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Teleology
A Shopper's Guide

Edward Feser
Department of Philosophy
Pasadena City College
Pasadena, California

The *telos* of a thing or process is the end or goal toward which it points. Teleological notions feature prominently in current debates in philosophy of biology, philosophy of action, philosophy of mind, and philosophy of religion. Naturalists generally hold that teleological descriptions of natural phenomena are either false or, if true, are reducible to descriptions cast in nonteleological terms. Nonnaturalists generally hold that at least some natural phenomena exhibit irreducible teleology. For example, Intelligent Design (ID) theorists hold that certain biological phenomena cannot properly be understood except as the products of an intelligence which designed them to carry out certain functions.

Teleology's controversial status in modern philosophy stems from the mechanistic conception of the natural world, which early modern thinkers like Bacon, Galileo, Descartes, Hobbes, Boyle, and Locke put in place of the Aristotelian philosophy of nature that featured in medieval Scholasticism. Following Aristotle, the Scholastics took the view that a complete understanding of a material substance required identifying each of its "four causes." Every such substance is, first of all, an irreducible composite of *substantial form* and *prime matter* (irreducible because on the Scholastic view, substantial form and prime matter cannot themselves be understood apart from the substances they compose, making the analysis holistic rather than reductionist). The substantial form of a thing is its nature or essence, the underlying metaphysical basis of its properties and causal powers; it constitutes a thing's *formal cause*. Prime matter is the otherwise formless stuff that takes on a substantial form so as to instantiate it in a concrete object,

Abstract: Teleology features prominently in recent discussions in the philosophy of mind, action theory, philosophy of biology, and in the dispute between Intelligent Design theorists and Darwinian naturalists. Unfortunately, discussants often talk past each other and oversimplify the issues, failing to recognize the differences between the several theories of teleology philosophers have historically put forward, and the different natural phenomena that might be claimed to be teleological. This paper identifies five possible theories of teleology, and five distinct levels of nature at which teleology might be said to exist. Special attention is paid to the differences between Aristotelian-Thomistic and ID theoretic approaches to teleology.

and apart from which the form would be a mere abstraction; it constitutes a thing's *material cause*. That which brings a thing into existence constitutes its *efficient cause*. And the end or goal towards which a thing naturally points is its *final cause*.[1]

As the last sentence indicates, the notion of a final cause is closely tied to that of a *telos* and thus to the notion of teleology. But the adverb "naturally" is meant to indicate how the Aristotelian notion of final cause differs from other conceptions of teleology. For Aristotle and for the Scholastics, the end or goal of a material substance is *inherent* to it, something it has precisely because of the kind of thing it is by *nature*. It is therefore not to be understood on the model of a human artifact like a watch, whose parts have no inherent tendency to perform the function of telling time, specifically, and must be forced to do so by an outside designer. For example, that a heart has the function of pumping blood is something true of it simply by virtue of being the kind of material substance it is, and would remain true of it whether or not it has God as its ultimate cause.

The thinkers who founded modern philosophy and modern science rejected this picture of nature. In particular, they rejected the notions of substantial form, of matter as that which takes on such a form, and of a final cause as an *inherent* end or *telos* of a thing. Of Aristotle's four causes, only efficient cause was left in anything like a recognizable form (and even then the notion was significantly altered, since, as we shall see, efficient causes were regarded by the Scholastics as correlated with final causes).[2] Material objects were reconceived as comprised entirely of microscopic particles (understood along either atomistic, corpuscularian, or plenum-theoretic lines) devoid of any inherent goal-directedness and interacting in terms of "push-pull" contact causation alone. This "mechanical philosophy" underwent various transformations as modern philosophy and modern science developed. The philosophical inadequacy of the contact model of causal interaction soon became evident in light of the critiques of occasionalists, Humeans, and others; and in any event, the model could not survive the empirical difficulties posed for it by Newtonian gravitation, electromagnetism, and quantum mechanics. But what has clearly survived the anti-Aristotelian "mechanistic" revolution to the present day is the rejection of teleology as an inherent feature of the natural order. As philosopher of science David Hull has written:

1. For a brief exposition and defense of Aristotelian-Scholastic metaphysics and philosophy of nature, see ch. 2 of my *Aquinas* (Oxford: Oneworld, 2009). For a more detailed exposition and defense, see my *The Last Superstition: A Refutation of the New Atheism* (South Bend, IN: St. Augustine's, 2008). The most thorough recent defense of Aristotelian-Scholastic metaphysics is David S. Oderberg, *Real Essentialism* (London: Routledge, 2007).

2. See Kenneth Clatterbaugh, *The Causation Debate in Modern Philosophy 1637–1739* (London: Routledge, 1999) for a useful overview of the history of the early moderns' gradual transformation of the notion of efficient cause.

> Mechanism in its extreme form is clearly false because numerous physical phenomena of the most ordinary sort cannot be explained entirely in terms of masses in motion. Mechanics is only one small part of physics. Historically, explanations were designated as mechanistic to indicate that they included no reference to final causes or vital forces. In this weak sense, all present-day scientific explanations are mechanistic.[3]

Modern philosophers have almost universally embraced this conception of scientific explanation. They have disagreed about whether an appeal to irreducible teleology conceived of as something *extrinsic* to the material world ought to supplement the mechanistic explanations of empirical science. Contemporary naturalists deny that any such appeal can be justified. By contrast, early modern thinkers like Boyle and Newton regarded an appeal to extrinsic teleology—in particular, to God's intentions and activity as artificer of the natural world—as an essential capstone to the edifice of science.[4] William Paley's design argument gave this line of thought its most fully developed and influential articulation. As we will see in a later section, the arguments of contemporary ID theorists like William Dembski, though differing from the arguments of Boyle, Newton, and Paley in various particulars, carry on their appeal to teleology as something extrinsic to the material world, and allow that at least much of the natural order is in principle nonteleological. Where these thinkers all agree with each other and with their naturalistic opponents is in rejecting the Aristotelian-Scholastic conception of final causes as *inherent* in material substances.

Among contemporary writers, it is primarily Thomists, and especially those who regard Thomism as essentially building on Aristotelianism, who reject mechanism as defined above and endorse a return to something like the Scholastics' philosophy of nature, its application suitably modified in light of the empirical findings of modern science. Aristotelico-Thomistic (A-T) arguments for irreducible teleology, and for the existence of God as the ultimate explanation of the reality of such teleology (such as Aquinas's Fifth Way), thus differ significantly from Paleyan design arguments and the arguments of contemporary ID theory.

Unfortunately, this history and the conceptual nuances reflected in it (only some of which we have touched on so far) seem to have been forgotten in many contemporary philosophical discussions of teleology. Consequently, partisans on either side of various debates within philosophy of biology, phi-

3. *The Cambridge Dictionary of Philosophy*, s.v. "mechanistic explanation." Cf. William Hasker, *The Emergent Self* (Ithaca, NY: Cornell University Press, 1999), 59–64.

4. For an account of the transition from an intrinsic to an extrinsic conception of teleology among such early modern thinkers and its effect on natural theology, see Margaret J. Osler, "From Immanent Natures to Nature as Artifice: The Reinterpretation of Final Causes in Seventeenth-Century Natural Philosophy," *The Monist* 79 (1996): 388–407. Cf. William B. Ashworth, Jr., "Christianity and the Mechanistic Universe," in *When Science and Christianity Meet*, ed. David C. Lindberg and Ronald L. Numbers (Chicago: University of Chicago Press, 2003).

losophy of mind, philosophy of religion, and other philosophical subdisciplines often talk past one another, or either affirm or reject the existence of irreducible teleology on the basis of arguments that may in fact be relevant only to some conceptions of teleology and not to others.

In the sections that follow, I aim to provide a "shopper's guide" of sorts for philosophers interested in questions about teleology, in the course of which I will expand upon some of the historical and conceptual themes already alluded to. Specifically, I will show in the second section, "Five Approaches to Teleology," that the question of whether teleology exists in nature is not susceptible of a simple "yes or no" answer, but that there are in fact five main positions that can and have been taken on the issue. In the third section, "Levels of Teleology," I will show that there are also at least five levels of nature at which irreducible teleology might be claimed to exist, so that to establish that it exists or does not exist at one of them does not suffice to determine whether it exists at the others. With at least five levels of nature at which teleology might be said to exist, and five possible ways in which to conceive of teleology at any of these levels, the conceptual lay of the land can be seen to be complex indeed. Finally, in the last section I will address the implications of these conceptual distinctions for the debate over teleological arguments for the existence of God. In particular, I will explain how the approach taken by philosophers committed to A-T metaphysics differs radically from that taken by ID theorists and defenders of Paley-style design arguments. In the process I hope to shed light on a phenomenon that many ID theorists seem to find puzzling, namely, that Thomists, who would seem to be their natural allies in the dispute with naturalism, are typically very critical of ID. As we will see, this state of affairs has less to do with disagreements about the merits of Darwinian evolutionary biology (though it does sometimes have something to do with that) than it has to do with disagreements over basic metaphysics—disagreements which, for the A-T metaphysician, show that the ID theorist is (surprising as this might seem) philosophically closer to the Darwinian naturalist than to A-T.

In the interests of full disclosure, I should note that my own sympathies are with the A-T position. But the point of what follows is not to defend that position, but only to provide a road map to the debate over teleology in the various branches of philosophy I have mentioned. There is nothing in the classification that I will propose that could not in principle be accepted by any philosopher, whichever position he happens to take on these issues.

Five Approaches to Teleology

As happens, the five main approaches to teleology parallel the five main approaches that have, historically, been taken to the problem of universals—nominalism, conceptualism, and three varieties of realism. Indeed, as we will

see, there are several ways in which the problem of universals and the problem of teleology are intertwined. So it will be useful briefly to summarize the main approaches to the former problem before discussing the latter.

They are as follows: *Realism* affirms that universals—triangularity, "catness," humanness, and so forth—are irreducible to their particular instances and exist in a way that is in some sense independent of the human mind. *Nominalism* denies that there are any true universals and insists that only particulars are real—there is this triangle and that one, this cat and that one, but no such thing as "triangularity" or "catness" over and above them. *Conceptualism* can be thought of as a kind of middle-ground position, and holds that universals exist, but only in the mind—"triangularity," "catness," and the like are the products of abstraction, and correspond to nothing in the world of external objects, all of which are particular.

Realism in turn takes three different forms. *Platonic realism* (sometimes called "extreme realism") holds that universals exist in a "third realm" distinct from the world of particular things and distinct from the human mind. *Aristotelian realism* (sometimes called "moderate realism") rejects the "third realm" approach, and regards universals as existing only in the particular things that instantiate them and in the intellect that abstracts them from the particulars. It differs from nominalism in regarding universals as irreducible to their instances, and from conceptualism in regarding the products of abstraction as grounded in the particulars themselves and not a sheer invention of the mind—triangularity corresponds to something really there in actual triangles (waiting to be abstracted, as it were). Finally, *Scholastic realism*—the position developed by medieval writers like Aquinas as a way of harmonizing Aristotelian realism with Augustine's brand of Platonism—holds that while universals do indeed exist only in either their particular instances or in intellects, they nevertheless do not depend entirely on particulars or on *finite* intellects for their being insofar as they exist eternally in the infinite *divine* intellect, as the archetypes according to which God creates the world.[5]

Now let us turn to the five corresponding approaches to teleology. *Teleological realism* affirms that teleology is a real and irreducible feature of the natural world, paralleling the realist view that universals are real and irreducible to particulars. Parallel to nominalism is what (following Christopher Shields) we might call *teleological eliminativism*, the view that there is no genuine teleology at all in the natural world. Shields cites ancient atomists like Democritus and Leucippus as representatives of this view, and it seems to be held by at least many contemporary adherents to the modern antiteleological mechanistic conception of nature described in the first sec-

5. For a useful recent introduction to the problem of universals, see J. P. Moreland, *Universals* (Montreal: McGill-Queen's University Press, 2001). Unfortunately, contemporary discussions of the issue tend to pay little or no attention to the position I have labeled "Scholastic realism." For a recent exposition and defense, see John Peterson, *Introduction to Scholastic Realism* (New York: Peter Lang, 1999). Cf. Feser, *The Last Superstition*, 39–49, 90–1.

tion above.[6] Many, but not all. For other contemporary writers whose views are broadly mechanistic would seem more appropriately described as committed to *teleological reductionism*, the view that there is a sense in which teleology exists in nature, but that it is entirely reducible to nonteleological phenomena. For example, philosophers of biology who hold that the function of a biological structure can be analyzed in terms of the reasons why that structure was favored by natural selection would seem to be taking a reductionist rather than eliminativist position.[7] Since conceptualism can be thought of as a reductionist view—universals are real, but contrary to the realist they are really "nothing but" ideas abstracted by the mind—we can regard teleological reductionism as the approach to teleology that parallels the conceptualist view of universals.[8]

Kant's approach to teleology in the *Critique of Judgment* is an interesting case. It might be interpreted as another possible kind of teleological reductionism, and one with even more obvious parallels to conceptualism insofar as Kant regarded teleological analysis as a regulative principle the mind brings to bear on its explanation of biological phenomena. On the other hand, if it is merely a regulative principle, with no objective validity, Kant's position might instead be interpreted as a kind of eliminativism.[9] But since what Kant denied was not that the notion of teleology has objective validity but rather that we can *know* that it does, it might be best to interpret him as taking the agnostic position that some version of teleological realism, reductionism, or eliminativism is true, but we can never know which.

Of greater interest for our purposes, though, is the fact that teleological realism might be spelled out in ways that correspond to each of the three varieties of realism about universals. Christopher Shields and Andre Ariew have recently emphasized the distinction between the first two of these ways.[10]

6. Christopher Shields, *Aristotle* (London: Routledge, 2007), 90. Andre Ariew labels this view "materialism," but Shields's label seems more appropriate given that it is (as we will see presently) possible to be a materialist while being a reductionist rather than an eliminativist about teleology. See Ariew's articles "Platonic and Aristotelian Roots of Teleological Arguments," in *Functions: New Essays in the Philosophy of Psychology and Biology*, ed. Andre Ariew, Robert Cummins, and Mark Perlman (Oxford: Oxford University Press, 2002); and "Teleology," in *The Cambridge Companion to the Philosophy of Biology*, ed. David L. Hull and Michael Ruse (New York: Cambridge University Press, 2007).

7. For the debate over "naturalistic" analyses of biological functions, see David J. Buller, ed., *Function, Selection, and Design* (Albany, NY: State University of New York Press, 1999).

8. Strictly speaking, then, conceptualism would be a species of a more general approach to universals we might call *reductionism*, where other possible varieties of reductionism would include (e.g.) the view that universals are reducible to the totality of their instances. But since the standard classification of approaches to the problem of universals as "realism, nominalism, and conceptualism" is so well established, I have opted to follow tradition rather than introduce a novel (but arguably more precise) "realism, nominalism, and reductionism" classification.

9. Such a reading might also be called "instrumentalist," but since a useful fiction is still a fiction, such an instrumentalism would still seem nothing more than a riff on eliminativism rather than a separate view.

10. See Shields, *Aristotle*, 68–90, and the two articles by Ariew cited above.

Platonic teleological realism holds that the irreducible teleology manifest in nature is extrinsic, entirely derivative from an outside source.[11] Natural phenomena *as such* are not teleological, but they have been ordered to certain ends by (say) a divine mind. Shields cites Anaxagoras as an ancient representative of this view; Ariew cites Plato (given the demiurge of the *Timaeus*), Newton, and William Paley. *Aristotelian teleological realism* holds that teleology or final causality is intrinsic to natural substances, and does not derive from any divine source. Aristotle did of course believe in a divine Unmoved Mover. But he thought that the existence of the Unmoved Mover followed from the fact of motion or change, not from the existence of final causes, which he regarded instead as simply a basic fact about the world. The acorn points beyond itself to the oak—not because it was *made* that way, but because it just *is* that way by nature, simply by virtue of being an acorn.[12] It does not do this consciously, of course, since acorns are totally unconscious. The whole point of the Aristotelian view is to insist that goal-directedness does not require a mind which consciously intends the goal. Hence, *pace* many adherents of the Platonic approach to teleology, there is on the Aristotelian view no necessary connection between teleology and theism.

What Shields and Ariew overlook is that there is a middle ground position between the Platonic and Aristotelian views, which we might call *Scholastic teleological realism*; and it corresponds quite neatly to the Scholastic middle ground position between Platonic and Aristotelian approaches to the problem of universals. On this view, represented most prominently by Aquinas's Fifth Way, final causes are indeed immanent within or intrinsic to natural substances, just as the Aristotelian claims they are. The acorn can be known to be "directed at" the oak entirely independently of the question of God's existence, and theism can in practice be "bracketed off" from the study of final causes as such. All the same, for the Scholastic teleological realist, the existence of final causes must *ultimately* be explained in terms of the divine intellect. The difference from the Platonic approach is that the Scholastic view does not take the existence of a divine ordering intelligence to follow *directly* from the existence of teleology in nature. An intermediate step in argumentation is required, for the link between teleology and an ordering intelligence is (with a nod to Aristotle) not taken to be *obvious*. This is one reason why (as we shall see) the Fifth Way differs from the strategy taken by Paley and by contemporary ID theorists.

Note the parallels with the three versions of realism about the problem of universals. For Platonic realism about universals, the universal essence *acorn* exists entirely apart from particular acorns and from the finite minds that grasp this universal, in a "third realm"; for Platonic teleological realism,

11. Shields labels this view "teleological intentionalism," and Ariew calls it "Platonic teleologism."

12. See Monte Ransome Johnson, *Aristotle on Teleology* (Oxford: Oxford University Press, 2005) for a recent book-length treatment of Aristotelian teleological realism.

the end or goal of an acorn exists entirely apart from it, in (say) a divine mind, which orders it to its end. For Aristotelian realism about universals, the universal essence *acorn* exists only in particular acorns themselves and in the finite minds that abstract it; for Aristotelian teleological realism, the end or goal of an acorn exists only intrinsic to the acorn itself. For Scholastic realism about universals, the universal essence *acorn* exists in the particular acorns themselves and in the finite minds that abstract it, but it also preexists in the divine intellect as the archetype according to which God creates acorns; for Scholastic teleological realism, the end or goal of an acorn exists intrinsic to the acorn itself, but only because God created it according to the preexisting essence in question, which includes having the generation of an oak as an end or goal.

To summarize the five main approaches to teleology: *Teleological eliminativism* denies that there is any teleology at all in the natural world. *Teleological reductionism* allows that there is, but holds that it can be reduced to nonteleological phenomena. *Platonic teleological realism* holds that there is irreducible teleology in the natural world but only in the sense that an external ordering intellect orders things to certain ends. *Aristotelian teleological realism* holds that there is irreducible teleology in the natural world and that it is immanent, existing in things simply by virtue of their natures and in no way dependent on an ordering intelligence. *Scholastic teleological realism* holds that there is irreducible teleology in the natural world and that it is immanent to things given their natures, but also that the fact that they exist with natures directing them to those ends cannot itself ultimately be made sense of apart from a divine ordering intelligence.

Levels of Teleology

We will have more to say about what motivates the Scholastic position. But before doing so, it will be useful to identify the five levels of the natural world at which teleology might be held to exist. In philosophical discussions of teleology, biological examples have tended to dominate, certainly in modern philosophy and to some extent even in Aristotle. Indeed, it is often assumed that to attribute teleology to some natural phenomenon is to attribute to it a function of the kind a biological organ serves, or perhaps of the kind a human artifact serves. But this is a mistake. For many teleological realists—in particular, for the Scholastic teleological realist—biological function is merely one kind of teleology among others.

Biological teleology paradigmatically involves a part serving to realize the good of some whole, in the way the stomach functions to digest food so that the organism as a whole can survive, or the way sexual organs function to enable an organism to reproduce so that the species as a whole will carry on beyond its death. For Scholastic writers, a capacity for this sort of "im-

manent causation" (to use the Scholastic jargon) *just is* what makes something a living thing. Inanimate phenomena are capable only of "transeunt causation," causation which terminates in an effect outside the cause itself and therefore does not promote the cause's own good. (Living things exhibit transeunt causation as well; the point is that, unlike inanimate things, they are also capable of immanent causation.[13])

But inanimate phenomena are nevertheless capable of exhibiting a more basic kind of teleology. Indeed, for the Scholastics, even the simplest causal regularity in the order of efficient causes presupposes final causality. If some cause *A* regularly generates some effect or range of effects *B*—rather than *C*, *D*, or no effect at all—then that can only be because *A* of its nature is "directed at" or "points to" the generation of *B* specifically as its inherent end or goal. To oversimplify somewhat, we might say that if *A* is an efficient cause of *B*, then *B* is the final cause of *A*.[14] If we deny this—in particular, if we deny that a thing by virtue of its nature or essence has causal powers that are directed toward certain specific outcomes as to an end or goal—then (the Scholastic holds) efficient causality becomes unintelligible. Causes and effects become inherently "loose and separate," and there is no reason in principle why any cause might not be followed by any effect whatsoever or none at all. From an A-T point of view, it is precisely the early moderns' rejection of final causes, substantial forms (or inherent essences), and the like that opened the way to Humean puzzles about causation and induction.[15] (Interestingly, there has been a trend in recent analytic metaphysics back toward the idea that material substances have inherent causal powers by virtue of which they exhibit what George Molnar calls a kind of unconscious "physical intentionality," and what David Armstrong calls a "proto-intentionality" or "pointing beyond themselves" to certain outcomes.[16] What such writers do not seem to realize is that they have essentially returned to a Scholastic position.[17])

13. For discussion, see Feser, *Aquinas*, 132–7, and Oderberg, *Real Essentialism*, 177–83.

14. As Aquinas puts it, "every agent acts for an end: otherwise one thing would not follow more than another from the action of the agent, unless it were by chance" (*Summa Theologiae* I, q.44, a.4). By "agent" he means not just thinking beings like us, but anything that brings about an effect.

15. But not only from an A-T point of view. Alfred North Whitehead makes a similar point in *Science and the Modern World* (New York: The Free Press, 1967), arguing that the problem of induction is generated by a mechanistic conception of matter on which for any material particular, "there is no inherent reference to any other times, past or future" (51). Hence, "if the cause in itself discloses no information as to the effect, so that the first invention of it must be *entirely* arbitrary, it follows at once that science is impossible, except in the sense of establishing *entirely arbitrary* connections which are not warranted by anything intrinsic to the natures either of causes or effects" (ibid., 4).

16. See George Molnar, *Powers: A Study in Metaphysics* (Oxford: Oxford University Press, 2003), and D. M. Armstrong, *The Mind–Body Problem* (Boulder, CO: Westview, 1999), 138–40.

17. On the other hand, this implicit vindication of Aristotelianism is acknowledged in Nancy Cartwright, "Aristotelian Natures and the Modern Experimental Method," in *Inference, Expla-*

More complex inanimate causal patterns might also arguably exhibit teleology. A-T philosopher David Oderberg holds that natural cycles like the water cycle and the rock cycle provide clear examples.[18] Consider the water cycle: condensation leads to precipitation, which leads to collection, which leads to evaporation, which leads to condensation, and the cycle begins again. Scientists who study such processes identify each of their stages as playing a certain specific role relative to the others. In particular, each stage has the production of a certain outcome or range of outcomes as the "end" or "goal" toward which it points—the role of condensation is to bring about precipitation, for example. Nor, Oderberg argues, will it do to suggest that the cycle could be adequately described by speaking of each stage as being the efficient cause of certain others, with no reference to its playing a "role" of generating some effect as an "end" or "goal." For each stage has many other effects that are not part of the cycle. Condensation in some area might for all we know cause someone to have arthritic pain in his big toe. But causing arthritic pain is no part of the water cycle. Some causal chains are relevant to the cycle and some are not. Nor is it correct to say that the student of the water cycle just happens to be interested in how water in one form brings about water in another form, and is not interested in arthritis, so that he pays attention to some elements in the overall causal situation rather than others. For the patterns described by scientists studying such cycles are *objective* patterns in nature, not mere projections of human interests. But the only way to account for this is to recognize that each stage in the process, while it might have various sorts of effects, has only the generation of certain *specific* effects among them as its "end" or "goal" *in the cycle*. In short, it is to recognize such cycles as teleological.

Obviously, many questions might be raised about such arguments, but the point is merely to note that both basic causal regularities and complex inorganic processes provide further examples of arguably teleological natural phenomena, additional to the standard example of biological phenomena. Within biological phenomena too, though, we might distinguish two further possible examples of natural teleology. The "immanent causation" spoken of above is common to all living things, whether plants or animals. But unlike plants, animals are capable of sensation, appetite, and locomotion, namely, movement prompted by appetite in response to what sensation has detected in an animal's environment. All of this entails a kind of goal-seeking—the kind manifest in conscious desires—that goes beyond the mere coordination of parts to the good of the whole that plants also possess. This plausibly indicates a further level of biological teleology, beyond the basic level represented by plants. Furthermore, in human beings, desire is informed by

nation, and Other Frustrations: Essays in the Philosophy of Science, ed. John Earman (Berkeley: University of California Press, 1992).

18. David S. Oderberg, "Teleology: Inorganic and Organic," in *Contemporary Perspectives on Natural Law*, ed. Ana Marta Gonzalez (Aldershot: Ashgate, 2008).

reason; our actions are guided by *thought*, which has a conceptual structure foreign to other animals. Here we have intentionality, and purpose in the fullest sense—and, it seems, yet another level of teleology. And that human action is *irreducibly* teleological is a thesis that has had a long history in philosophy.[19]

Again, whether there really is teleology at these or any other levels of nature—and if so, whether it ought to be interpreted in a reductionist, Platonic, Aristotelian, or Scholastic fashion—is not something we can settle here. The point is that there are at least these five levels at which irreducible teleology *might* be said to exist: in *basic causal regularities*; in *complex inorganic processes*; in *basic biological phenomena*[20]*; in distinctively animal life*; and in *human thought and action*.[21]

Teleological Arguments in Paley, ID Theory, and Thomism

It is generally assumed in contemporary philosophy that if irreducible teleology really does exist in nature, then it necessarily follows that there must be an ordering intelligence (presumably a divine one) responsible for this. Naturalists deny that such irreducible teleology exists and defenders of Paley-style design arguments and/or of ID theory affirm that it does, but

19. The irreducibly teleological character of human action has been defended most recently in G. F. Schueler, *Reasons and Purposes* (Oxford: Oxford University Press, 2003) and Scott Sehon, *Teleological Realism* (Cambridge, MA: MIT Press, 2005).

20. There are further distinctions that could be made within this level. E.g., as Ariew has emphasized in the articles cited above, the adaptation of an organism to its environment is only one apparent instance of biological teleology, and one that is commonly claimed to have been explained away by Darwin. Developmental processes, and in particular the fact that some growth patterns are normal and others aberrant, provide another example, and one that Darwinism has *not* explained away. (Cf. Marjorie Grene, "Biology and Teleology," in *The Understanding of Nature: Essays in the Philosophy of Biology* (Dordrecht: D. Reidel, 1974), and J. Scott Turner, *The Tinkerer's Accomplice: How Design Emerges from Life Itself* (Cambridge, MA: Harvard University Press, 2007).) Then there is the way in which genetic information seems to "point beyond itself" to a phenotypic expression—a circumstance physicist Paul Davies has noted appears to evince precisely the sort of purpose mechanism rules out, and which biophysicist Max Delbrück characterized as a vindication of Aristotle. (See Paul Davies, *The Fifth Miracle* (New York: Simon and Schuster, 1999), 121–2; and Max Delbrück, "Aristotle-totle-totle," in *Of Microbes and Life*, ed. Jacques Monod and Ernest Borek (New York: Columbia University Press, 1971). For a recent debate, see Sahotra Sarkar, "Genes Encode Information for Phenotypic Traits," and Peter Godfrey-Smith, "Genes Do Not Encode Information for Phenotypic Traits," in *Contemporary Debates in Philosophy of Science*, ed. Christopher Hitchcock (Oxford: Blackwell, 2004).)

21. These last three correspond, of course, to the traditional Aristotelian distinction between vegetative, animal, and rational forms of life. Whether one thinks these really are irreducible, it is (*pace* the glib assumption to the contrary made by most contemporary philosophers and scientists) at least *debatable* whether they are. See Oderberg, *Real Essentialism*, chs. 8–10 for a recent defense of the traditional Aristotelian distinction.

they share this assumption about what the existence of irreducible teleology would entail if it were real. But as we have seen, Aristotelian teleological realism denies this assumption, and holds instead that teleology is both immanent to the natural world and in need of no further explanation, divine or otherwise. One of the differences between Paley and ID defenders on the one hand, and A-T defenders of Aquinas's Fifth Way on the other, is that the latter acknowledge the Aristotelian challenge and take it seriously. The reason is that they reject the mechanistic conception of nature held in common by naturalists on the one hand and Paley and ID defenders on the other—a conception which, by definition, rules out from the start the Aristotelian view that teleology is immanent to natural substances.

Now, defenders of ID theory do sometimes deny that their position is mechanistic. For example, William Dembski does so several times in his book *The Design Revolution*.[22] But elsewhere in the same book, and in other writings, Dembski makes assertions that clearly presuppose the truth of a mechanistic conception of nature, at least as A-T writers understand "mechanism." For example, in discussing Aristotle in *The Design Revolution*, Dembski identifies "design" with what Aristotle called *techne* or "art."[23] As Dembski correctly says, "the essential idea behind these terms is that information is conferred on an object from outside the object and that the material constituting the object, apart from that outside information, does not have the power to assume the form it does. For instance, raw pieces of wood do not by themselves have the power to form a ship." This contrasts with what Aristotle called "nature," which (to quote Dembski quoting Aristotle) "is a principle in the thing itself." For example (again to quote Dembski's own exposition of Aristotle), "the acorn assumes the shape it does through powers internal to it: the acorn is a seed programmed to produce an oak tree"—in contrast to the way the "ship assumes the shape it does through powers external to it," via a "designing intelligence" which "imposes" this form on it from outside.

Having made this distinction, Dembski goes on explicitly to acknowledge that just as "the art of shipbuilding is not in the wood that constitutes the ship" and "the art of making statues is not in the stone out of which statues are made," "so too, *the theory of intelligent design contends that the art of building life is not in the physical stuff that constitutes life but requires a designer*" (emphasis added). In other words, living things are for ID theory (at least as Dembski understands it) to be modeled on ships and statues, the products of *techne* or "art," whose characteristic "information" is not "internal" to them but must be "imposed" from "outside." And that *just is* what A-T philosophers mean by a "mechanistic" conception of life. As Dembski says elsewhere, in putting forward ID theory, "I don't want to give the im-

22. William Dembski, *The Design Revolution* (Downers Grove, IL: InterVarsity, 2004), 25, 151.

23. Ibid., 132–3.

pression that I'm advocating a return to Aristotle's theory of causation. There are problems with Aristotle's theory, and *it needed to be replaced*."[24] So, for ID theory as for Paley, it is (contrary to the A-T position) at least *possible* that natural substances have no end, goal, or purpose; they just think this is *improbable*. The reason is that their essentially mechanistic conception of nature leads them to model the world on the analogy of a human artifact. The bits of metal that make up a watch have no *inherent* tendency toward functioning as a timepiece; it is at least *theoretically* possible, even if improbable, that a watch-like arrangement might come about by chance. And natural objects are like this too; there is nothing *inherent* in any natural object or system—no essences, natures, substantial forms or anything else corresponding to such Aristotelian-Scholastic categories—by which we might read off final cause or teleology. The world *might* be like a collection of bits of metal that have by sheer accident come together in the form of something resembling a watch. It is just that this is so highly improbable that the "best explanation" is that some intelligence arranged the bits that make up the world into their present purposive configuration, much as a watchmaker arranges bits of otherwise purposeless bits of metal into a watch. This approach is what led Paley to focus on complex biological phenomena, and it has led ID theorists to do the same. It is only because the eye or the bacterial flagellum exhibits "specified complexity" (as William Dembski holds) or "irreducible complexity" (as Michael Behe claims) that they stand out as candidates for design. The implication is that fingernails or eyelids (say)—not to mention inanimate substances and processes—would not provide nearly as powerful a case, or even any case at all.

The A-T approach could not be more different.[25] For the Aristotelico-Thomist, there is simply a fundamental metaphysical difference between

24. William Dembski, *Intelligent Design* (Downers Grove, IL: InterVarsity, 1999), 124 (emphasis added). Cf. Dembski's *No Free Lunch* (New York: Rowman and Littlefield, 2002), 5. The context of the discussion in both cases is the early modern philosophers' rejection of Aristotelian formal and final causes, and Dembski makes it clear that his problem is not with the rejection of Aristotle's position, but only with how "what replaced it" ended up "excluding design" of *any* sort.

25. For a critique of Paley's design argument from an A-T perspective, see Christopher F. J. Martin, *Thomas Aquinas: God and Explanations* (Edinburgh: University of Edinburgh Press, 1997), ch. 13. For a critique of ID theory written from a broadly A-T point of view, see Ric Machuga, *In Defense of the Soul* (Grand Rapids, MI: Brazos, 2002), 161–6, though there are significant inaccuracies in Machuga's exposition of A-T metaphysics. Benjamin Wiker, "Review of Ric Machuga, *In Defense of the Soul*," *ISCID Archive* (October 18, 2003) is a response to Machuga that corrects the errors in his exposition and sets out a more detailed account of the differences between A-T and ID. See also Oderberg, *Real Essentialism*, 287; Francis J. Beckwith, "How to Be an Anti-Intelligent Design Advocate," *University of St. Thomas Journal of Law and Public Policy* 4:1 (2009–10); Michael Tkacz, "Aquinas vs. Intelligent Design," *This Rock* (November 2008); and the more-or-less A-T inspired critique of ID presented by Edward T. Oakes in his review of Phillip E. Johnson's *The Wedge of Truth* in *First Things*, January 2001, and the debate this generated in "Edward T. Oakes and His Critics: An Exchange," *First Things*, April 2001.

natural substances and human artifacts. The parts of a living thing, for example, are oriented *inherently* and *by nature* toward functioning together for the good of the whole. The parts of an artifact, by contrast, have no inherent or natural tendency to function together in this way, and must be made to do so by something outside them. Their natural orientation is toward other ends—those inherent in their being whatever natural substances they happen to be—even if an artificer might be able to organize them in such a way that these natural tendencies do not frustrate the artificial end he wants them to serve. To take an example from Aristotle, if a wooden bed could be planted (while the wood was still fresh from the original tree, say) what would grow from it, if anything, would be a tree and not a bed.[26] The *natural* orientation of the fresh wood is to be "treelike" rather than bedlike, even if a skilled craftsman can arrange it so as to function as a bed all the same. In general, for A-T, artifacts and the ends they are *made* to serve presuppose natural substances and the tendencies they *naturally* exhibit, so that it is incoherent to model natural substances on artifacts. That does not mean that natural objects are not created by God. But it does entail that God does not create them *in the way* a craftsman arranges parts so as to produce an artifact.

Similarly, the reason A-T philosophers affirm the existence of irreducible teleology in nature has nothing at all to do with complexity or the weighing of probabilities, nor with any analogy to human designers, nor with biological phenomena more than any other natural phenomena. As we saw in the third section, A-T affirms the existence of irreducible teleology at all five of the levels of nature there distinguished, including the simplest causal regularities.[27] *Qua teleological*, the functions served by fingernails or eyelids, or the tendency of an ice cube to cause room temperature water to grow colder, are no more or less significant than the eye or the bacterial flagellum. A-T holds that teleology must exist of *metaphysical necessity* in the natural objects that have it, otherwise they simply would not *be* the objects they by nature are—it is not a matter of probability, high or low. For that very reason, A-T philosophers follow Aristotle in holding that *detecting* teleology has nothing whatsoever to do with reasoning on the basis of an analogy between some natural substance or process and the products of human design, or indeed even with supposing that there is a designer in the first place. If a thing is *naturally* directed toward a certain end, that is (naturally) because it is in its *nature* to be, and we can know the natures of things without knowing where they came from.

Explaining (as opposed to detecting) the existence of irreducible natural teleology is a different story, at least for Scholastic teleological realism if not for Aristotle himself. But even here the question has nothing to do with

26. Aristotle *Physics* bk. 2, ch. 1.

27. Contrast Dembski, *The Design Revolution*, 140, which allows that such regularities are "as readily deemed brute facts of nature as artifacts of design."

drawing analogies with human designers, weighing probabilities, or the like. This brings us to Aquinas's Fifth Way. The argument starts out as follows:

> We see that things which lack intelligence, such as natural bodies, act for an end, and this is evident from their acting always, or nearly always, in the same way, so as to obtain the best result. Hence it is plain that not fortuitously, but designedly, do they achieve their end.[28]

This essentially sums up what has been said already. Aquinas is not saying here that certain exceptional natural objects—those which exhibit "specified complexity" or "irreducible complexity," say—are so difficult to account for in purely naturalistic terms that it is probable that they were made by an intelligent designer. He is saying that *any natural body at all*—even a very simple one—which regularly behaves in a certain way must have that way of behaving as its natural end. It is not a matter of "high probability," but a matter of the way a thing *has* to act given its nature.[29] It is in this sense that such unintelligent objects act "designedly" rather than "fortuitously." Aquinas is not referring here to an intelligent designer; he does not get to God until the second half of the argument. He is instead simply making the Aristotelian point that regularity points to teleology, that if *A* is an efficient cause of *B* then generating *B* must be the final cause of *A*. Other translations have "by purpose" or "by intention" rather than "designedly," and all of these expressions must be read in an Aristotelian way, as connoting final causality or immanent end-directedness as opposed to chance or fortuitousness.

At this stage in the argument, then, Aquinas is not saying anything that would not also be said by the Aristotelian teleological realist. Where he goes beyond the latter to a distinctively Scholastic teleological realist position is in the second half of the argument:

> Now whatever lacks intelligence cannot move towards an end, unless it be directed by some being endowed with knowledge and intelligence; as the arrow is shot to its mark by the archer. Therefore some intelligent being exists by whom all natural things are directed to their end; and this being we call God.

Here Aquinas *does* claim that the teleology or end-directedness in nature affirmed in the first half of the argument must ultimately be explained in terms of a divine ordering intelligence. Notice that here too, though, he makes no

28. Thomas Aquinas, *Summa Theologica*, trans. Fathers of the English Dominican Province (New York: Benzinger Brothers, 1946), I, q.2, a.3.

29. Why, then, does Aquinas speak of things acting "always, or *nearly* always" in a certain way? Because a natural tendency can be frustrated. An acorn will always grow into an oak under the right circumstances—rather than into an elm, or a spider, or a dog—because that is its natural tendency. But of course, the right circumstances do not always obtain. The acorn may be damaged, or put into a desk drawer, or eaten. When A-T philosophers talk about the way things have to behave by nature, they don't mean that they will always succeed in behaving that way, but rather that that is the way they naturally *tend* to behave, the way they will behave *unless prevented* from doing so.

reference to probabilities—he says that unintelligent natural objects *cannot* move towards an end unless directed by an intelligence, not that it is highly improbable that they will do so. That is one reason why Aquinas's reference to the archer cannot be interpreted along the lines of a Paley-style appeal to watchmakers and the like. Another is that arrows and their behavior when shot are very simple phenomena, unlike watches and other machines of the sort Paley and his heirs use to construct an argument from analogy. Aquinas is not saying "Arrows are complex objects made by intelligent beings, and certain natural objects are also complex; so, by analogy, we can infer that they were made by an intelligent being too." Nor is he even saying "Arrows reach their mark because an intelligent being makes them do so; therefore, by analogy, we can infer that anything that aims at a certain end must be made to do so by an intelligent being"—as if the argument were an extremely feeble inductive generalization based on a single instance! It is not an inductive generalization at all, nor an argument from analogy, nor an argument to the best explanation. Again, Aquinas's claim is a very strong one; he is saying that an unintelligent object *cannot* move toward an end—*cannot* have a certain outcome as its final cause—unless directed by an intelligence. This is a *metaphysical* assertion, not an exercise in empirical hypothesis formation.

What Aquinas *is* doing here is something I have discussed at length elsewhere.[30] For our purposes here, it will suffice to note that Thomists have interpreted the argument along the following lines. One of the common objections to the very idea of final causation is that it seems to entail that a thing can produce an effect even before that thing exists. Hence to say that an oak tree is the final cause of an acorn seems to entail that the oak tree—which does not exist yet—in some sense causes the acorn to pass through every stage it must reach on the way to becoming an oak, since the oak is the "goal" or natural end of the acorn. But how can this be? Where goal-directedness is associated with consciousness, as it is in us, there is no mystery. A builder builds a house, and he is able to do so because the *form* of the house exists in his intellect before it is instantiated in a concrete particular object. And of course, the materials that will take on that form also exist already, waiting to take it on. So there is no question of something having a cause that does not yet exist: the materials already exist in the natural world; the form exists in the builder's intellect; and the builder himself already exists, ready to arrange the materials so that they take on the form of a house. Together these already existing factors suffice to account for the coming into being of the house.

So, final causation is perfectly intelligible when associated with an intelligence, because in that case the "end" or "goal" *does* exist already as

30. See Feser, *Aquinas*, 110–20, and *The Last Superstition*, 110–19. Cf. Reginald Garrigou-Lagrange, *God: His Existence and His Nature* (St. Louis: B. Herder, 1939), 1:345–72; Maurice Holloway, *An Introduction to Natural Theology* (New York: Appleton-Century-Crofts, 1959), 134–53; and Martin, *Thomas Aquinas*, ch. 13.

a form in the intellect. Is there any other way the end or goal might exist already? There would seem to be only four possibilities: It might exist in the natural object itself; it might exist in a Platonic "third realm"; it might exist in some human intellect, or in another intellect within the natural world; or it might exist in an intellect outside the natural world altogether. But it obviously does not exist in the natural object itself; if the form of an oak were already in the acorn itself, it would be an oak, and it is not. It cannot exist in a Platonic "third realm" either, at least not if one endorses (as the Scholastic teleological realist does) the Aristotelian realist critique of Platonic realism about universals. Nor can it exist in some human or other intellect within the natural order, at least not without a vicious regress. Humans obviously are not the ones directing acorns and other natural objects (including human beings themselves) to their natural ends; and if we supposed that some other nonhuman but still natural intellects were doing so, this would just raise the question of what directs *those* intellects (since they too would be natural objects with final causes of their own) to *their* ends. The only possibility remaining, then, is the last one: Final causation in the natural world is intelligible because there is an intelligence altogether outside the natural order that directs natural objects to their ends.

To the "How can something nonexistent be a cause?" objection to final causation, then, the Thomist's reply is to say, "It can't. That's why the final cause of a natural object must exist already as an idea or form in an intellect existing altogether outside the natural order." Notice that, though the exposition of the argument made reference to the example of a house builder, it is *not* an "argument from analogy" in the sense that design arguments are thought to be. The reasoning is not "Houses are made by intelligent beings, and natural objects are analogous to houses, so they too are probably made by intelligent beings." The point of the builder example is rather to illustrate one of several possible ways the form of a thing might be efficacious even though the thing itself does not yet exist. The argument then goes on to try to show that all the other possibilities can be ruled out, and thus that there is no other way to make sense of the efficacy of final causes. Its structure is that of an attempted metaphysical demonstration, not that of an appeal to analogy, inductive generalization, argument to the best explanation, or any other exercise in empirical hypothesis formation.

In summary, then, the thrust of the Fifth Way is this: (1) Irreducible teleology is immanent to the natural order; (2) but such teleology is unintelligible unless there is an intellect outside the natural order; so (3) there is an intellect outside the natural order. The argument differs from Paley-style design arguments and the arguments of ID theorists in ways other than those already mentioned. For example, since the entities comprising the natural world have the final causes they have as long as they exist, the intellect in question has to exist as long as the natural world itself does, so as continu-

ally to direct things to their ends. The deistic notion that God might have "designed" the world and then left it to run independently is ruled out. Here, as in the other main Thomistic arguments for God's existence, the aim is to show that God is a *sustaining or conserving* cause of the world rather than that He got the world started at some point in the past. But why assume that the ordering intellect in question has all the divine attributes in the first place? Here appeal would have to be made to broader themes of A-T metaphysics. For example, an ordering intelligence which sustains a thing's having the *natural* ends it has would thereby be that which gives it its *nature* or *essence*. From an A-T perspective, this in turn entails conjoining an essence with an "act of existence," and only that in which essence and existence are identical—that which is *ipsum esse subsistens* or Subsistent Being Itself—can possibly do that. When this notion is itself unpacked, all the divine attributes follow. Hence the suggestion that the ordering intellect might be a very powerful but still finite designer (often raised against the "design argument") or even an extraterrestrial (as ID theorists sometimes allow) is also ruled out. The Fifth Way, when worked out, is intended to get us all the way to the God of classical theism.

Whether it succeeds in doing so is not something that can be settled here. The point is just to explain how the A-T approach to these questions differs from those that have gotten the bulk of the attention in the contemporary debate over the teleological argument. With at least five main approaches that could be taken to the question of whether teleology exists in the natural world, at least five levels of nature at which it could be said to exist, and at least two main approaches one could take to constructing a teleological argument for God's existence, the issue of teleology is far more complex than many contemporary philosophers may realize.[31]

31. The blogosphere has recently seen some fairly intense debate between ID theorists and A-T philosophers. Some readers might find of interest an exchange on the subject between me, Vincent Torley, and William Dembski that occurred in early 2010 at my personal blog and at the blog Uncommon Descent. In the course of the exchange I address several issues that are beyond the scope of the present paper but relevant to understanding the larger dispute between ID and A-T. Here are the relevant Web addresses: Feser, "'Intelligent Design' Theory and Mechanism," http://edwardfeser.blogspot.com/2010/04/intelligent-design-theory-and-mechanism.html; Torley, "A Response to Professor Feser," http://www.uncommondescent.com/intelligent-design/a-response-to-professor-feser/; Feser, "ID Theory, Aquinas, and the Origin of Life: A Reply to Torley," http://edwardfeser.blogspot.com/2010/04/id-theory-aquinas-and-origin-of-life.html; Dembski, "Does ID Presuppose a Mechanistic View of Nature?" http://www.uncommondescent.com/intelligent-design/does-id-presuppose-a-mechanistic-view-of-nature/; Feser, "Dembski Rolls Snake Eyes," http://edwardfeser.blogspot.com/2010/04/dembski-rolls-snake-eyes.html; Torley, "In Praise of Subtlety," http://www.uncommondescent.com/intelligent-design/in-praise-of-subtlety/; and Feser, "ID, A-T, and Duns Scotus: A further reply to Torley," http://edwardfeser.blogspot.com/2010/04/id-t-and-duns-scotus-further-reply-to.html.