Thomas Aquinas on Analogy*, 26). Doolan discusses this passage in *Divine Ideas*,

For Aquinas, these two angles on divine exemplarity also exhibit different forms of similitude. A creature's imitation of the divine essence must be taken as strictly analogical, as a likeness against the background of a yet greater unlikeness, since God and creatures belong to no overarching category and whatever God may bestow upon the creature, such as being, goodness, beauty, or anything else, is not in the creature as it is in God. The creature's imitation of the divine ideas, however, involves a certain identity in form (although not in mode): a creature by necessity bears a perfect likeness to its divine exemplar in the mind of God, since that is precisely the idea of what that creature is in all its individuality. As Aquinas puts it, "every single thing attains a perfect imitation to that which it is in the divine intellect (for any kind of thing is the sort of thing he has ordained it to be)."[69] The idea in the mind of God is of *this* tiger or of *this* antelope, and that does not admit of more or less.

This is brought out in a discussion of these two modes of likeness in *De potentia*:

> There is a twofold likeness between God and creatures. One is the likeness of the creature to the divine mind, and thus the form understood by God and the thing itself are homogeneous [*forma intellecta per Deum est unius rationis cum re intellecta*], although they have not the same mode of being, since the form understood is only in the mind [*tantum in intellectu*], while the form of the creature is in the thing [*etiam in re*]. There is another likeness inasmuch as the divine essence itself is the supereminent but not homogeneous [*non unius rationis*] likeness of all things.[70]

To summarize what will be discussed in greater detail below, in its likeness to the divine essence, each creature imitates God in reflecting God's being, goodness, beauty, strength, and so on, to a

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76–77. An example of this distinction in a mature work would be *ST I*, q. 93, a. 2 ad 4, although in the judgement of Klubertanz, only in "early texts is a twofold exemplarity the basic approach" (*Aquinas on Analogy*, 26).

69 *In* II *sent.*, d. 16, q. 1, a. 2, ad 2.

70 *De potentia*, q. 7, a. 7, ad 6. It is unusual for Aquinas to describe the divine essence as a likeness ("supereminent" or not). For him, it is a general, and indeed obvious, principle that creatures are in the likeness of God, not vice versa (*SCG* I, ch. 9, no. 5). His point here would be that the divine essence is the "supereminent" exemplar for all the likenesses that creatures bear to it.

different degree and in a different combination. In this way, each creature also imitates a divine idea, which is to say that it embodies, in creation, one of the distinct ways in which God knows his essence to be imitable by creatures. Each of these two descriptions of what it is in God that the creature imitates—ideas or the combination of divine nobilities in various degrees—offers a way into thinking in an evolutionary register about how the divine likeness comes to be in specific creatures.

The Divine Ideas and Morphological Space

First, I will consider imitation of the divine ideas defined, as we have seen, in terms of God's knowledge of all the ways in which the divine essence could be imitated by a creature. That approach to the divine ideas, coming to us from mediaeval theology, bears a striking resemblance to a concept in contemporary theoretical biology: morphological space.[71]

The divine ideas could be said to map, within the knowledge of God, all of the ways in which a creature could exist. The morphological spaces of the contemporary computational biologist also map, from their perspective, the variety of forms (*morphe*) that an organism could take. This is called a "space" because it typically represents such possibilities as points plotted in multidimensional space, where each axis represents a different changeable aspect of the creature. When put to any practical use, only a limited set of aspects of creaturely variability is mapped, rather than the totality of creaturely possibility per se. There is nonetheless an analogy to be drawn suggesting some circumspect comparison between the biologist's morphological space and Aquinas's notion of divine ideas.[72]

A simple example involving only two variables might clarify the concept of a morphological space: perhaps the width and length of Darwin's Galapagos finches. Each individual would provide a particular value of length and width, and that would correspond to a single

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[71] George R. McGhee, *Theoretical Morphology: The Concept and Its Applications* (New York: Columbia University Press, 1999); McGhee, "Exploring the Spectrum of Existent, Nonexistent and Impossible Biological Form," *Trends in Ecology & Evolution* 16, no. 4 (2001): 172–73; McGhee, *The Geometry of Evolution: Adaptive Landscapes and Theoretical Morphospaces* (Cambridge: Cambridge University Press, 2012).

[72] The range of divine ideas, however, incomparably exceeds anything a biologist is likely to conceive, taking in angels, for instance, and perhaps fundamentally different universes.

point on a two-dimensional surface, the *x* axis perhaps representing length and the *y* axis width. The clustering of points on this map, within clumps, would indicate the distinction of one species from another. It is easy to visualize a two-variable analysis such as this, as also with three variables, especially if the three-dimensional plot can be rotated on a screen. Beyond that, however, with more than three variables, and more than three dimensions, morphological spaces are difficult to take in visually, and a notional map of all conceivable creatures along these lines is obviously only the product of an extreme thought experiment.

Nonetheless, in thinking about divine exemplarity in relation to particular creatures, the relation between the divine ideas and a "total morphological space" of creatures provides a useful opening. The thinnest connection we can imagine between the divine ideas and the unfolding creaturely story of what is realized by evolution might be approached in terms of potential. That is to say that, as a first stage of analysis, we can observe a likeness simply between the vastness of the divine ideas and the vastness of what is mapped as morphological possibility. More typically, however, Aquinas placed the emphasis on actuality, rather than potential.[73] A more authentically Thomist analysis of exemplarity here would therefore focus on being as an act. The resemblance would not then be one of possibility to possibility, but the likeness between the creative fecundity of the divine essence, as expressed in the breadth of the divine ideas, and its image in the fecundity of created being, as coming to exist in many ways. The divine ideas would then not be considered in terms of unrealized potential, in terms of what God could make but, in most cases, has not. They would be a way of speaking about the intensity of divine being, already realized in itself, as containing within itself all that creation could be. The likeness to this in creaturely being would then be in its irrepressible tendency toward what Darwin called "endless forms most beautiful and wonderful."[74]

We have so far looked only at morphological space as laying out the sorts of creatures that *could* exist. When we start to look at what actually *does* exist or *has* existed, we come upon a more focused manifestation of divine exemplarity, in the sense that created being

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[73] Aquinas, *In* X *metaphys.*; *ST* I, q. 2, a. 3, resp.

[74] Charles Darwin, *The Annotated Origin: A Facsimile of the First Edition of On the Origin of Species*, ed. James T. Costa (Cambridge, MA: Harvard University Press, 2009), 490.

seems already shaped to bring forth certain sorts of creatures.

Any particular corner of our imagined morphological hyperspace represents some aspect of biological possibility. When we compare that range of possibility, however, with what actually exists or has existed in terrestrial biology, we find the latter to be unexpectedly circumscribed. Only a minute fraction of total morphological space is occupied—a fraction, indeed, even given the limited time that evolutionary processes have had to explore it. That observation is immediately suggestive when it comes to how divine exemplarity is mediated to organisms through evolution. The crucial point here is that not only do individuals of the *same* species "clump" together in some recurring morphological fashion, as with individuals of a particular species of finch, but so also do *different* species. When we compare species that are profoundly distinct, genetically speaking, we find surprising overlaps of morphology. Certain ways of being a creature have been adopted independently, more than once, and often many times. To underline the point, this is the case not only when two species share a common ancestor with this same property but *even though they do not*. In this way, biologists say, evolution is in various respects *convergent*. [75] Its repertoire is more limited that we might have expected.

An ideal illustration involves comparing marsupial mammals in Australia with placental mammals elsewhere.[76] Australia separated from the landmass of the ancient continent Gondwana around 100 million years ago, before the extinction of dinosaurs around 65 million years ago had opened the way for the diversification of mammals, both marsupial and placental. In Australia, marsupials have largely prevailed; in South America, both groups are found in diverse forms; in North America north of Mexico, we find only one marsupial today, the Virginia opossum.[77]

The point of interest is that, although Australian evolutionary processes took place in isolation, several resulting marsupials

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[75] Writing in 2003, Simon Conway Morris could list nine columns of evolutionary convergences in the index of *Life's Solution: Inevitable Humans in a Lonely Universe* (Cambridge: Cambridge University Press, 2008).

[76] The yolk-like placentas of marsupials support only a short gestation period. Their young have a substantial period of development outside the womb, at a nipple, typically within a pouch. Placental mammals nourish their young in the womb, from the mother's blood, over a much longer gestation.

[77] Otherwise, marsupials are found only in some parts of Asia close to Australasia, including Indonesia and Papua New Guinea.

nonetheless bear a striking resemblance to corresponding placental mammals. There are marsupial moles, for instance, and marsupial mice. The marsupial phalanger is remarkably like a flying squirrel, bandicoots resemble rabbits, the wombat is like a groundhog, the numbat resembles an anteater, the spotted cuscus mirrors the lemur, the bobcat stands alongside the Tasmanian tiger cat, and the (now probably extinct) Tasmanian wolf was remarkably similar to the placental wolf. These various marsupial species are far more closely related to one another genetically than they are to any mammal, and yet, in each of these cases, we see a strong morphological similarity between a species or genus of marsupial and a species or genus of placental mammal. A particular morphology has evolved twice, independently, as well-suited to a similar ecological niche.[78]

This serves as an excellent example of convergent evolution, where a similarity of environment has occasioned similar creaturely ways of flourishing in such a setting.[79] The same could be said of

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[78] Richard Dawkins and Yan Wong, *The Ancestor's Tale: A Pilgrimage to the Dawn of Evolution*, 2nd ed. (London: Weidenfeld & Nicolson, 2016), 271–78.

[79] The introduction of a measure of flourishing or adaptive fitness marks the difference between a morphological space and a fitness landscape. With a morphological space, we simply consider what might exist and note what does. Going beyond that, a fitness landscape recognizes that, for any given environment, certain ways of being a creature are better adapted than others. Possible forms are not only plotted but also assigned a "height" corresponding to the fitness of such a kind of creature for that ecological setting. This visualization provided the title of Richard Dawkins's book *Climbing Mount Improbable* (New York: W. W. Norton, 1996). Adaptedness can be described as an "attractor" in that landscape, employing a term from non-linear dynamics or complexity theory. This language of "attractors" in evolution has been used recently by theologians including Ilia Delio and Józef Życiński: Ilia Delio, *The Emergent Christ: Exploring the Meaning of Catholic in an Evolutionary Universe* (Maryknoll, NY: Orbis, 2013), 142–46; Delio, *Christ in Evolution* (Maryknoll, NY: Orbis, 2008), 17–18; Józef Życińsky, "Evolutionary Theism and the Emergent Universe," in McKenny, Sloan, and Eggleson, *Darwin in the Twenty-First Century*, 349–50; Życińsky, "Evolution and the Doctrine of Creation," Caruana, *Darwin and Catholicism*, 181–89; Życiński, *God and Evolution: Fundamental Questions of Christian Evolutionism* (Washington, DC: Catholic University of America Press, 2006), 161–64. Greater precision is needed in the use of this idea, however. In both writers, there is often considerable ambiguity as to whether the idea of an "attractor" is being used in the scientific and mathematical sense or, more generally and colloquially, as an indicator of final causation (perhaps in relation to God as final cause). Delio also uses it to mean something like the attractiveness and operation of Christ in human spirituality (*Emergent Christ*, 142–46). Both authors describe God as an attractor (in

the independent close convergence in body shape among swimming creatures: for instance, in cartilaginous and bony fish, the *Ichthyosaurus* (an extinct reptile), and the dolphin and porpoise (mammals).[80] For a deeper sense of the mediation of divine exemplarity here, we should turn to the role of mathematical form in evolution and its convergences. It is not simply that a particular environment calls for a certain way of flourishing, but that those ways of flourishing draw on certain solutions that are woven into creaturely being, often in ways disclosed by mathematics (as with those sea creatures and the laws of fluid dynamics).

Many evolutionary biologists today will single out form as a basic component of any properly comprehensive evolutionary perspective.[81] Certain "formal" possibilities are present in reality, available to be explored, and that is part of the evolutionary picture. This is one way in which the neo-Darwinian synthesis of the mid-twentieth century has expanded and become more complex and nuanced in recent years. The evolutionary process, this insight points out, does not create *de novo* the various fundamental aspects of creatures that can be expressed mathematically. Rather, it discovers or works with them. The liturgy-minded theologian might appreciate a play that can be made here on two senses of the word "invention." The evolution of the bee has not "invented" the packaging properties of a hexagonal comb in the more contemporary sense of invent (to "make up"). Rather, evolutionary history "invented" the hexagonal comb in the same sense in which the feast day marked in the West on September 14 is called "the Invention of the Holy Cross": as the day of its *discovery*. The evolutionary process discovers what is woven into

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the colloquial sense) but leave substantially undiscussed how that relates to the scientific meaning of the term as the particular adaptedness of a region of morphological space for a particular environment. Życiński describes the relation as analogical, but provides little meaningful detail (*God and Evolution*, 161). The present article offers some openings for an exploration of how the proximate "causality" of the attractor on the landscape participates in God, but further investigation of this relation of mediation will be needed before the term "attractor" can play a well-considered part in the dialogue between theology and science beyond its current loose and metaphorical role.

[80] George McGhee, "Convergent Evolution: A Periodic Table of Life?" in *The Deep Structure of Evolution: Is Convergence Sufficiently Ubiquitous to Give a Directional Signal*, ed. Simon Conway Morris (West Conshohocken, PA: Templeton Press, 2008), 19–20, 23.

[81] Jerry A. Fodor and Massimo Piattelli-Palmarini, *What Darwin Got Wrong* (London: Profile, 2010), 72–92.

created being and what can be realized on that account.

The storage of honey in a comb requires the subdivision of the space. Geometrically speaking, there is no limit to the complexity of interlocking shapes that can be combined to divide a larger space into segments. For the bee, however, an evolutionary selection advantage accrues to solutions that are both rigid and parsimonious in the sense of using less wax and in terms of how frugally such propensity to build combs can be encoded in a bee's DNA. If, with a honeycomb, we are looking for a solution that is built from prismatic shapes (that is, from three dimensional shapes with a uniform cross section), only three cross sections can be repeated as simply as possible to give coverage without interstices: a triangle, a parallelogram, and a (regular) hexagon. Of these, the first two compromise rigidity, since rows could slip past one another, which hexagonal prisms do not. It should be no surprise, then, that bees build hexagonal combs.

This is one of the simplest imaginable examples of a more general principle. The reality within which evolution is situated, and that which it explores, is not that of so much neutral possibility. At the level of what all creatures share (the Thomist could say, at the level of *esse commune*), much is already inscribed: being has contours. With that observation, we begin to perceive how a likeness to perfections of the divine essence could be said to be mediately woven into reality, to be discovered, deployed, and manifest by evolution and what it produces.

Moving from the honeycomb to more explicitly theological territory, consider the "dappled things" so dear to Gerard Manley Hopkins in his poem "Pied Beauty," which he took to be likenesses of divine beauty.[82] They include the "couple-colour" of the "bridled cow," the "stipple" of shades on "trout that swim," and the pattern of "finches' wings." Here, Hopkins saw divine exemplarism: God "fathers-forth whose beauty is past change." As to *how* these things come to be, however, Hopkins was ignorant: "Who knows how?" he wrote. The answer is a good deal clearer today than it was in 1877, when this sonnet was written. Patterning, we now understand, is poised to emerge with ease through the interaction of certain basic and universal features of diffusion.[83] Indeed, underlying *each* of the

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[82] Gerard Manley Hopkins, *The Major Works*, ed. by Catherine Phillips (Oxford: Oxford University Press, 2009), 132.

[83] See: Alan M. Turing, "The Chemical Basis of Morphogenesis," *Philosophical Transactions of the Royal Society B 237*, no. 641 (14 August 1952): 37–72;

examples given above from Hopkins, we find the same mathematical propensities, as also with the patterns on the fur of other animals, and possibly even in the shape of spiral galaxies.[84] In this inherently variegated beauty, Hopkins saw a likeness to God. Today, we understand that such patterning is woven into the mathematical structures of the universe. God, the theologian would want to say, is the author of nature and of its fundamental characteristics. Whatever that theologian might want to add about the direct working of providence in relation to the beauty of any specific finch or trout, it did not have to work against the grain of nature in producing these contingent details.

As a final specific example, consider the rigidity already mentioned in relation to the honeycomb. One of James Clark Maxwell's many contributions to science was to identify rigidity as inherently characteristic of certain forms of structure. All that is necessary for rigidity is that a particular relationship holds between a small set of variables: the number of points to be connected, the number of bars that connect them, and the number of dimensions within which one is operating.[85] Evolution has arrived at organisms with all manner of

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Philip Ball, *Nature's Patterns: Shapes* (Oxford: Oxford University Press, 2009), 156–204. This work is notably successful in predicting the basic two forms of patterning observed in nature: stripes and spots.

[84] Lee Smolin, "Galactic Disks as Reaction-Diffusion Systems," December 3, 1996, arxiv.org/abs/astro-ph/9612033.

[85] James Clerk Maxwell, "On Reciprocal Figures and Diagrams of Forces," *Philosophical Magazine Series 4* 27, no. 182 (1864): 250–61; Maxwell, "On the Calculation of the Equilibrium and Stiffness of Frames," *Philosophical Magazine Series 4* 27, no. 182 (1864): 294–99. This point serves to illustrate quite how far evolutionary convergences accord with Thomistic hylomorphism, in which form aligns with *that which* is instantiated and matter with *that in which* it is instantiated. Similarly, form is realizable in more than one material context, while matter is, by definition, under-determined as to what form it realizes. In Maxwell's analysis, rigidity is a *formal* characteristic belonging to the nature of the coordinated whole, not a "material" one (with the minimal requirement that the parts themselves have stiffness). Other examples of convergent evolution illustrate this point. Spatial perception, for instance, is formal and open to many different instantiations: realized in terms of light, we have sight, realized in terms of sound, we have echolocation (see Joe Parker et al., "Genome-wide Signatures of Convergent Evolution in Echolocating Mammals," *Nature* 502, no. 7470 [2013]: 228–31). Considering sight in more detail, it too is formally under-determined as to its material instantiation, which can be as a "camera" eye (with a lens) or a compound eye (as in flies and most spiders), to name two examples (Dawkins, *The Ancestor's Tale*, 1st ed. [London: Weidenfeld & Nicolson, 2004], 673–74). The scientific question of what is definitely the

rigid features, some of which exhibit an urge to build rigid structures themselves. On the one hand, all of that must conform to Maxwell's generalization; in another sense, however, all of this is also *offered* by what his generalization describes. Structural rigidity (and the stability it provides) is a feature of reality. Rigidity, like dappling, is a feature of the universe, there to be exploited in the evolutionary process. The exemplarist might suppose that here creation is marked with the imprint of the One to whom scriptural writers have given the name "Rock."[86]

The more broadly one studies convergent evolution, the further one is taken into theological territory. This is a lesson to be learnt from the disagreement over convergence between two important recent figures in evolutionary theory: Steven Jay Gould and Simon Conway Morris. Until his untimely death in 2002, Gould stressed contingency, writing that, if the "tape of life" were to be rewound and played afresh (his image is of a VHS video tape), entirely new forms would have evolved and survived.[87] In contrast, the work of Conway Morris suggests the opposite: certain solutions would have recurred, converged toward in those alternative histories, just as they have been converged toward several times within the one actual history of life on Earth. With further study since Gould's death, convergence has been more and more solidly confirmed. Significantly for our purposes, much of what turns out most clearly to have been converged toward also bears the greatest theological significance. The color of human skin or eyes and the number of digits on our fingers may well land with contingency and go to Gould. On the other hand, the story of evolution on earth shows multiple, independent evolutions of perception, intelligence, community,

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result of independent convergence, when it comes to the eye, and what has involved parallel evolution from a common ancestor is a matter of scientific dispute. The significance of parallel convergence is nonetheless clear, as is the hylomorphic sense of "matter" being that which is under-determined when it comes to how a formal property is instantiated in it, the lensing properties required for a camera eye having been "discovered," independently, several times, constructed in these cases out of the raw "material" of totally unrelated protein molecules (Joram Piatigorsky, "A Genetic Perspective on Eye Evolution: Gene Sharing, Convergence and Parallelism," *Evolution: Education and Outreach* 1, no. 4 [2008]: 403–14).

86 For instance: 1 Sam 2:2; Isa 17:10; Ps 28:1; 95:1; Hab 1:12.

87 Stephen Jay Gould, *Wonderful Life: The Burgess Shale and the Nature of History* (London: Norton, 1989), 45–52.

communication, cooperation, altruism, and construction.[88] In this way, convergence—and Conway Morris—gets much that most interests the theologian. Once again, and in highly significant ways, we see that the cosmos has, in its underlying constitution, a propensity toward bringing forth certain likenesses to divine excellence.

Likeness to Divine Perfections

As we have noted, Aquinas held out two related accounts of divine exemplarity, one to the divine ideas and the other to the divine essence, and it is the latter that is the wellspring of exemplarity in God. Ultimately, the creature's likeness is to the Godhead. I started our discussion of convergence in evolution with a tentative parallel between the divine ideas and the morphological space of the computational evolutionary scientist. I turn now to focus on the creature's likeness to the divine essence itself. Aquinas's texts on this matter proceed most typically in terms of the creature bearing a likeness to divine *perfections*.

We can return to the passage from the *Commentary on the Sentences*, quoted above. Imitation of the divine essence takes the form of a likeness to various divine perfections,[89] and the imitation of those perfec-

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[88] Intelligence is likely to be considered the contentious item in this list. On this, see Edward A. Wasserman and Thomas R. Zentall, *Comparative Cognition: Experimental Explorations of Animal Intelligence* (Oxford: Oxford University Press, 2006), and Robert W. Shumaker, Kristina R. Walkup, and Benjamin B. Beck, *Animal Tool Behavior: The Use and Manufacture of Tools by Animals* (Baltimore, MD: Johns Hopkins University Press, 2011), and also the discussion of analogy, characteristics and classes of organisms below.

[89] Aquinas uses the language both of "perfections" (*perfectiones*) and of "excellences" (*nobilitates*) without obvious distinction. They are coupled in *SCG* I, ch. 28, no. 3. Aquinas clearly entertained a wide list of perfections, but his lists in any one place tend to be short: "wisdom, goodness, and the like" (*In* I *sent.*, d. 2, q. 1, a. 2); "good and the like" (*De potentia*, q. 7, a. 7, ad 6); "goodness, wisdom, being, and the like" (*SCG* I, ch. 30, no. 2); and "being . . . life . . . and . . . wisdom" (*ST* I, q. 93, a. 2, ad 4 [*sapientia* in God but *intelligentia* in creatures]). Generally, he is taking about "whatever names unqualifiedly designate a perfection without defect" (*SCG* I, ch. 30, no. 2). Looking across the first book of *SCG*, for instance, we find good, one, intelligent, living, possessing a will, delight, joy, virtue, and blessedness. "Goodness" is Aquinas's central example of what the creature receives from God as a likeness. It would seem to function as his mediating perfection, encompassing, alongside "being," all that is excellent and characterful about each creature. As Aquinas puts it in a passage from *Commentary on the Sentences* quoted above, "whatever there is of being and goodness in a creature is entirely from the creator (*In* I *sent.*, d. 2, q. 1, a. 2). Goodness here refers more to "ontological" than to "moral" goodness.

tions admits of degrees. There is a variable pitch of intensity when it comes to how a creature exhibits what it means to be wise,[90] to live, or to exhibit any other of the perfections of the divine essence—even what it means to be.[91]

Likenesses to the perfectly simple excellence of the divine essence are exhibited by creatures in the form of multiple and circumscribed creaturely perfections. These are recognized and named differently, although what those names indicate in God is one: these multiple and distinct refractions in creatures—goodness, truth, beauty and so on—are one and the same in their source.[92] Aquinas describes the analogical likeness of the particular creature to the divine essence not only in terms of *degrees* of participation in these divine perfections but also in terms of their creaturely *combination*. The relation of these creaturely likenesses to the divine essence is seen not only in the variety of their varied degrees but also in the variety of their varied combinations.

To work this through in relation to evolution, we can start with the observation that, while any and all talk of divine exemplarity in an obvious sense proceeds "from above," from God as exemplar to the creature as recipient, such talk still admits of a distinction. The exemplarity of the divine ideas is from above almost without qualification, but in a certain sense, the exemplarity of the divine essence can also be said to operate in creation "from below," as an exploration of what of that likeness is latent in creaturely being as such. While talk of the exemplarity of the divine ideas stresses that the whole of a particular creature's being and character proceeds from God thus and so, in line with God's foreknowledge, the exemplary likeness of the perfections of the divine essence is exhibited by creatures variably and in different conjunctions. There is considerable promise in saying that the processes of evolution explore the ways in which the likenesses of the perfections of the divine essence can be exhibited and combined in varying degrees.

A creature expresses something of the perfection of God by being excellent in its own way. Such excellence—"being good at something"—is precisely what the evolutionary process tends to produce.

90 Doolan's example is degrees of cognition: "Consider the perfection of cognition: whereas plants do not possess it, brute animals do; but human beings possess it in a more excellent way" (*Divine Ideas*, 67). But see below on plant cognition.

91 Fran O'Rourke, "Virtus Essendi: Intensive Being in Pseudo-Dionysius and Aquinas," *Dionysius* 15 (1990): 68–69.

92 See Doolan, *Divine Ideas*, 90–91, for texts and discussion.

Even acknowledging the unease with which some evolutionary biologists would greet any claim of directionality in evolution, it would not be scientifically irresponsible for the theologian to note that life on earth, taken as a sum, has exhibited successively and more profound embodiments of divine perfection, both as to the degree to which any particular perfection has been inhabited and as to the number of divine perfections displayed. Aquinas routinely demarked forms of life according to such perfections, here following Aristotle, proceeding from inanimate being, to living being, to sensing being, and finally to intelligent being (even if not every one of these distinctions is present in every one of Aquinas's discussions of this theme).[93] These are examples of successive (and cumulative) exemplarity, "inasmuch as all things, as being, are like to the First Being, as living, like to the First Life, and as intelligent, like to the Supreme Wisdom."[94]

Today, biology sets something of a question mark against a sense of clear-cut overarching boundaries between kinds of creature laid out in terms exhibiting such characteristics. Plants and slime moulds, for instance, display hitherto unguessed responsiveness to environment and forms of calculation or problem solving.[95] Whether that deserves to be called awareness as Thomas understood it, and what relation it bears to intelligence, is not the subject of this article. It does demonstrate, however, an even greater range to creaturely participation in divine perfections than Aquinas envisaged. In any case, the sort of participation in divine perfections that Aquinas envisaged, which is strictly analogical and characterized as a matter of "more or less," does

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93 In *SCG* III, ch. 22, no. 7, Aquinas lists types of form—of an element, a mixed body, a plant, an animal, and of the human being—as in a hierarchy not of complexity, but of their degree of self-determination. Each is "in potency" to the next. The advent of increasingly complex forms underpins Maritain's only partially successful essay "Toward a Thomist View of Evolution," mentioned above.

94 *ST* I, q. 93, a. 2, ad 4.

95 Paco Calvo Garzón and Fred Keijzer, "Plants: Adaptive Behaviour, Root-brains, and Minimal Cognition," *Adaptive Behavior* 19, no. 3 (2011): 155–71; Michael Gross, "Could Plants Have Cognitive Abilities?" *Current Biology* 26, no. 5 (2016): R181–84; Anthony Trewavas, *Plant Behaviour and Intelligence* (Oxford: Oxford University Press, 2015); Romain P. Boisseau, David Vogel, and Audrey Dussutour, "Habituation in Non-Neural Organisms: Evidence from Slime Moulds," *Proceedings of the Royal Society B* 283, no. 1829 (2016): rspb.royalsocietypublishing.org/content/royprsb/283/1829/20160446.full.pdf.

not in itself require firm boundaries between classes of organism.[96]

A passage in *SCG* is of particular interest here, both because it usefully relates these two ways of thinking about divine exemplarity (of the divine ideas and of the perfections of the divine essence) and, more particularly, because it does so in terms of the complexification of forms of life (albeit not here in an evolutionary or chronological fashion):

> The divine essence comprehends within itself the nobilities of all beings, not indeed compositely, but . . . according to the mode of perfection. . . . Thus, by understanding His essence as imitable in the mode of life and not of knowledge, God has the proper form of a plant; and if He knows His essence as imitable in the mode of knowledge and not of intellect, God has the proper form of animal, and so forth.[97]

Creatures represent successively deeper participations in, and expressions of, divine perfections. Creaturely forms are interweavings of different ways of imitating the divine perfection that, taken together, *compose* the creature's form.[98]

Understanding the exemplarist relation of creatures to God in terms of this imitation of the perfections of the divine essence allows us to think of evolution's trajectories as various ways in which the history of creaturely being, in its mutability, has explored some of the innumerable ways in which it is possible for a creature to combine aspects of divine perfection as they are refracted and combined in

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96 Aquinas held that the higher part of a lower nature reaches toward the lower part of a higher nature (for instance *De veritate*, q. 15, a. 1, resp., citing Pseudo-Dionysius, *On the Divine Names* 7.3).

97 *SCG* I, ch. 54, no. 4.

98 Aquinas held to a single substantial form for each creature, and participation in different divine perfections is manifest in that single substantial form of the creature, not in many (*Quaestiones de anima*, a. 11). Reading this alongside *SCG* I, ch. 55, to say that "Socrates is called an animal inasmuch as he participates in the Idea, 'animal,' and a man inasmuch as he participates in the Idea, 'man'" would be to name ways in which the one substantial form participates in what (in creatures) are distinct divine perfections (see Doolan, *Divine Ideas*, 192). In his commentary on the *Metaphysics*, Aquinas denies that the human being is constituted by separate participation in distinct exemplars such as "animal" and "two-footed" *as well as* "human-in-itself" (*In* I *metaphys.*, lec. 15, no. 234), as well as in *De substantiis separatis*, ch. 11, nos. 60–66 (both cited by Doolan, *Divine Ideas*, 194).

creatures. Evolutionary processes have roved over the contours of being—over the contours of reality, which bears the stamp of God—and in this way, they have explored various ways to express something of the plenitude of God in a creaturely fashion.

As we have seen, from one angle, we can talk about an oak tree participating in God after the manner of the divine idea of that tree. However, we can also think of the tree's particular mode of imitation as combining certain "excellences" and say that this has been arrived at by evolutionary processes. A tree is nature's fantasia on themes of life and light, of stability and reaching out, of loftiness and strength. Each of these facets, stretching the definition of a perfection more or less creatively, finds its exemplar in the divine essence; anything that is good, on an exemplarist view, must do so. Since these excellences can be blended in the creature in any number of ways, the emphasis returns to plurality, both of species and of individuals, and change is by no means excluded. Evolution is a moving image, since there are always new ways to be explored as to how these divine excellences can be combined. A species, say the English oak (*Quercus robur*), can therefore evolve. Resulting species, still participating in these properties but in a different way, will have found a different combination or balance between them. The many ways in which such a combination of excellences can be imitated is reflected in the thousands of species of tree on the planet and by the variety of ways in which any particular species can be instantiated (i.e., in terms of accidental differences as well as substantial ones). This, in its way, is another part of the exemplarist witness of creation to the plenitude of God.

Conclusion

Evolution has forced us to turn away from an account of creation that imagines God creating and forming the prototypes of species one by one and side by side: "The first members of the species were immediately created by God, such as the first man, the first lion, and so forth," as we saw Aquinas putting it.[99] That poses proper challenges for notions of exemplarity, although there is also something theologically compelling about having to move away from a scheme that might risk conceiving of the action of God as akin to an agent with creation forming clay, supposing instead that divine agency is here mediated through creaturely processes: God's work is mediated precisely because

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[99] *In* II *sent.*, d. 1, q. 1, a. 4.

God is not a thing among things.[100] Evolution is part of that mediation in which, to quote Aquinas again, "the same effect is not attributed to a natural cause and to divine power in such a way that it is partly done by God, and partly by the natural agent; rather, it is wholly done by both, according to a different way."[101]

We have found this to be compatible with divine exemplarity: first, and negatively, in the demotion of specific form as what is central in divine exemplarity and in favor of the exemplarity of the divine ideas in respect of individuals, and secondly, and positively, in the way in which creaturely being itself is not blank and neutral, but has "contours," such that it is poised to bring forth certain forms of creature and certain creaturely propensities. In terms of exemplarity, we can readily approach that in terms of the creature's expression of combinations of divine perfections in varying degrees.

None of this is to say that the understanding of nature presented by Aquinas, as the theologian under discussion here, necessarily squares with evolution at every point. Any evolutionary challenges to Aquinas's account of nature do not, however, stem from the side of exemplarity.

Toward the beginning of this article, I argued that a reluctance to "lead back" creaturely *form* to God as its cause risks overstepping the doctrine of *creatio ex nihilo*, just as surely as would holding to uncreated *matter* as co-eternal with God. This comes into all the greater focus now that we have distinguished a twofold exemplarity of God in relation to the world. At stake with the affirmation of divine exemplarity is not simply the issue of ideas in the divine mind; also at stake is the contention that any and all of the nobilities found in creatures have their origin in God.[102] A consideration of evolution will have served theology well if it has served to underline that point.[103] NV

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100 I have discussed this point in relation to cosmology in "Scientific Cosmology as Creation Ex Nihilo Considered 'from the Inside,'" in Creation Ex Nihilo: Origins and Contemporary Significance, ed. Markus Bockmuehl and Gary Anderson (Notre Dame, IN: University of Notre Dame Press, 2017), 367–89.

101 *SCG* I, ch. 70, no. 8.

102 *SCG* I, ch. 29, no. 2.

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