From the Action of Creatures to the Existence of God: The First Way, Science, and the Philosophy of Nature

Michael J. Dodds, O.P.
Dominican School of Philosophy and Theology
Berkeley, California

> Even if there is only one possible unified theory, it is just a set of rules and equations. What is it that breathes fire into the equations and makes a universe for them to describe? The usual approach of science of constructing a mathematical model cannot answer the questions of why there should be a universe for the model to describe. Why does the universe go to all the bother of existing? Is the unified theory so compelling that it brings about its own existence? Or does it need a creator, and if so, does he have any other effect on the universe? And who created him?
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> —Stephen Hawking[1]

Stephen Hawking poses quite a few questions in this brief paragraph. The last one may seem rather flippant, but the second could be helpful: "Why does the universe go to all the bother of existing?" We might take it a bit further: "Once things exist, why do they go to all the bother of acting?" "Why do things act or move at all?"

In the mechanistic philosophy of Descartes, things would not bother to move unless they were pushed, and God becomes something like the Great Pusher.[2] In the hylomorphic philosophy of Aristotle and Aquinas, motion is

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1 Stephen Hawking, *A Brief History of Time* (New York: Bantam, 1990), 174.

2 The interpretation of the philosophy of causation espoused by René Descartes is notoriously controversial. Tad Schmaltz notes that "a central question, given the scholastic rejection of occasionalism, is whether Descartes allows for any causes other than God." He acknowledges Descartes's statement that God is "the universal

not a bother, but a spontaneous activity, and things act, not because they are forced or pushed, but simply because of the kinds of things they are—and each is what it is in virtue of its substantial form. Still, their actions are not self-explanatory, but provoke a question as to their ultimate origin. That question is the foundation of Aquinas's First Way of showing the existence of God.

Although Aquinas calls this his "most evident" argument, I think it has become less evident to us for two reasons, both associated with the advent of modern science. First, the argument requires a robust notion of causality as it traces a causal chain from the evident motion of creatures to its First Cause, who is God. The idea of causality, however, has lost a lot of its "oomph" in the wake of modern science. Secondly, the argument requires a philosophy whose concepts are pliable enough to pierce the limits of this world and point to a transcendent First Cause. With modern science, however, a mechanistic philosophy was adopted that reduced causality to the univocal notion of the force that moves the atoms.

In what follows, I will first show how the notion of causality was diminished with the advent of modern science and then consider how, with the more robust understanding of causality suggested by contemporary science, the First Way can still lead us from the action of creatures to the existence of God.

Causality in Aristotle and Aquinas

Aristotle proposes four types of causes: material, formal, efficient, and final. He also finds a place for the quasi causality of chance. For Aquinas and Aristotle, the hallmark of causality is ontological dependence: "Those things upon which others depend for their being or becoming are called causes."[3] Since this dependence takes various forms, causality is an analo-

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and total cause," but defends "a reading on which such a claim endorses not the occasionalist conclusion that God is the only cause of natural effects, but rather the more modest conclusion that all other causes of natural effects are subordinated to God's universal causality." I would point out, however, that the mode of this subordination should not be confused with Aquinas's account of secondary causality where the entire effect is attributed wholly to both the primary and the secondary cause. For Descartes, as Schmaltz explains, God "is not a cause of change. Rather he is the cause of a constant quantity of motive force in the world." There is therefore "a sort of causal division of labor" in the interaction of God and secondary causes, where God "produces an effect that is constant and thus distinct from the changes that are attributable only to secondary causes" (Tad M. Schmaltz, *Descartes on Causation* [Oxford: Oxford University Press, 2008], 76, 90, 104, 218).

3 Thomas Aquinas, *In* I *phys*., lec. 1, no. 5, in *Commentary on Aristotle's Physics*, trans. R. Blackwell et al. (New Haven, CT: Yale University Press, 1963).

gous notion that has various senses. All four types of causes involve dependence, but in different ways.[4]

Matter and form are intrinsic ontological causes of things on two levels, accidental and substantial. On the accidental level, a statue may be made of marble (the material cause) and have the shape of Zeus (the accidental form). On the substantial level, a dog is a substance composed of matter and form. Here, however, the matter is not a particular type of thing (such as marble), but the sheer possibility of being a thing. This possibility of being is actualized not by an accidental form, such as a certain shape or structure, but by a substantial form, the principle by which a substance is a particular kind of substance.[5] It is the principle by which a dog is a dog, and therefore exhibits the structure and activities of a dog. So the dog barks and wags its tail in virtue of its substantial form.

Matter and form are also intrinsic causes of change, again on accidental and substantial levels. Any change involves some subject that endures through the change and initially lacks some actuality that it then acquires.[6] On the accidental level, a slab of copper may be reshaped into a statue. The new shape is the formal cause, the accidental form. The copper is the material cause, the substrate that endures through the change. In this case the material cause is itself a substance (copper) that has the potency to be reshaped and so acquire a new accidental form. On the substantial level, a substance may cease to be what it is altogether and become something else. When a dog dies, for instance, it ceases to be a dog (one organically unified substance) and becomes a carcass (which is really a collection of substances gradually decaying into still more basic substances). While copper remains copper when it is reshaped, the dog does not remain a dog when it becomes a carcass. The substance cannot be the principle that endures through the change when the substance itself is changing. It is not the substance that endures, but the mere potentiality of being a substance, a potentiality actualized first by one substantial form and then by another. This potentiality is not itself a *thing*, but the mere possibility of being a thing. Aristotle calls it "primary matter" (*prōtē hylē*).[7] Together, substantial form and primary matter

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4 See Thomas Aquinas, *De potentia*, q. 5. a. 1, corp., in *On the Power of God*, trans. the English Dominican Fathers (Westminster, MD: Newman Press, 1952).

5 Thomas Aquinas, *Summa theologiae* [*ST*] I, q. 110, a. 2, corp., trans. the English Dominican Fathers (New York: Benziger Brothers, 1946).

6 Aristotle, *Physics* 1.7.191a 3–5, in *The Basic Works of Aristotle*, ed. Richard McKeon (New York: Random House, 1941).

7 Aristotle, *Physics* 2.1.193a 29; 1.7.191a 7–12. Cf.: Aquinas, *In* I *phys*., lec. 13, no. 118.

comprise the "nature" of a material substance, the spontaneous source of its proper activities.[8]

While Aquinas accepted Aristotle's notion of form as an intrinsic principle, he tweaked it somewhat to allow for something like the exemplar causes of Plato. Aristotle himself had no use for Plato's Forms, as he makes clear in his *Metaphysics*:

> Above all one might discuss the question what on earth the Forms contribute to sensible things, either to those that are eternal or to those that come into being and cease to be. For they cause neither movement nor any change in them. But again they help in no wise either towards the knowledge of other things (for they are not even the substance of these, else they would have been in them), or towards their being, if they are not *in* the particulars which share in them. . . . And to say that they are patterns and the other things share in them is to use empty words and poetical metaphors.[9]

Aquinas found a place for the Forms, not as the existing entities that Plato envisioned, but as ideas in the mind of God. Formal causality includes not only intrinsic formal principles or substantial forms by which each substance is the kind of thing that it is (as in Aristotle), but also extrinsic formal principles or exemplar causes (as in Plato). As Aquinas says: "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."[10]

Change requires not only matter and form but also efficient and final causes. The efficient cause is the agent, and the final cause is the end or purpose in virtue of which the agent acts. The efficient cause is what we tend to think of first when we talk about causes. It is the agent that makes something happen. Such agency, however, is taken in a very broad sense. The art student who shapes the marble is the efficient cause of the

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8 See Aristotle, *Physics* 2.1.192b 21–23: "Nature is the principle of motion and rest in those things to which it belongs properly (*per se*) and not as a concomitant attribute (*per accidens*)." See also James A. Weisheipl, O.P., "The Concept of Nature," in *Nature and Motion in the Middle Ages*, ed. William E. Carroll (Washington, DC: Catholic University of America Press, 1985), 1–23.

9 Aristotle, *Metaphysics* 1.9.991a8–22), in McKeon, *Basic Works*.

10 *ST* I, q. 44, a. 3, corp. See also: Thomas Aquinas, *De veritate*, q. 3, a. 3, corp., in *Truth*, trans. R. Mulligan et al., 3 vols. (Chicago: Henry Regnery, 1952–1954). On the divine ideas in Aquinas, see Vivian Boland, O.P., *Ideas in God according to Saint Thomas Aquinas: Sources and Synthesis* (Leiden: Brill, 1996).

statue, but so is the teacher who directs her.[11]

Final causality is also needed, since an agent acts only in view of some end or purpose. The final cause, as a good to be attained, moves the agent to act. Aquinas explains: "If an agent did not incline toward some definite effect, all results would be a matter of indifference for him. . . . So, it would be impossible for him to act. Therefore, every agent tends toward some determinate effect, and this is called his end."[12] Aquinas and Aristotle see final causality as a universal feature of nature, operative not only in intelligent beings, but also in things that lack intelligence— even inanimate things.[13] As the principle that moves the agent to act, the final cause is the foundation of all causality, "the cause of the causality of all the causes."[14]

The notion of dependency characterizes all four types of causes, but in different ways. Each thing depends on its material and formal causes for its being, since these are intrinsic to its nature. If they were removed, it would cease to exist. Each instance of change depends upon material and formal causes as well as efficient and final causes.[15]

The notion of "action" is ascribed not only to the efficient cause, but also to the formal and final causes: "A thing is said to act [agere] in a threefold sense. In one way formally, as when we say that whiteness makes white. . . . In another sense a thing is said to act effectively, as when a painter makes a wall white. Thirdly, it is said in the sense of the final cause, as the end is said to effect by moving the efficient cause."[16] For Aquinas, to act means "to make something to be in act."[17] This can happen in various ways. If an artist (efficient cause) shapes a lump of clay into a ball, she makes it actually round. But the accidental form of "roundness" (formal cause) also makes the clay round. For all her pushings and pullings, the artist's clay will not be round until it attains that particular shape. The end or purpose (final

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11 One of Aristotle's examples of efficient causality is "the man who gave advice" (*Physics* 2.3194b 30).

12 Thomas Aquinas, *Summa contra gentiles* [*SCG*], II, ch. 2, no. 8 (*On the Truth of the Catholic Faith*, 4 vols., trans. Anton C. Pegis et al. [Garden City, NY: Image, 1955–57]).

13 See Aristotle, *Physics* 2.8.199b16–18. Final causality is the basis of Aquinas's Fifth Way of showing the existence of God (*ST* I, q. 2, a. 3, corp.). On the compatibility of universal final causality and modern empirical science, see Benedict M. Ashley, O.P., "Research into the Intrinsic Final Causes of Physical Things," *Proceedings of the American Catholic Philosophical Association* 26 (1952): 185–94.

14 Thomas Aquinas, *De principiis naturae*, ch. 4, no. 24, in *Selected Writings of St. Thomas Aquinas*, ed. Robert P. Goodwin (New York: Bobbs-Merrill, 1965).

15 *De potentia*, q. 5, a. 1, corp.

16 *ST* I, q. 48, a. 1, ad 4. Cf.: *ST* I, q. 82, a. 4, corp; q. 105, a. 5, corp.

17 *ST* I, q. 115, a. 1, corp.

cause) also "acts" on the agent or "moves" the agent to act. The beauty of the perfectly rounded clay (as a good to be attained) also induces her to act. Efficient, formal, and final causes all "act" in the process of change, but each acts in a distinctive way.

Causality is not always quantifiable. The action of the efficient cause may sometimes be quantified (represented, for instance, in terms of measurable force), but not always. Although the activity of the art student, for example, may be described in terms of how much pressure (pounds per square inch) she applies to the clay, the action of her adviser (itself a mode of efficient causality) cannot be represented quantitatively.

Formal and final causality can never be described as quantitative force. While the formal cause does act on the clay to make it round, it exerts no force. Rather, it acts according to the mode of formal causality by making something (in this case the roundness of the clay sphere) to be actual. Its action is quite different from that of efficient causality, especially the efficient causality of "force." The final cause also acts on the agent to influence or induce it to act, but again this implies no quantitative force. Rather, it acts according to the mode of final causality, as an end or good that induces the efficient cause to act. Final causality cannot be reduced to efficient causality, much less to that mode of efficient causality that might be called "force."

Causality in Modern and Contemporary Science

The classical understanding of causality was abandoned with the coming of modern science, since science had no place for causes that could not be quantified.[18] Formal and final causes were ignored, and the material cause was no longer understood as pure potentiality, but as the fundamental, measurable "stuff" of the universe (the atoms). As Mario Bunge explains: "The Aristotelian teaching of causes lasted in the official Western culture until the Renaissance. When modern science was born, formal and final causes were left aside as standing beyond the reach of experiment; and material causes were taken for granted in connection with all natural happenings. . . . Hence, of the four Aristotelian causes only the efficient cause was regarded as worthy of scientific research."[19]

Efficient causality itself was reduced to the force or energy that moves

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18 For a more complete account of the fortunes of causality and the discussion of divine action in relation to modern and contemporary science, see Michael J. Dodds, O.P., *Unlocking Divine Action: Contemporary Science and Thomas Aquinas* (Washington, DC: Catholic University of America Press, 2012).

19 Mario Bunge, *Causality and Modern Science* (New York: Dover, 1979), 32.

the atoms.[20] Even this narrow idea of efficient causality was questioned by David Hume, who argued that causation was merely a habit of our thinking as we become accustomed seeing one thing constantly conjoined to another.[21] Causality became a property of thought rather than things. The hallmark of causality shifted from the ontological category of *dependence* to the epistemological category of *predictability*. The world was viewed as a deterministic realm, governed by inexorable laws that provided no room for outside causes. It was best studied by a reductionistic method that explained all phenomena in terms of their most fundamental components.

With the discoveries of contemporary science, new ways of understanding causality have arisen. We can see this in the theories of quantum mechanics, emergence, and contemporary biology. Quantum mechanics (at least in the Copenhagen interpretation) affirms a world of spontaneity with a fundamental indeterminism at its foundation.[22] Such indeterminacy brings to mind Aristotle's material cause—not the actual, measurable "stuff" of Newtonian science, but a principle of sheer possibility.[23] Werner Heisenberg himself was aware of this association.[24]

The theory of emergence claims that, at various levels in the natural world, new features arise that cannot be explained simply by reference to their parts.[25] The study of them must begin with the whole (from the top

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20 Edwin A. Burtt, *The Metaphysical Foundations of Modern Science* (Garden City, NY: Doubleday, 1954), 30, 98–99, 208–9.

21 See David Hume, *Enquiry Concerning Human Understanding*, in *Enquiries Concerning Human Understanding and Concerning the Principles of Morals*, ed. L. A. Selby-Bigge, 3rd ed. rev. P. H. Nidditch (Oxford: Clarendon, 1975), 75–77.

22 See John Polkinghorne, "Space, Time, and Causality," *Zygon* 41 (2006): 975–84, at 979: "Those of a realist cast of mind will tend to correlate epistemology closely with ontology, believing that what we know, or what we cannot know, is a reliable guide to what is the case. If this metascientific strategy is followed, unpredictability will be seen as the sign of a degree of causal openness in physical process. In the case of quantum theory, this is indeed the line that has been followed by the majority of physicists, who join with Bohr in interpreting Heisenberg's uncertainty principle as an ontological principle of indeterminism and not merely an epistemological principle of ignorance in the way that Bohm suggests."

23 On the compatibility of these two understandings of matter, see Norbert A. Luyten, O.P., "Matter as Potency," in *The Concept of Matter*, ed. Ernan McMullin (Notre Dame, IN: University of Notre Dame Press, 1965), 122–33.

24 See Werner Heisenberg, *Physics and Philosophy* (New York: Harper and Row, 1958), 160.

25 See: Philip Clayton, *Mind and Emergence: from Quantum to Consciousness* (New York: Oxford University Press, 2006), 66–69; Mariusz Tabaczek, "The Metaphysics of Downward Causation: Rediscovering the Formal Cause," *Zygon* 48 (2013): 380–404.

down) rather than the part (from the bottom up). There are, for instance, "several features of the present-day theory of elementary particles" which suggest that "at certain levels of complexity, matter exhibits 'emergent properties' and 'emergent laws' which can neither be defined nor explained in terms of the properties and laws at a lower level of complexity."[26] As John Polkinghorne points out: "Subatomic particles are not only not 'more real' than a bacterial cell; they also have no greater privileged share in determining the nature of reality."[27] The "bottom-up" method of reductionism no longer seems adequate for the study of such phenomena. The move away from reductionism to the "top down" causality of the whole invites a reconsideration of Aristotle's notion of substantial form as an intrinsic principle that makes the whole substance to be what it is.

Contemporary biology has embraced the notion of purpose or final causality. As Francisco Ayala explains: "Biologists need to account for the functional features of organisms, their 'design,' in terms of the goals or purposes they serve, which they do by teleological hypotheses or teleological explanations."[28] Ayala concludes that "teleological explanations in biology are not only acceptable but indeed indispensable."[29]

Potentiality, form, and finality are all modes of causality that are not measurable, and so cannot come directly under the scientific microscope. What is studied in science, however, now seems to invite (or possibly require) their consideration as categories of explanation.[30]

The Notion of Causality and the Discussion of Divine Action

To argue from creatures to the existence of God, the First Way requires a notion of causality that allows the action of creatures to manifest the influence of the Divine Cause. This, however, is precisely what disappeared with the advent of modern science and the mechanistic philosophy that accompanied it.

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26 Jonathan Powers, *Philosophy and the New Physics* (New York: Methuen, 1982), 155.

27 John Polkinghorne, *Reason and Reality* (Philadelphia: Trinity Press International, 1991), 39.

28 Francisco J. Ayala, "Reduction, Emergence, Naturalism, Dualism, Teleology: A Précis," in *Back to Darwin: A Richer Account of Evolution*, ed. John B. Cobb (Grand Rapids, MI: Eerdmans, 2008), 84.

29 Francisco Ayala, "Teleological Explanations in Evolutionary Biology," in *Nature's Purposes: Analyses of Function and Design in Biology*, ed. Colin Allen et al. (Cambridge, MA: MIT Press, 1998), 44.

30 See William A. Wallace, *The Modeling of Nature: Philosophy of Science and Philosophy of Nature in Synthesis* (Washington, DC: Catholic University of America Press, 1996).

As the notion of causality was restricted, so was our ability to speak of God's action.[31] As Keith Ward explains: "The scientific world-view seems to leave no room for God to act, since everything that happens is determined by scientific laws."[32] Langdon Gilkey is more explicit: "Contemporary theology does not expect, nor does it speak of, wondrous divine events on the surface of natural and historical life. The causal nexus in space and time which Enlightenment science and philosophy introduced into the Western mind . . . is also assumed by modern theologians and scholars."[33]

If physical force is the only kind of causality, then divine causality must be understood in those terms. But when God's action is conceived as one physical force among others in the world, it inevitably appears to interfere with the others and with the determined laws of science that describe them. Gordon Kaufman accordingly asks how God can act in the world without "violently ripping into the fabric of history or arbitrarily upsetting the momentum of its powers."[34]

If there is only one univocal kind of causality, God must also exercise it, and so become just one more univocal cause[35] alongside of creatures. When two univocal causes are involved in the same action, however, the causality of one inevitably interferes with that of the other. If two people are carrying a table, for instance, each one lifts only part of the total weight. The more one hefts, the less there is for the other. If one hoists the whole load, the other is left with nothing to do. Similarly, if we think of God as a cause like any other in the world, God's causality must interfere with that creatures. An omnipotent God would then necessarily rob all creatures of their proper causality. Accepting such premises, many theologians concluded

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31 As Philip Clayton says: "The present-day crisis in the notion of divine action has resulted as much as anything from a shift in the notion of causation" (*God and Contemporary Science* [Edinburgh: Edinburgh University Press, 1997], 189).

32 Keith Ward, *Divine Action* (London: Collins, 1990), l.

33 Langdon Gilkey, "Cosmology, Ontology and the Travail of Biblical Language," in *God's Activity in the World: The Contemporary Problem*, ed. Owen C. Thomas (Chico, CA: Scholars Press, 1983), 31.

34 Gordon D. Kaufman, *God the Problem* (Cambridge, MA: Harvard University Press, 1972), 147.

35 It should be noted that the term "univocal cause" will be used in two distinct senses in this article. In the first sense, a univocal cause is an efficient cause that acts with another efficient cause of the same order to produce some effect (as when two people carry a table). In the second sense (that will appear in the discussion of the "chain of causes" in Aquinas's First Way), a univocal cause is one that belongs to the same species as its effect, such as a parent and its offspring in biological reproduction (a dog that generates a dog).

that God's power must be limited if creatures are to retain any causality of their own.

The deists, for instance, limit God's action to the moment of creation. Some liberal theologians allow that God continues to act in the world, but deny that God can act outside the limits of the laws of nature. Friedrich Schleiermacher argues that, "as regards the miraculous, the general interests of science, more particularly of natural science, and the interests of religion seem to meet at the same point, i.e., that we should abandon the idea of the absolutely supernatural."[36] Rudolf Bultmann considers it inappropriate to view divine action as a cause "which intervenes between the natural, or historical, or psychological course of events." Events in nature are "so linked by cause and effect" as to leave "no room for God's working."[37] To avoid divine interference, some theologians maintain that God's knowledge and power must be limited. Arthur Peacocke argues that "God's omniscience and omnipotence must be regarded, in some respects, as 'self-limited.'"[38] Polkinghorne thinks that the presence of chance in the world requires a limitation of divine power: "God chose a world in which chance has a role to play, thereby . . . accepting limitation of his power to control."[39]

We must limit God's action if we believe that it would otherwise disturb or interfere with the causality of creatures and the nexus of scientific laws. And we will think that God's action must involve such a disturbance so long as we understand God as a univocal cause. We will have no other way to understand God's causality, however, if we reduce causality itself to a univocal notion. This apparent impasse has been happily overcome by the discoveries of contemporary science which suggest a much broader notion of causality, and so open wider avenues for speaking of divine action.

Today's science provides two fundamentally new options for speaking about God's action. One is to import the new discoveries of science directly into theology and use them to speak of divine action. The other is to employ not so much the discoveries themselves as the expanded notion of causality that they imply. The second invites a retrieval of certain classical notions of causality. We will look briefly at both options.

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36 Friedrich Schleiermacher, *The Christian Faith*, ed. and trans. H. R. Mackintosh and J. S. Stewart (Edinburgh: T & T Clark, 1960), 183.

37 Rudolf Bultmann, "The Meaning of God as Acting," in Thomas, *God's Activity in the World*, 61, 64.

38 Arthur Peacocke, *Theology for a Scientific Age: Being and Becoming— Natural, Divine and Human* (Minneapolis, MN: Fortress Press, 1993), 155.

39 John Polkinghorne, *Science and Creation* (Boston: Shambhala, 1989), 63.

Some theologians choose the first option and employ the discoveries of science themselves in their discussion of divine action. Robert Russell, for instance, uses the indeterminism of quantum mechanics to show how God might act in the world, yet not interfere with natural causes. He argues that: "We can view God as acting in particular quantum events to produce, indirectly, a specific event at the macroscopic level, one which we call an event of special providence. . . . Quantum mechanics allows us to think of special divine action without God overriding or intervening in the structures of nature."[40] Using another development in science, John Polkinghorne suggests that the openness of chaos theory may be understood in a way that leaves "room for divine maneuver."[41]

Such discussions, however, still tend to be hampered by a narrowly conceived notion of causality. The very effort to locate divine action within pockets of scientific indeterminacy suggests a univocal understanding of causality in which God's action is liable to interfere with the causality of creatures.

We must turn instead to the second option and employ the expanded notion of causality that the discoveries of science imply, a notion reminiscent of the classical account of material, formal, efficient, and final causes.

The Nature of Divine Action

God's action, like any other attribute we predicate of God, must be one with God's being. As Aquinas says, "whatever exists in God is God."[42] Accordingly, Aquinas teaches: "God's action is his being [suum agere est suum esse]."[43] This teaching means, minimally, that God's action must be wholly unlike that of creatures, whose actions are always distinct from their being. Creaturely action is still in some way like God's, however, since God is the ultimate cause of the being and action of creatures, and every effect is in some way like its cause. This accords with Aquinas's fundamental teaching that, "although it may be admitted that creatures are in some sort like God, it must nowise be admitted that God is like creatures."[44] This teaching invites us to speak of divine action analogously, as we speak of other divine

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40 Robert John Russell, "Does the 'God Who Acts' Really Act in Nature?," in *Science and Theology: The New Consonance*, ed. Ted Peters (Boulder, CO: Westview, 1998), 89, 94.

41 John Polkinghorne, *Science and Providence: God's Interaction with the World* (Boston: New Science Library, 1989), 31.

42 *ST* I, q. 27, a. 3, ad 2. Cf.: *ST* I, q. 28, a. 2, corp.; q. 40, a. 1, ad 1.

43 *SCG* II, ch. 9, nos. 4–5.

44 *ST* I, q. 4, a. 3, ad 4.

attributes, using words that are normally applied to creatures.[45] A rich vocabulary and conceptual framework for such speech is available in the classical notions of formal, efficient, and final causality. We have already seen how developments in contemporary science point to these kinds of causes. We can now use them to discuss God's action.

God is the final cause of each creature. Since every action of the creature is for the sake of some real or apparent good, and each thing is good only insofar as it participates in a likeness to the Supreme Good, who is God, "it follows that God himself is the cause of every operation as its end."[46] As final cause, God is intimately involved in all creaturely action. Far from interfering with such action, God is rather its source.

God is also the exemplar formal cause of all things. As the idea or exemplar in the mind of an artist is the source of her artwork, so God, "the first exemplar cause of all things,"[47] is the cause of all creatures. As the creative idea of the artist does not interfere with her work, but is rather its source, so God, as the exemplar cause, does not interfere with the world of creatures, but is its origin.

God is the first efficient cause of all things. We must not understand this causality in the narrow sense of Newtonian physics. God's action is not a mathematically describable force that moves the atoms. It is rather the transcendent cause of the being of all things.[48] And since being is the innermost actuality of each thing, God is most intimately present to each creature. As Aquinas says: "Being is innermost in each thing and most fundamentally inherent. . . . Hence, it must be that God is in all things and innermostly."[49]

God's efficient causality is also manifest in the actions of creatures. Insofar as the effects of those actions entail being and perfection, they are wholly from God and wholly from creatures. As Aquinas says: "It is apparent that 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, but in different ways."[50]

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45 See: *ST* I, q. 12, a. 12; I, q. 13, a. 5.

46 *ST* I, q. 105, a. 5, corp. Cf.: *ST* I, q. 44, a. 4, ad 3; q. 103, a. 2, corp.

47 *ST* I, q. 44, a. 3, corp.

48 *ST* I, q. 3, a. 4, corp.; q. 44, a. 1, corp.; q. 104, a. 1, corp.; *SCG* III, ch. 65, nos. 5 and 7.

49 *ST* I, q. 8, a. 1, corp. Cf. *ST* I, q. 105, a. 5, corp.

50 *SCG* III, ch. 70, no. 8. Cf.: *De potentia*, q. 3, a. 7. corp.; *SCG* III, ch. 67, no. 1. It is important to note here that evil as such is precisely *not* being, but rather a lack of being. The fact that God is the source of all being in no way implies that God is the source or cause of sin (see *ST* I, q. 19, a. 9).

God is the ultimate transcendent cause, whose action does not diminish the contingency or freedom of the creature, but is rather its source.[51] As Aquinas says: "God not only gives things their form, but he also preserves them in existence, and applies them to act, and is moreover the end of every action."[52] No action of God in nature or in any creature can be characterized as meddling or interfering. Even when God acts miraculously, causing events in the world that are beyond the causality of creatures, his action cannot be said to disturb the worldly order, since the most profound order of the world is its ordering toward God.[53]

Divine Causality and the First Way

Against the background of this restored vision of God's causality and action, we can now consider Aquinas's First Way.[54] Since this argument is about motion and movers, we might be tempted, given the influence of the mechanistic philosophy of modern science, to picture it mechanically. A mechanistic philosophy, however, can only yield a series of causes that are

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51 Aquinas, *In* I *de interpretatione*, lec. 14, no. 22: "The divine will must be understood as existing outside of the order of beings, as a cause producing the whole of being and all its differences. Now the possible and the necessary are differences of being, and therefore necessity and contingency in things and the distinction of each according to the nature of their proximate causes originate from the divine will itself, for He disposes necessary causes for the effect that He wills to be necessary, and He ordains causes acting contingently (i.e., able to fail) for the effects that He wills to be contingent. And according to the condition of these causes, effects are called either necessary or contingent, although all depend on the divine will as on a first cause, which transcends the order of necessity and contingency" (*Aristotle: On Interpretation Commentary by St. Thomas and Cajetan*, ed. Jean T. Oesterle [Milwaukee, WI: Marquette University Press, 1962]).

52 *ST* I, q. 105, a. 5, ad 3.

53 See *ST* I, q. 105, a. 6, corp.: "If therefore we consider the order of things depending on the first cause, God cannot do anything against this order; for if he did so, he would act against his foreknowledge, or his will or his goodness. But if we consider the order of things depending on any secondary cause, thus God can do something outside such order; for he is not subject to the order of secondary causes, but on the contrary this order is subject to him as proceeding from him not by a natural necessity, but by the choice of his own will; for he could have created another order of things. Wherefore God can do something outside this order when he chooses, for instance by producing the effects of secondary causes without them or by producing certain effects to which secondary causes do not extend."

54 *ST* I, q. 2, a. 3, corp. For a more extensive introductory account of Aquinas's doctrine of God and creation, see Michael J. Dodds, O.P., *The One Creator God in Thomas Aquinas and Contemporary Theology* (Washington, DC: Catholic University of America Press, 2020).

always of the same type—like cogs in a machine.[55] To get to God, we must find a cause that utterly transcends all others.[56]

We will have more success in understanding the argument if we begin not with wheels and levers, but with potency and act, as the argument itself suggests: "Whatever is in motion is put in motion by another, for nothing can be in motion except it is in potentiality to that towards which it is in motion; whereas a thing moves inasmuch as it is in act. For motion is nothing else than the reduction of something from potentiality to actuality."[57]

To adopt the language of potency and act, we must move beyond empirical science to the philosophy of nature.[58] We need not transplant the

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55 See Eric A. Reitan, O.P., "Aquinas and Weisheipl: Aristotle's Physics and the Existence of God," in *Philosophy and the God of Abraham: Essays in Memory of James A. Weisheipl, O.P.,* ed. R. James Long (Toronto: Pontifical Institute of Medieval Studies, 1991), 186: "For Aristotle and St. Thomas, 'to move' or to cause motion, is not primarily a mechanical function, such that the First Mover, as it were, pushes the material universe around in a circle. Rather, the immaterial mover is the source of material 'nature,' the cause of the mobile object's own principles of motion—matter and form. The Aristotelian-Thomistic world of nature is not a static universe of material bodies pushed here and there by immaterial souls or intelligences—it is a dynamic universe, filled with natural, physical beings that spontaneously and regularly exhibit specific, characteristic behavior. This spontaneous and characteristic activity springs from 'nature,' from matter and form, that is, from the constituents of natural, physical substances—mobile beings."

56 See Simon Oliver, *Philosophy, God and Motion* (New York: Routledge, 2005), 107: "Aquinas does not have in mind a first mover who acts only to set off a kind of 'domino effect.' He is seeking to describe a cosmology in which any motion at any time is unintelligible without a fully actual first mover who is the source of motion for all things in the present." (See also William A. Wallace, O.P., "Aquinas and Newton on the Causality of Nature and of God: The Medieval and Modern Problematic," in Long, *Philosophy and the God of Abraham*, 275: "If the *per se* subordinated series of movers and moveds is likened to the fall of dominoes, the fall of the first domino could be temporally quite distant from that of the last. Applying this to the *prima via*, one could interpret this to hold that the argument does not prove that God exists here and now, but only that he existed some time ago—perhaps a very long time ago, say, at the 'Big Bang' fifteen billion years into the distant past. Clearly this is not what St. Thomas had in mind."

57 *ST* I, q. 2, a. 3, corp.

58 The philosophy of nature, as exemplified by Aristotle's *Physics*, broadly studies change in material things and its ultimate causes. It is distinct from, but complementary to, the investigations of empirical science: "When one uses the terminology of modern science one invariably interprets this causal agency through the concepts of force, mass, energy, and the like. . . . But when one absorbs motor causality totally into these terms, and regards them as logical constructs that have no reference to the real world apart from some theoretical system of which they form a part, the proof quickly loses its persuasive power. In effect, one suppresses any intimations

argument, however, from a physical to a metaphysical context.[59] We start, as Aquinas says, with the fact that "in the world some things are moving." This is "certain and evident to our senses."[60] But while the reality of motion is evident, its nature is not.[61] Aquinas provides a compact definition: "Motion is nothing else than the reduction of something from potentiality to actuality."[62] Motion is not fundamentally about pushers and pullers, but about potency and act. The First Cause that we are looking for is not a mechanical agent giving a first or sustaining "push" to the natural world, as in the philosophy of Descartes, but the ultimate source of actuality.

The thing that is moving or changing must be in potency to some new

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of transcendence that are to be found in the movement of material objects. That is why, for many of our contemporaries, physical arguments for the existence of God are terminated before they start, or at least become so insulated from philosophical inquiry as to nullify their value as valid starting points" (Wallace, "Aquinas and Newton," 276–77). See also: Edward Feser, "Natural Theology Must Be Grounded in the Philosophy of Nature, Not in Natural Science," in *Neo-Scholastic Essays* (South Bend, IN: Saint Augustine's Press, 2015), 61–83.

59 The First Way, in its argument for a First Mover, does not presuppose metaphysics, but rather provides the foundation for metaphysics: "Far from reserving to metaphysics the proof for a Prime Mover, the philosophy of St. Thomas requires such a proof as the necessary approach to metaphysics without which metaphysics, as a science, cannot come into existence. And should this verdict be accepted, then it is supremely necessary to rehabilitate the philosophy of nature not only to provide a porchlight for modern science but also to build the very portals of metaphysics itself" (Vincent E. Smith, "The Prime Mover: Physical and Metaphysical Considerations," *Proceedings of the American Catholic Philosophical Association* 28 [1954]: 79–80). As David Twetten notes: "The familiar proof of God's existence through motion has frequently been represented in more metaphysical terms so as to address contemporary conceptions of motion and causality. The resulting arguments, however cogent, inevitably lose the original's status as 'the first and most manifest way'" ("Why Motion Requires a Cause: The Foundation for a Prime Mover in Aristotle and Aquinas," in Long, *Philosophy and the God of Abraham*, 239).

60 ST I, q. 2, a. 3, corp.

61 To understand the First Way, we need to understand the nature of motion: "This thorough investigation of 'mobile being,' the principles of 'nature,' and the reality of 'motion' is necessary for understanding the argument [for the unmoved mover] of books seven and eight [of Aristotle's *Physics*]. Only by grasping these preliminary principles can we perceive the need for an immaterial, immobile, and indivisible First Mover who 'moves' the whole universe for all eternity. Only by understanding natural beings, precisely in terms of their own natural principles, can we then identify the reasons for positing a being that is neither physical nor subject to change—a being upon whom the physical world depends for its physical existence, considered precisely as physical, that is, as natural and changeable" (Reitan, "Aquinas and Weisheipl," 184).

62 *ST* I, q. 2, a. 3, corp. Cf. Aristotle, *Physics* 3.1.201b 5–6.

actuality. In observing the change, we realize that some potency is presently being actualized (as potentially hot water may become actually hot). But potency (the mere possibility of being) cannot actualize itself. So the present influence of some being in act is required.[63] If that being accounts for its own actuality, we have arrived at the cause we are looking for. But if that being is itself dependent (right now) on something else for its own actuality (and so also for its capacity to move another), we must continue the search.

The next stage in the argument is to consider the series of dependent movers (or actualizers). This series is not "accidentally" ordered, but rather "essentially." The difference between the two orderings is that, in an accidentally ordered series, one cause does not depend upon another for the exercise of its causality, while in an essentially ordered series, it does. We can find an example of an accidentally ordered series in Agatha Christie's *Murder on the Orient Express*. In that story, a series of passengers, acting in succession, stab the malevolent Samuel Ratchett to death. In so doing, they comprise an accidentally ordered series of causes since one does not depend upon another in doing the dastardly deed. In an essentially ordered series of causes, however, each cause does depend upon the one before it for the very exercise of its causality. Aquinas illustrates this with the example of a hand that moves a stick that moves a stone. The motion of the stone depends on the present action of the stick, which in turn depends on the present action of the hand.[64]

An essentially ordered series of causes cannot be infinite.[65] Aquinas defines infinity as "that beyond which there is always something."[66] In his argument, what we need is a first mover, a first actualizer, that does not owe its actuality to another. But in an infinite series, we never get to the "first,"

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63 See Dennis Bonnette, *Aquinas' Proofs for God's Existence: St. Thomas Aquinas on "The Per Accidens Necessarily Implies the Per Se"* (The Hague: Martinus Nijhoff, 1972), 100: "The *process* of coming-to-be requires the continued and simultaneous causation of the agent—since . . . 'removing a cause is to remove that of which it is a cause' (*SCG* I, ch. 13)."

64 See *ST* I, q. 2, a. 3, corp.; q. 46, a. 3, ad 7.

65 See *ST* I, q. 46, a. 3, ad 7: "In efficient causes it is impossible to proceed to infinity *per se*—thus, there cannot be an infinite number of causes that are *per se* required for a certain effect; for instance, that a stone be moved by a stick, the stick by the hand, and so on to infinity. But it is not impossible to proceed to infinity *accidentally* as regards efficient causes; for instance, if all the causes thus infinitely multiplied should have the order of only one cause, their multiplication being accidental, as an artificer acts by means of many hammers accidentally, because one after the other may be broken."

66 *In* III *phys*., lec. 11, no. 383. Aquinas's understanding of divine infinity is quite different from this account of material infinity. See *ST* I, q. 7, a. 1.

since there is always one more to be added. A mere series of actualizers in which each depends on the one before it does not get us to the needed first mover, even if we extend the series to infinity, since infinity itself means that there is no first.[67] Aquinas therefore argues that "it is necessary to arrive at a first mover, put in motion by no other."[68] He concludes that the first mover is what "everyone understands to be God."[69]

The Chain of Causes

So, we have reached the conclusion of the argument, but a niggling question still remains as to what sorts of causes are entailed in that long chain stretch-

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67 See Gaven Kerr, "The Relevance of Aquinas' Uncaused Cause Argument," in *Revisiting Aquinas' Proofs for the Existence of God* (Leiden: Brill, 2016), 80: "Taking the principle that if you remove the cause then you remove the effect, we can apply it to the essentially ordered series of causes and observe that if there were no primary cause in such a series, then the intermediate and the ultimate causes would be causally inefficacious with respect to the causal property of the series, since in an essentially ordered series of causes, the intermediate and ultimate causes depend on some primary cause not only for their existence but also for their causality. . . . But . . . then there could not be an infinite series of such causes, since an infinite series is infinite precisely insofar as it has no primary cause."

68 *ST* I, q. 2, a. 3.

69 *ST* I, q. 2, a. 3, corp. See Reitan, "Aquinas and Weisheipl," 188–90: "The point to note here is that Aristotle and St. Thomas, thinking as natural philosophers, are concerned not only with isolating individual agents of physical change, but also with tracing universal lines of natural causality, which account for the activities and characteristics proper to entire species of natural substances. . . . This preserves the spontaneous dynamism of natural substances and avoids considering physical causality as merely some version of mechanical push or pull. . . . This immaterial being is not simply some created intelligence that pushes or pulls an independently existing material world; rather, this immaterial being is the active source and origin of the material world. It 'moves' that world by being the cause and foundation of all the material and formal principles of motion within that world. . . . An analysis of Aristotle's fundamental principles of natural philosophy, including a notion of universal equivocal cause, as well as a dynamic understanding of nature and motion, leads the mind to God, that is, to the First Unmoved Mover, upon which the physical universe depends for its entire natural, physical, and material existence. Of course, this discovery leads to an expanded notion of 'existence,' which can no longer be restricted to the natural, physical, and material. This discovery leads to a new science, 'metaphysics,' which then leads us to a more profound understanding of God and his intimate relationship to the whole of material and immaterial creation. However, the roots of this more profound understanding lie in the philosophy of nature, in an understanding of the natural principles at work in the physical world, and in a recognition of the explanatory limits of those principles. It is in Aristotle's 'argument from motion,' in St. Thomas' *prima via*, that philosophy—'natural philosophy'—first encounters (albeit in a limited and hidden way) the God of Abraham."

ing from the water being heated, or the hand moving the stick, to the First Cause whom we call God. Are those causes hopelessly medieval?[70] In Aquinas's world, the chain would certainly include the concentric celestial spheres of ancient cosmology, centered on the earth and imparting motion one to the next, all derived from the motion of the outermost sphere, which is itself moved by its desire for the unmoved mover.[71] Those crystalline spheres have long since vanished from our modern cosmology, and it might well seem the validity of the First Way went with them. Here we must remember that the argument is to be understood not in terms of mechanisms (whether medieval or modern), but in terms of potency and act. The potential cannot actualize itself: it depends on the actual. The series of actualizers need not be crystalline spheres, but the need for a first actualizer remains.

So, given our cosmology and science, together with the philosophy of nature, how do we get to that first actualizer? We can start with Aquinas's simple example: "the staff moves only because it is put in motion by the hand." The next question, of course, is what moves the hand? Here we might get into all the complexity of physiology and neuroscience and, if we choose a human example, the added complications of free will, and so on. To simplify things, let us consider a hungry ape who employs a stick to poke a plump termite out of a log. The stick is moved by the ape's hand, which is moved by its arm, which is moved by its nerves and brain, that somehow entail its desire for food, and so on. Ultimately, though, the ape exhibits all of this activity because it *is* an ape, and it *is* an ape in virtue of its substantial form, which, as its nature, is the spontaneous source of its characteristic activities. But the substantial form of the ape is not itself the First Cause for which we are searching, since it is also caused by something else. To get to the First Cause, then, we must find the cause of the substantial form of the ape (or of any other substance that exhibits spontaneous motion according to its nature).

The substantial form is the principle by which a thing is what it is. But

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70 See Anthony Kenny, *The Five Ways: Saint Thomas Aquinas' Proofs of God's Existence* (Notre Dame, IN: University of Notre Dame Press, 1980), 3: "The Five Ways fail, I shall argue, principally because it is much more difficult than at first appears to separate them from their background in medieval cosmology." For a critique of Kenny's arguments, see David S. Oderberg, "'Whatever is Changing is Being Changed by Something Else': A Reappraisal of Premise One of the First Way," in *Mind, Method, and Morality: Essays in Honour of Anthony Kenny*, ed. John Cottingham and Peter Hacker (Oxford: Oxford University Press, 2010), 140–64.

71 On the celestial spheres, see Michael J. Dodds, O.P., *The Unchanging God of Love: Thomas Aquinas and Contemporary Theology on Divine Immutability* (Washington, DC: Catholic University of America Press, 2008), 19–25.

neither the ape nor any other substance can be the cause of its own substantial form, for then it would be the cause of itself. Could the ape's parents be the cause of its substantial form? Here Aquinas makes an important distinction. A univocal agent (one belonging to the same species as its effect) may be the cause of the "becoming" of the effect (the cause that disposes primary matter in such a way that a substantial form of the same species is educed from it), but it cannot be the cause of the "being" of the effect (the cause of the substantial form as such through which the effect has its being). If it were the cause of the substantial form as such, it would be the cause of itself, since it has its being through that form. As Aquinas explains:

> We must observe that an agent may be the cause of the "becoming" of its effect, but not directly of its "being." . . . For if an agent is not the cause of a form as such [causa formae inquantum huiusmodi], neither will it be directly the cause of "being" which results from that form; but it will be the cause of the effect, in its "becoming" only. Now it is clear that of two things in the same species one cannot directly cause the other's form as such, since it would then be the cause of its own form, which is essentially the same as the form of the other; but it can be the cause of this form for as much as it is in matter—in other words, it may be the cause that "this matter" receives "this form." And this is to be the cause of "becoming," as when man begets man, and fire causes fire. Thus whenever a natural effect is such that it has an aptitude to receive from its active cause an impression specifically the same as in that active cause, then the "becoming" of the effect, but not its "being," depends on the agent. Sometimes, however, the effect has not this aptitude to receive the impression of its cause, in the same way as it exists in the agent: as may be seen clearly in all agents which do not produce an effect of the same species as themselves: thus the heavenly bodies cause the generation of inferior bodies which differ from them in species. Such an agent can be the cause of a form as such [causa formae secundum rationem talis formae], and not merely as existing in this matter, consequently it is not merely the cause of "becoming" but also the cause of "being" [est causa non solum fiendi, sed essendi]."[72]

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72 *ST* I, q. 104, a. 1, corp. See Gregory T. Doolan, "The Causality of the Divine Ideas in Relation to Natural Agents in Thomas Aquinas," *International Philosophical Quarterly* 44 (2004): 393–409, at 398–99: "Thomas explains that as regards two things in the same species, one cannot be a *per se* cause of form in the other, i.e., the cause of its form as such; if it were, it would be the cause of its own form since

Lawrence Dewan illustrates this with the example of dogs: "The doctrine of the nature of univocal causality (dogs producing dogs and cats cats) should be taken into consideration. A univocal cause presupposes the common nature which it communicates in causing individuals of that nature. The dogs which reproduce are not causes of doghood as doghood, but of doghood-in-this-or-that. To say that they cause doghood would be to make them causes of themselves, and thus prior to themselves, a contradiction in terms. The cause of doghood as doghood must have a nature nobler than doghood."[73]

The Cause of the Form as Such

To find the First Cause, we must find the cause of the substantial form as such. Aquinas identifies this cause as the heavenly bodies that "cause the generation of inferior bodies which differ from them in species. Such an agent can be the cause of a form as such [causa formae secundum rationem talis formae]."[74] We may rightly shy away from this suggestion as overly medieval. Still, we should remember that even medieval thinkers did not view the heavenly bodies as the First Cause of generation or the ultimate cause of the form as such.[75] In our search for that First Cause, therefore,

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it shares the same nature as its effect. Thus, e.g., an individual man cannot be the cause of human nature absolutely, for he would then be the cause of himself. Rather, a univocal cause can only be the cause of the form of another individual in the same species inasmuch as that form exists in matter—i.e., only inasmuch as such an agent causes this matter to acquire this form. Thus, while one man cannot be the cause of human nature absolutely, he can be the cause of human nature inasmuch as it exists in this man. And it is this mode of causality that Thomas terms generation, according to which an agent's action presupposes determinate matter. . . . Because the operations of natural agents proceed from a form that is determined by designated matter, such agents are only particular ones. It is for this reason that they cannot be the cause of a nature absolutely but, rather, only inasmuch as that nature exists in this individual. Consequently, Thomas concludes that although such agents are the cause of the coming-to-be (*causa fiendi*) of a thing, they are not the cause of its being (*causa essendi*)."

73 Lawrence Dewan, O.P., "St. Thomas's Fourth Way and Creation," *The Thomist* 59, no. 3 (1995): 371–78, at 376.

74 *ST* I, q, 104, a. 1, corp.

75 See Reitan, "Aquinas and Weisheipl," 188–89: "Now, in the generation of all natural, physical substances, including heavy and light bodies, the natural philosopher must take into account, not only the particular univocal causes, such as this man or this fire, causes which bring about only individuals like to themselves; he must also consider the universal equivocal causes, such as the sun, causes whose power ranges over a wide variety of natural effects. . . . When Aristotle claims that the mover and the thing moved—the cause and its effect—must exist simultaneously,

we can omit the heavenly bodies and proceed directly to God. In this, however, we may still follow Aquinas, who begins by showing us what cannot be the cause of the form as such. It cannot be a creature that has the same form as the substance that it generates (such as the parents of our hungry ape). Nor can it be any material substance, except to the extent that such a substance acts as an instrument of an immaterial cause:

> The being of a thing made depends on its efficient cause according as the form of the thing made depends on that cause. Now there can be an efficient cause on which the form of the thing made does not depend directly [*per se*] and considered as a form, but only indirectly [*per accidens*]: thus the form of a generated fire does not depend on the generating fire directly and by reason of its species, seeing that it occupies the same degree in the order of things, and the form of fire is in the same way in both the generated and in the generating fire, and is distinguished therefrom only by a material distinction, through being seated in another matter. Hence since the generated fire has its form from some cause, this same form must depend on some higher principle, that is the cause of that form directly and in

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he is not speaking only about individual univocal causes and their effects, but also about universal equivocal causes and their effects. . . . The point to note here is that Aristotle and St. Thomas, thinking as natural philosophers, are concerned not only with isolating individual agents of physical change, but also with tracing universal lines of natural causality, which account for the activities and characteristics proper to entire species of natural substances. At least, this seems to be the only way to account for the fact that mover and moved must be simultaneous and in contact, that is, in some way naturally and physically connected by being parts of a single universe. Furthermore, this preserves the spontaneous dynamism of natural substances and avoids considering physical causality as merely some version of mechanical push or pull. These universal, celestial movers, however, are themselves 'moved movers,' for they are material and extended, they are moved in place, and they are directed towards some end or goal, that is, they have an intrinsic intentionality for a specific kind of physical existence. They are not, however, 'generated,' in the proper sense of the term, for they have always existed. Nevertheless, they do depend on another for their motion, for their intrinsic principles of natural change and existence, and for being the kind of reality that they are. That is to say, they are not self-made, or self-sufficient, for nothing can 'move' itself *primo* and *per se*—nothing can give to itself its own principles of change, its own principles of directedness, its own 'nature.' Of course, this continuous series of moved movers cannot go on to infinity, for then there would be no motion here and now. Hence, both Aristotle and St. Thomas conclude that there must be a First Unmoved Mover, entirely separate from matter, infinitely powerful, who 'moves' the entire universe for all eternity."

> respect of its very species [causa ipsius formae per se et secundum propriam speciei rationem]. Now seeing that properly speaking the existence of a form in matter implies no movement or change except accidentally, and since no bodies act unless moved, as the Philosopher shows, it follows of necessity that the principle on which the form depends directly [principium ex quo per se dependet forma] must be something incorporeal, for the effect depends on its active cause through the action of a principle. And if a corporeal principle be in some way the cause of a form, this is due to its acting by virtue of an incorporeal principle and as its instrument [quasi eius instrumentum].[76]

Although the material agent is not the cause of the form as such, it is still an essential cause of generation in disposing the matter to the particular form that will be educed from it:

> In fact this [the action of the corporeal agent] is necessary in order that the form begin to exist, inasmuch as it does not begin to exist otherwise than in matter: because matter cannot be the subject of a form unless it have a particular disposition, since the proper act should be in its proper matter. When, therefore, matter is in a disposition unsuitable to a particular form, it cannot directly receive that form from an incorporeal principle on which the form directly depends, so that there is need for something to transmute the matter: and this will be a corporeal agent whose action consists in moving something. This corporeal agent acts by virtue of the incorporeal principle, and its action terminates in this or that form, inasmuch as this or that form is in the corporeal agent either actually (as in univocal agents [agentibus univocis]) or virtually (as in equivocal agents [agentibus aequivocis]). Accordingly these lower corporeal agents are not the cause of the forms in things made, except to the extent of their causality in transmuting matter, since they do not act except by transmuting, . . . and this is insofar as they dispose the

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[76] *De potentia*, q. 5, a. 1, corp. (translation corrected slightly). See also *SCG* II, ch. 2, no. 5: "Whatever is caused as regards some particular nature cannot be the first cause of that nature, but only a second and instrumental cause; for example, since the human nature of Socrates has a cause, he cannot be the first cause of human nature; if so, since his human nature is caused by someone, it would follow that he was the cause of himself, since he is what he is by virtue of human nature. Thus, a univocal generator must have the status of an instrumental agent in respect to that which is the primary cause of the whole species."

> matter and educe the form from the potency of the matter. Hence the form of the thing generated depends naturally on the generator [the corporeal agent] insofar as it is educed from the potentiality of matter, but not as to its absolute existence. And, therefore, when the act of the generator ceases, the eduction of the form from potentiality into actual being, that is the becoming of the thing generated, ceases, whereas the form itself whereby the thing generated has its existence, does not cease.[77]

This means that, when the corporeal generators (the parents of our hungry ape) cease to be, our ape does not die with them, since its form depends on them only for its coming to be (its eduction from the potency of matter), not for its being. The cause of the form as such must be immaterial, and the ultimate immaterial cause of the form is God:

> Wherefore just as when the action of their efficient cause which acts by movement ceases, at that very instant the becoming of the thing generated ceases, even so when the action of an incorporeal agent ceases, the very existence of things created by it ceases. Now this incorporeal agent by whom all things, both corporeal and incorporeal are created, is God . . . from whom things derive not only their form but also their matter.[78]

As cause of the form, God is the ultimate source of creaturely action. Since the substantial form, understood as "nature," is the source of the characteristic action of a substance, the cause of the form is also the ultimate cause of that action: "The generating agent, because it gives the form, gives all the properties and resultant motions [generans enim, quod dat formam, dat omnes proprietates et motus consequentes]."[79] In this

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77 *De potentia*, q. 5, a. 1, corp. (translation corrected slightly).

78 *De potentia*, q. 5, a. 1, corp. See also *ST* I, q. 44, a. 3, corp., and *SCG* III, ch. 65, no. 4: "Now this cause [of the human species itself or any other species of natural things] is God, either mediately or immediately. For we have shown that he is the first cause of all things. So he must stand in regard to the species of things as the individual generating agent in nature does to generation, of which he is the direct cause. But generation ceases as soon as the operation of the generative agent ceases. Therefore all the species of things would also cease as soon as the divine operation ceased. So he preserves things in being through his operation."

79 *SCG* III, ch. 99, no. 4. See also *De potentia*, q. 3, a. 7, corp.: "Accordingly this or that individual thing cannot by its action produce another individual of the same species except as the instrument of that cause which includes in its scope the whole

way, God is the ultimate cause of all creaturely action (including our free human acts), but without robbing any creature of its own proper causality: "Now not only is every motion from God as from the First Mover, but all formal perfection is from him as from the First Act. And thus the act of the intellect or of any created being whatsoever depends upon God in two ways: first, inasmuch as it is from him that it has the form whereby it acts; secondly, inasmuch as it is moved by him to act. Now every form bestowed on created things by God has power for a determined act, which it can bring about in proportion to its own proper endowment."[80]

Returning to the First Way, we can now see why the action of any creature (such as that of our hungry ape poking around for termites) is not explained simply by reference to the substantial form (or nature) of the creature, but only when that substantial form has been traced back to the ultimate cause of the substantial form as such, who is God.[81] Here we have, of course, gone beyond the limits of empirical science, but we are still within the philosophy of nature. The First Way does not require a medieval cosmos or a metaphysical interpretation— only an account of motion in terms of potency and act, which is the business of the philosophy of nature.

The Cause of the Form in Aquinas and Avicenna

Aquinas's account of God as the "cause of the form as such," acting through secondary causes that dispose matter to the new form, is not to be confused with Avicenna's "Giver of the Forms [Dator Formarum]."[82] Avicenna seems

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species and, besides, the whole being of the inferior creature. . . . Therefore God is the cause of every action, inasmuch as every agent is an instrument of the divine power operating."

80 *ST* I–II, q. 109, a. 1, corp. Were we to use a human example (instead of our hungry ape) and trace the motion of the stick to an act of human freedom, we would still need to name God as primary cause to account for the action of the will as secondary cause: "Besides, as natural inclination in an inanimate thing, which is also called natural appetite, is related to its proper end, so also is the will, which is also called intellectual appetite, in an intellectual substance. Now, to give natural inclinations is the sole prerogative of him who has established the nature. So also, to incline the will to anything is the sole prerogative of him who is the cause of the intellectual nature. Now, this is proper to God alone, as is evident from our earlier explanations. Therefore, he alone can incline our will to something" (*SCG* III, ch. 88, no. 4).

81 See *De potentia*, q. 5, a. 1, ad 18: "Just as a form cannot be a principle of existence, unless we presuppose some previous principle, even so neither can it be a principle of operation since God works in everything."

82 Aquinas uses the term *dator formarum* only once in all of his writings (if my

to introduce a kind of occasionalism that robs creatures of their own proper causality in the act of generation. Kara Richardson offers a helpful distinction between Avicenna's "Infusion Model" and Aquinas's "Eduction Model" of generation. In Avicenna's model, a new substantial form is created *ex nihilo* by an immaterial "Giver of the Forms" (identified as the Agent Intellect) when matter is properly disposed by natural causes. In Aquinas's model, a new substantial form is simply educed from the potency of matter when the matter is properly disposed by natural causes.[83] Aquinas himself explains the difference between the induction of a substantial form by an external agent (Avicenna) and the eduction of the form from primary matter (Aristotle). In the latter, the corporeal agent is truly the cause of the substantial form, but only in its *becoming* and not in its *being*:

> The Platonists together with Avicenna through denying the eduction of forms from matter were obliged to hold that natural agents merely dispose matter, and that the form is induced by a principle that is separate from matter. On the other hand if with Aristotle we hold substantial forms to be educed from the potentiality of matter, natural agents will be causes not only of the disposition of matter but also of substantial forms, only, however, in regard to their eduction from the potentiality of matter into actual existence, . . . so that they will be principles of existence as considered in its inchoation but not as considered absolutely [sunt essendi principia quantum ad inchoationem ad esse, et non quantum ad ipsum esse absolute]."[84]

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investigations in the *Index Thomisticus* are correct). In that one place, he seems to imply that the Giver of the Forms is God, even while allowing Avicenna's opinion that it is something other than God: "Even the giver of forms, if we suppose with Avicenna that it is something apart from God, must cease to exist if God who is its cause cease to act [ipse dator formarum si ponatur aliquid aliud praeter Deum, secundum sententiam Avicennae, oportet quod et ipsum deficeret cessante actione Dei, quae est sua causa]" (*De potentia*, q. 5, a. 1, ad 9).

83 Kara Richardson, "Avicenna and Aquinas on Form and Generation," in *The Arabic, Hebrew and Latin Reception of Avicenna's Metaphysics*, ed. D. Hasse and A. Bertolacci (Boston: De Gruyter, 2012), 251–74, at 251.

84 *De potentia*, q. 5, a. 1, ad 5 (translation corrected slightly). In distinguishing Aquinas from Avicenna, James Weisheipl is correct in saying that, in Aquinas's view, fire generates fire without need of a "giver of the forms" to infuse a new substantial form from outside, but he seems to overlook the role that Aquinas does assign to the cause of the form as such: "Similarly, in the case of natural events, Thomas's view was that fire is sufficient in itself not only to dispose water to its boiling point, but even to the point of becoming another substance, namely, air. There was no need for him to invoke a *dator formarum*, since nature itself can be credited

Aquinas insists that effects such as offspring result from the causality of their parents in disposing matter in such a way that a form of a similar kind is educed from it. It is not that natural agents dispose the matter and then some "Giver of the Forms" creates a new form in that matter. Rather, the new form is educed from the potency of the matter precisely though the causality of the parents. Still, the parents cannot exercise this causality apart from the influence of the first exemplar cause, who is God: "Just as the divine power, the first agent to wit, does not exclude the action of the natural forces, so neither does the prototypal form which is God [prima exemplaris forma, quae est Deus] exclude the derivation of forms from other lower forms whose action terminates in like forms."[85] As in all cases of instrumental causality, the effect is not divided between the principal and instrumental cause, but belongs wholly to both.[86] As the ultimate cause of the form as such, God's action does not exclude the causality of more proximate causes, such as the parents in disposing matter to the new form: "Forms which are in matter derive from forms which are without matter not as from proximate causes but as from the prototypes [primis exemplaribus]."[87] In this way, Aquinas is able to affirm God's causality as

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with substantial changes—real efficient causality—in the world. The great irony of Avicenna's view is that he conceives 'nature' as an efficient cause of the body's own motion, and yet refuses to allow 'nature' to be an efficient cause of changing another body. Consequently the second point of difference between Avicenna and Aquinas is that Avicenna explains all substantial changes in terms of a *dator formarum*, a celestial force existing apart from nature, while Thomas explains them in terms of 'nature' as an active source of natural motion and an efficient cause of substantial changes. . . . Aquinas rejects outright the need for any *dator formarum*, and holds that natural bodies are capable of changing other bodies substantially" ("Aristotle's Concept of Nature: Avicenna and Aquinas," in *Approaches to Nature in the Middle Ages*, ed. Lawrence D. Roberts [Binghamton, NY: Center for Medieval and Renaissance Studies, 1982], 151, 154).

85 *De potentia*, q. 3, a. 8, ad 17.

86 See Doolan, "Causality," 409: "Despite the fact that natural agents are the instruments of higher causes, however, they still possess their own proper actions that follow from their proper forms. Hence, while form as such is not a proper effect of their power, this form as it comes to be in this matter is. Thus the divine ideas do not through their causality exclude natural agency; rather, they facilitate it, for it is through the combined agencies of God and the natural agent that a natural effect is caused—'not so that the same effect is attributed to a natural cause and to the divine power as though part is made by God and part by the natural agent,' Thomas explains, 'but so that in a different way the whole effect is from each: just as the whole same effect is attributed to an instrument and also to the principal agent' (*SCG* III, 70)."

87 *De potentia*, q. 3, a. 8, ad 18. See Richardson, "Avicenna and Aquinas," 271–72:

the cause of the form as such while avoiding the possible occasionalism of Avicenna.[88]

The Cause of the Form and the Law of Inertia

Newton's law of inertia is often invoked as an objection to the First Way.[89] Aquinas's argument is considered outmoded because it ignores Newton's law, which states: "Every body continues in its state of rest, or of uniform motion in a right line, unless it is compelled to change that state by forces impressed upon it."[90] According to this law, it seems that a body does not require a cause for its state of motion, but only for a change in that state. Here, we should remember that, although the law describes the motion of a body mathematically, it provides no physical explanation for that motion. Like all laws of nature, it is descriptive but not prescriptive.[91] The philo-

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"Insofar as a corporeal agent is a cause of form it acts in the power of an incorporeal principle as if it were its instrument."

88 Richardson questions whether Aquinas's interpretation of Avicenna is correct and finds common ground between them: "This account of form, matter and their relationship suggests that . . . he [Avicenna] shares with Aquinas the following view of the structure of substantial change: matter first has a form potentially and later, through the activity of some agent or agents, it has it actually. . . . I find questionable the application of the term 'occasionalist' to Avicenna. It seems to me that he has no occasionalist axe to grind. Even where he emphasizes the superiority of divine causality, he recognizes lesser agents as genuine causes. . . . While Aquinas' argument against the Infusion Model of generation in *De potentia* q. 3 a. 8 is persuasive, it is problematic insofar as it takes Avicenna as one of its targets. In my view, the attribution to Avicenna of the Infusion Model of generation is based on a coarse reading of Avicenna's discussions of the causal roles played by the Agent Intellect, which conflicts with his account of the unity of form/matter compounds" ("Avicenna and Aquinas," 257, 267–68).

89 See, for example Kenny, *Five Ways*, 28–33.

90 Sir Isaac Newton, *Mathematical Principles of Natural Philosophy*, in *Sir Isaac Newton's Mathematical Principles of Natural Philosophy and his System of the World*, trans. Andrew Motte and Florian Cajori (Berkeley, CA: University of California Press, 1946), 13.

91 See William R. Stoeger, "Contemporary Physics and the Ontological Status of the Laws of Nature," in *Quantum Cosmology and the Laws of Nature: Scientific Perspectives on Divine Action*, ed. Robert John Russell, Nancey Murphy, and C. J. Isham (Berkeley, CA.: Center for Theology and the Natural Sciences, 1993), 209–34, at 210: "Although the laws of nature do reveal and describe fundamental patterns of behavior and regularities in the real world, we cannot consider them the source of those regularities, much less attribute to them the physical necessity these regularities seem to manifest. Nor can we ascribe to them an existence independent of the reality whose behavior they describe. Instead I claim that they are imperfect abstract descriptions of physical phenomena, not prescriptions dictating

sophical explanation for why a body behaves in a certain way is "because it is a certain kind of body." And it is a certain kind of body because of its substantial form. The substantial form explains not only why it is a certain kind of thing but also why it manifests a certain type of activity. To discover the ultimate cause of that activity, we must find the cause of the form as such, since the one who gives the form also "gives all the properties and resultant motions."[92] We have already seen that God is the ultimate cause of the form as such. This philosophical explanation complements, but does not contradict, the scientific account. As Dennis Bonnette explains: "Now we do not wish to challenge Newton's law which simply describes the fact that a body in motion tends to remain in motion. Yet, we do demand an explanation as to why this fact is so. . . . It is our suggestion that, since the conventional physical agent as well as the 'law of inertia' have proven to be insufficient as a total explanation, it is possible that some transcendental cause beyond the range of natural science may be posited as the only adequate cause for the phenomena of inertia."[93]

Conclusion

We began with Hawking's question: "Why does the universe go to all the bother of existing?" To that, we added a second question: "Once things exist, why do they go to the bother of acting?" We then saw that Aquinas implicitly addresses this question in his First Way of showing that God exists.

To follow his arguments from the movement of creatures to the existence of God, however, it was first necessary to retrieve a robust notion of causality, largely lost with the advent of modern science but now implied in the considerations of contemporary science. Using that richer notion

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or enforcing behavior."

92 See *SCG* III, ch. 99, no. 4: "The generating agent, because it gives the form, gives all the properties and resultant motions [generans enim, quod dat formam, dat omnes proprietates et motus consequentes]."

93 Bonnette, *Aquinas' Proofs*, 100–102. See William Wallace, "Newtonian Antinomies against the Prima Via," *The Thomist* 19, no. 2 (1956): 184: "Further, far from the principle of inertia disproving the existence of God, the more one tries to verify this principle, the more one is led to affirm the existence of an infinite Mover. If all the idealized concepts that have been discussed be granted, and the idealized case be considered as physically real, then not only is *some* extrinsic mover required, but also one of infinite power, and this can only be God." See also: Antonio Moreno, O.P., "The Law of Inertia and the Principle *'Quidquid movetur ab alio movetur*,'" *The Thomist* 38, no. 2 (1974): 306–31; James A. Weisheipl, O.P., "The Principle '*Omne quod movetur ab alio movetur*' in Medieval Physics," in Carroll, *Nature and Motion in the Middle Ages*, 75–97.

of causality, we then traced the chain of causes from creaturely motion to its Divine Cause without becoming trapped in either the celestial spheres of medieval cosmology or the mechanistic philosophy of modern science.

Each thing "bothers" to act because of the kind of thing it is; and it is what it is in virtue of its substantial form. But what is the source of its substantial form? We saw that an explanation through univocal causes (as fire produces fire) was inadequate. To find the ultimate cause of creaturely action, we had to discover the ultimate cause of the substantial form as such. We found that cause to be God, the author of nature, acting intimately in each thing as the ultimate exemplar, efficient, and final cause, who does not diminish but is rather the source of all secondary causes, each acting spontaneously according to its substantial form or nature. God as pure act is the ultimate cause of all of the actualizations (changes/motions) that we find in nature.

God explains not only the fact *that* creatures act, but also why they "bother" to act. Each thing, in acting according to its nature, is not behaving senselessly, but acting to achieve some good appropriate to it. But in seeking its own good, it is also implicitly seeking the goodness of God.[94] So its action should not be characterized as a "bother," but as an endeavor, rich in meaning, reflecting the infinite wisdom and goodness of the Creator. As Timothy McDermott explains:

> For him [Aquinas] "just being" or "just happening" is in the last analysis unintelligible. Nothing can enter into being simply as a phenomenon. To exist, as St. Thomas sees it, is to have significance, to have point, to play out a role. Such an idea of being is indeed the seminal idea of his philosophical view of the world: an idea of being, that is, not just as an arbitrary thereness of things for sense-experience, but as a logical and significant thereness in a community of the universe revealed to man by knowledge and love. The model or image that St. Thomas uses to express this idea of being is the model of an action: being is playing out a role, realizing a significant conception. . . . Since action is in turn conceived as the expression and execution of some agent's desire (giving point to the action), the

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94 See *ST* I, q. 6, a. 1, corp.: "Now everything seeks after its own perfection; and the perfection and form of an effect consist in a certain likeness to the agent, since every agent makes its like; and hence the agent itself is desirable and has the nature of good. For the very thing which is desirable in it is the participation of its likeness. Therefore, since God is the first effective cause of all things, it is manifest that the aspect of good and of desirableness belong to him."

being of things is conceived as fulfilling a role desired by someone, as the expression of someone's love. So that this seminal idea of being leads almost immediately to the notion of a God whose intentions rule the world, the expression of whose intentions the world indeed is. Since St. Thomas's word for the community of the universe about which we have been talking is "nature," we may say that God enters into his philosophy as the one who conceives nature, as the "author" of nature.[95] N:V

[95] Timothy McDermott, O.P., "Introduction," in Thomas Aquinas, *Summa Theologiae*, ed. Timothy McDermott (London: Eyre and Spottiswoode, 1964), 2:xxiii–xxiv.