

Introduction

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At a first pass, the concept of teleology seems clear enough. Its central idea is that some things happen, or exist, for the sake of other things. That, for example, children go to zoos in order to see animals. Hippos lie in mud in order to cool themselves. Lions' teeth are for the sake of tearing flesh. It is closely related to a family of further notions including ends, goals, purposes, functions, and final causes. If some things happen or exist for the sake of other things, then the latter may be identified as the ends, goals, purposes, functions or final causes of the former. Seeing animals is a goal for children visiting zoos. Tearing flesh is a function of a lion's teeth. The concept of teleology, seemingly clear in itself, also seems simple to apply. Supposing that hippos lie in mud in order to cool themselves, we find it easy to suppose that the goal of cooling themselves might explain why hippos lie in mud. Why is the hippo lying in mud? To cool itself. As my zoo-loving daughter likes to say: easy peasy.

As we dig deeper into the concept of teleology, however, more and more questions arise. One set of questions centers around the issue of whether teleology is inherent in its subjects or imposed from the outside. Is teleology *intrinsic* or *extrinsic*? Take, for example, the box in my son's bedroom. It was once used to package, store, and transport shoes. That was its function, its purpose. It is now used to store Legos. Now, that's its function, its purpose. The function of the box in my son's bedroom seems extrinsic. The box has a function only because someone – a shoe company, a little boy – gives it a function. By itself – intrinsically – it has no function, no purpose, no end. But not so the activities of my son. When he goes to his bedroom in order to play with Legos, his action has a goal, namely, playing with Legos. But that goal isn't – at least

typically – imposed from the outside. Whereas the shoebox seems to have only extrinsic teleology, my son, or his actions, seem to have intrinsic teleology. What else has extrinsic teleology? What else has intrinsic teleology? If we suppose that fire has an end, should we think that its end is extrinsic or intrinsic? If we suppose that hearts have functions, should we suppose that their functions are extrinsic or intrinsic? If we imagine that dogs and cats act teleologically, should we think that their actions are intrinsically teleological, like my son's, or extrinsically teleological, like the function of his Lego box?

Another set of questions centers around *intentionality* – the “aboutness” that is most familiar from our thoughts. When my daughter goes into the kitchen in order to get a cookie her action is teleological – it has the end or goal of getting a cookie. Her action is also intentional in the sense that it involves a thought about something, namely, a cookie. Does intrinsic teleology therefore presuppose intentionality? Could my daughter aim to get a cookie without having a thought about a cookie? What about extrinsic teleology? At first, one might suppose that my son's Lego box shows that there can be extrinsic teleology without intentionality. My son's Lego box is a fine box as far as boxes go, but it doesn't have thoughts of its own: by itself, it's not *about* anything. But, on a second pass, maybe even extrinsic teleology presupposes intentionality. Maybe my son's Lego box has a function only because *he* has thoughts about using it to store his Legos. Perhaps then teleology presupposes intentionality either directly – as when my daughter gets a cookie – or indirectly – as when my son gives a function to a box. That conclusion, however, might be difficult to square with intuitions about organs and lower organisms. For we might think that hearts can have the function of circulating blood without having thoughts about circulating blood and without having been explicitly designed to circulate blood. Likewise, we might think that flowers might open in the morning in order to increase

pollination without having thoughts themselves and without being designed by an intentional creator.

Yet another set of questions concerns the *scope* of teleology. It should be uncontroversial that my daughter and son act for the sake of ends (at least much of the time!). But once we leave the bastion of intentional human action, controversy reigns. Does the world have a purpose? The seas? Fish? Gills? Water? Questions concerning the scope of teleology often intersect with our earlier questions. For example, should we ascribe teleology to artifacts and organs? How we answer this question may depend on how we answer questions about extrinsic and intrinsic teleology. If we think that teleology must be intrinsic, then we may be inclined to deny that artifacts may be genuinely teleological. If we think that teleology may be extrinsic, then we may be more willing to grant that shoes and shoeboxes can have functions. Should we ascribe teleology to lower animals and plants? How we answer this question may depend on how we answer questions about intentionality. If we think that teleology presupposes intentionality, we may be reluctant to ascribe teleology to slugs and hydrangeas. If we think that teleology does not presuppose intentionality, we may see no reason to deny that bugs look for food and that plants seek light. And, of course, all of these considerations cut both ways. If we think that artifacts have genuine functions, we should be more likely to insist that teleology may be extrinsic. If we are sure that slugs and hydrangeas are genuinely teleological, we should be less likely to insist that all teleology must involve intentionality.

A final set of questions concerns the *explanatory power* of teleology. Many philosophers have insisted that genuine explanations must give us information about causes. An explanation of why the car slid off the road must provide information about the causes that resulted in the car's sliding off the road. It must cite, for example, the car's bald tires, its speed as it rounded the

corner, the icy road conditions, etc. Now suppose I know that my daughter went into the kitchen in order to get a cookie. Do I have an explanation of why she went into the kitchen? Is her getting a cookie a cause? Perhaps I do have an explanation and her getting a cookie is a cause. Or perhaps I do have an explanation, but not all explanations involve causes after all. Or perhaps explanations do involve causes, her getting a cookie is not a cause, and – contrary to my first impression – I don't have an explanation of why my daughter went into the kitchen. (Perhaps a genuine explanation of her behavior would cite only brain or events.) Other explanatory puzzles abound. What if there are no cookies in the kitchen? Can my daughter's behavior be explained by something that doesn't exist? My son used to try to solve problems in what he called "superhero math." (What does Superman plus Batman equal? What is Gamora times Aquaman?) Assuming that it is not really possible to perform mathematical operations on fictional characters, can his behavior be explained by something that is, in fact, impossible? And, again, what about organs and artifacts? When I say that the function of hearts is to circulate blood, am I implicitly providing information about the causes of hearts? When I say that the function of my son's shoebox is to store Legos, am I offering a causal explanation, a non-causal explanation, or no explanation at all?

The concept of teleology – like most philosophically interesting concepts – is thus both clear at first pass and puzzling on reflection. This collection of essays seeks to explore in greater depth how the concept of teleology has been understood and developed through different times and traditions. Each essay digs into the views of a particular philosopher, tradition, or genre, seeking to unearth a coherent picture of how that philosopher, tradition, or genre understood the concept of teleology, of how he, she, or it would answer questions such as those just raised:

Was the concept of teleology understood to involve a commitment to intrinsic or extrinsic teleology?

Was the concept of teleology understood to presuppose intentionality?

What did the philosopher, tradition, or genre in question take to be the scope of teleology?

To what extent did that philosopher, tradition, or genre take teleology to be explanatory?

The overarching ambition of the volume is to offer an overview of the concept of teleology that provides insight into its complexity, its evolution, and its unifying themes. That hope is, if you will, the telos of the volume itself.

Our collection begins, appropriately enough, with the place of teleology in Plato's philosophy. In the *Phaedo*, Plato relates Socrates's early disappointment in the natural philosophy of Anaxagoras. Evidently seeking a teleological account of the world, Socrates found in Anaxagoras instead "a man making no use of his Intelligence at all, nor finding in it any reasons for the ordering of things." To Socrates, it was as if Anaxagoras wanted to explain intentional behavior in terms of efficient causes while neglecting the reasons for the behavior. It was as if someone were to say:

The cause of everything that Socrates does is mind – and then, in trying to account for my [i.e. Socrates's] several actions, said first that the reason why I am lying here now is that my body is composed of bones and sinews ... and since the bones move freely in their joints, the sinews by relaxing and contracting enable me to somehow bend my limbs, and that is the cause of my sitting here in a bent position. ... and never troubled to mention the real reasons, which are that since Athens has thought it better to condemn me, therefore I for my part have thought it better to sit here, and more right to stay and submit

to whatever penalty she orders. Because by dog, I fancy that theses sinews and bones would have been in the neighborhood of Megara or Boeotia long ago – impelled by a conviction of what is best! – if I did not think that it was more right and honorable to submit to whatever penalty my country orders rather than to take to my heels and run away.¹

In his chapter on Plato's teleology, Thomas Kjeller Johansen argues that in this passage and others from the *Phaedo*, we can discern Plato's view that any genuine causal account must be holistic and recognize the good as the only proper cause. A genuine causal account must thus not only identify an individual's good but must identify that individual's good in relation to the whole or larger system of which it is a part or element. With Plato's view properly in mind, we can then see, according to Johansen, that the teleological cosmology of Plato's *Timaeus* represents his own attempt to provide a genuine causal account of the world as a whole. Relying heavily upon craft analogies, Plato's teleology looks to be extrinsic, intentional, all encompassing, and explanatory.

In her chapter on Aristotle's teleology, Mariska Leunissen shows how close attention to Aristotle's views on nature shed light on his views on teleology. Like Plato, Aristotle sees a tight connection between teleology and craft. And yet, in sharp contrast with Plato, Aristotle rejects the notion of an intelligent, intentional, extrinsic, divine craftsman. Instead, Aristotle places teleology within the very natures of things. Natural beings, by Aristotle's lights, have innate, internal potentials that tend – unless impeded – to realization. The acorn has becoming a mighty

¹ Plato, *Phaedo*, trans. Hugh Tredennick in *Plato: The Collected Dialogues*, edited by Edith Hamilton and Huntington Cairns, Princeton University Press 1989, [Phd. 98-99] pp. 80-81.

oak among its ends. Unless it is hindered by, say, drought or disease, it will realize that potential under the guidance and force of its intrinsic "crafting" nature. Likewise the bunny rabbit has the perpetuation of its species among its ends. Unless it is impeded by, say, a premature death or the lack of a suitable mate, it will realize that potential under the guidance and force of its intrinsic nature. Leunissen illustrates how Aristotle's understanding of teleology is woven into the details of his accounts of animal generation and the explanation of the parts and features of animals. As she presents him, teleology for Aristotle is a scientific hypothesis verified by the sense it helps us to make of the natural world around us. In contrast to Plato's views, Aristotle's teleology is generally intrinsic and non-intentional. As with Plato, however, it is nonetheless pervasive and explanatorily essential.

On Aristotle's view – as well as on Plato's – there is a tight connection between teleology and goodness. Indeed, on one reading of Aristotle, for something to come about for the sake of an end is for that end to come about because it is, or appears to be, good. Focusing on the work of the tenth century philosopher Avicenna, Kara Richardson argues that Avicenna (*Ibn Sina*) develops an alternative picture of the relationship between final causation and goodness. On Richardson's telling, Avicenna agrees with Aristotle – as well as Plato – that all natural and rational actions are directed towards ends that are, or appear to be, good. Nonetheless, on Richardson's reading, for Avicenna there is no essential connection between ends and goodness. For Avicenna, what is essential about final causes is that they are required for agents to be causes. Although in Avicenna's providentially ordered world, agents bring about ends that are good (or appear to be good) it would nonetheless be a mistake to see goodness (or the appearance of goodness) as being essential to ends themselves. Avicenna would maintain that when my daughter goes into the kitchen in order to get a cookie, the end of getting a cookie

causes her action and appears good to her. However, it does the former essentially, the latter merely contingently. As Richardson presents him, for Avicenna, teleology is pervasive and explanatorily essential. It can also be intrinsic and non-intentional. In being agent-centered rather than good-centered, however, teleology is not essentially tied to an agent's own good.

The later medieval tradition is well known for its development of Aristotelian "Scholastic" philosophy. One might therefore expect philosophers working in that tradition to hew closely to Aristotle's own views on teleology. In his chapter on the later medieval tradition, however, Robert Pasnau argues that the reception of Aristotle's views on teleology during the late middle ages was in fact quite critical. Scholastic philosophers tended to agree with both Plato and Aristotle in seeing teleology as being ubiquitous – their commitment to a providentially ordered universe assured at least that much continuity. Nonetheless, in spite of their Aristotelian credentials, Scholastics tended to side with Plato over Aristotle in seeing teleology as being extrinsic and intentional. Pasnau argues that as a result, the most interesting discussions of teleology in the period often took place in discussions of ethics rather than in natural philosophy, as philosophers of the period wrestled with questions concerning how the human will is related to ends. Are we naturally ordered to our own happiness? If so, how are we to account for acts directed to the goods of others, including God? Is the will naturally inclined to something besides happiness, like justice? Or is it perhaps the case – as William Ockham would boldly propose – that our wills are not naturally inclined to anything at all? On Pasnau's telling, teleology in the later medieval tradition is a concept under massive pressure, pressure that first led philosophers to revise their Aristotelian inheritance and eventually brought them to question the very legitimacy of teleology even in its most secure bastions. In the later medieval tradition,

many philosophers agreed that foundational teleology is intrinsic, intentional and explanatory, but they disagreed over teleology's scope and implications.

In his discussion of teleology in the Jewish medieval to early modern tradition, Yitzhak Melamed begins by offering a brief review of some Rabbinic teachings on the purpose of the world. Those teachings – likely to be quite surprising to contemporary readers – show that Rabbinic thinkers differed considerably in their views on the purpose of the world and felt little temptation to identify the natural with the good. Jewish philosophers in the middle ages nonetheless generally inclined to an anthropomorphic, teleological worldview – to the thought that the world and its parts were created for the sake of humankind. Initially embracing just such a view, the great medieval Jewish philosopher Maimonides came to reject anthropomorphic teleology, with important implications for his views on divine teleology. Engaged in debates over the eternity of the world, Maimonides denies that there can be non-intentional, natural teleology and argues that it makes no sense to speak of God's existence or actions having ends. Melamed shows that similar questions concerning divine teleology arose in the Kabbalistic tradition. The Jewish medieval and Kabbalistic traditions in turn provide underappreciated context for Baruch Spinoza's much-discussed early modern critique of teleology. As Melamed demonstrates, Spinoza's attack on divine and anthropomorphic teleology can be seen as building on the foundations of his Jewish predecessors and setting the stage for his bold claim that even human desires and intentions are nothing more than efficient causes. As Melamed reads him, for Spinoza, my daughter's intending to get a cookie is the result of an inevitable series of efficient causes in which teleology plays no genuine role. For Spinoza, there simply is no teleology – extrinsic, intrinsic, intentional, natural, or otherwise. Teleology and teleological explanations are merely illusions fueled only by our "blind desire and insatiable greed."

The essays by Richardson, Pasnau and Melamed may defy readers' expectations that teleology was widely and uncritically accepted during the middle ages. If so, the essay by Jeffrey McDonough may defy expectations in the other direction. It is often thought that the rise of early modern science undermined a widespread medieval commitment to teleology, that teleological explanations were widely accepted before, but not after, the so-called scientific revolution of the early modern era. But if medieval philosophers were far more critical of teleology and teleological explanations than many have supposed, McDonough argues that, conversely, teleology was frequently upheld and developed even by early modern pioneers of the scientific revolution. He argues that teleological reasoning is inextricably woven into William Harvey's pioneering work in anatomy and physiology and that divine teleology receives an explicit and systematic defense at the hands of Robert Boyle, widely considered to be one of the founding fathers of modern chemistry. Finally, McDonough argues that, in the work of Pierre Maupertuis, we even find a bold attempt to establish a role for teleology in the heart of modern mathematical physics. If for Spinoza teleology is nowhere, for many leading figures of the scientific revolution it is (once again) everywhere. In Harvey, Boyle, and Maupertuis we can find teleology that is, at turns, extrinsic, intrinsic, intentional, natural and deeply explanatory.

In his discussion of the place of teleology in the thought of Immanuel Kant, Paul Guyer argues that for Kant teleology is both a philosophical method and a central topic for philosophy. From early in his career, Kant assumes that our natural ways of thinking, at least properly understood, cannot be in vain – they must have some point, some proper function. As Guyer argues, it is Kant's understanding of the teleology of human reason that structures the overarching argument of his famous *Critique of Pure Reason*, providing the foundation for both Kant's theoretical and practical philosophical programs. Kant's regulative principles for the

conduct of theoretical inquiry and postulates of pure practical reason thus hinge, for Kant, on the assumption that there is a telos to human reasoning. As a philosophical topic, Kant explores teleology in connection with a wide range of subjects, including scientific concepts and laws, aesthetic experiences and judgements, organisms, our understanding of nature, and our relation to nature. Perhaps no philosopher since Aristotle assigns such far-reaching and integral roles to teleology as Kant. And yet, what is most striking and distinctive about Kant's views on teleology is his characteristic suggestion that while we must take teleology for granted as a feature of human experience, we cannot establish it as a metaphysical certitude. As Guyer shows with a masterful command of the subtleties and details of Kant's complex thought and development, Kant ultimately insists that we must reason as if teleology were ubiquitous while admitting that it cannot be established with metaphysical certainty. We must, as it were, act as if Harvey, Boyle, and Maupertuis were right to suppose that teleology is extrinsic, intrinsic, intentional, natural and deeply explanatory, while conceding to Spinoza that for all we know it doesn't exist at all.

In his engaging discussion of teleology in the thought of Georg Wilhelm Friedrich Hegel, James Kreines presents Hegel as deeply engaged with his predecessors' views on teleology, and, in particular, with the views of Aristotle, Spinoza, and Kant. As Kreines reads him, Hegel's interest in teleology is spurred by two considerations in particular. The first is what Hegel sees as an early modern tendency to grant extrinsic teleology even while denying immanent teleology—to allow, for example, that my son's shoebox has a function even while denying that plants and animals have innate, natural ends. The second is Kant's subjectivism about teleology, that is, Kant's view that we should act as if the world is teleologically structured while stopping short of assigning teleology to the world as it is independently of our ways of thinking about it. Kreines argues that the first point "raises the stakes" for Hegel with respect to debates over teleology.

For, according to Hegel, there can be no extrinsic teleology without intrinsic teleology. If my son doesn't enjoy intrinsic teleology, then his shoebox can't enjoy extrinsic teleology. In short, for Hegel, if there is no intrinsic teleology, then there is no extrinsic teleology either, and thus no teleology at all. Kreines argues that the second point leads Hegel to offer a powerful argument to the effect that reflection on the concept of life shows that living creatures may enjoy immanent teleology even without the existence of an external designer. Provoked by early modern skepticism about immanent teleology and Kant's distinctive subjectivism, Hegel seeks to reestablish teleology as being intrinsic, wide-spread, and, explanatory but not necessarily intentional.

In the final chapter of the volume, Patrick Forber explores contemporary accounts of teleology in the context of modern biology. Biological systems have countless well-adapted features that appear to be well designed. Lions have famously sharp teeth. Hippos have a remarkable reflex that allows them to sleep under water. But can genuine teleological functions be assigned to biological systems in a way that is consistent with contemporary views of evolution? After sharpening the challenge to teleological functions provided by Darwin's theory of natural selection, Forber considers two important contemporary approaches to biological functions, namely, etiological accounts and causal role accounts. Very roughly, etiological accounts ground functions in reasons for the presence of an adaptation. The lion has sharp teeth for tearing flesh if its sharp teeth evolved because they tear flesh. Causal role accounts ground functions in the roles parts play in contributing to the capacities of organized systems. The hippo's reflex functions to allow the hippo to sleep under water if that reflex contributes to the hippo's capacity to sleep under water. Forber points out that while etiological and causal role accounts differ in what they see as the deepest roots of teleology, both kinds of accounts share a

common assumption that the ascription of biological functions should be closely tied to scientific explanations. As readers of earlier chapters will recognize, this is very much in keeping with many earlier philosophical accounts going back at least to Plato. Nonetheless, it is precisely in their commitment to tying biological functions to explanations that Forber sees a "devil's bargain." For, Forber argues, in linking biological functions to explanations, the etiological and causal role accounts inevitably make them hostage to our own perspectives, interests, and inquiries. On Forber's account, Kant was in many ways close to right. Teleological ascriptions may be useful, and even subjectively irresistible, but we have no reason to think – indeed, we have good reason not to think – that the world has a teleological structure that is both useful and accessible to us.

Collectively, the main chapters of the volume from Plato to Darwin provide a sort of keepsake book for the history of the concept of teleology as it has been understood by a wide variety of philosophical thinkers and traditions. Those main chapters mark especially important accounts and events in the long life of the concept. But philosophical thinking about teleology never took place in an intellectual vacuum. The concept of teleology is woven into almost every facet of human life. Interspersed with the main chapters, the reader will therefore find a number of shorter "reflection" pieces that point to a few of the many ways in which our thinking about teleology is entangled with other concepts and concerns. In her piece, "Teleology and Function in Galenic Anatomy," Patricia Marechal explains how Galen of Pergamum used a synthesis of Plato's and Aristotle's views on teleology to guide his pioneering working in dissection, anatomy, and physiology. Holly Flora explores the interpretation of Christian teleology present in a thirteenth century cycle of murals painted by the renowned Cimabue at the church of San Francesco at Assisi. Kathryn Murphy shows how Sir Philip Sidney hoped to reconcile his

Aristotelian theory of ends with poetical tropes of courtly love. Anna Harwell Celenza shows how the music critic Barry Ulanov – taking inspiration from Kant – sought, in the mid-twentieth century, to defend the artistic validity of bebop by offering a teleological account of jazz. If the main chapters of the volume aim to show how the concept of teleology endured and evolved in the thought of a wide variety of philosophical thinkers and traditions, the reflection pieces by Marechal, Flora, and Celenza bear witness to the fact that teleology is a concept whose implications reach far beyond the even purview of philosophers. Teleology – if it is anywhere – is everywhere.