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Chapter 13

Organic Powers

Matthew Tugby[1]

Abstract In this chapter I consider how a realist about powers ought to view the distinction between organisms and non-organisms. This is an underexplored issue but David Oderberg's theory of organic teleology provides a good place for the powers theorists to start. I argue that contemporary realism about powers is conducive to a teleological world view, regardless of whether one accepts the Aristotelian theory of substantial forms that Oderberg favours. According to the theory discussed, organisms are all and only those things that have *self-directed* ('immanent') powers, whereby the possessor of the power is also the subject of the power's effect. Such powers closely resemble what philosophers of biology call *autopoietic* functions. I find this approach promising, but argue that it is not easy to define immanent powers in a way that makes them applicable to all and only organisms. Oderberg and others attempt to draw a sharp distinction between organic and inorganic cases by insisting that only in the organic cases does it make sense to say that the entity flourishes by exercising immanent causation. After exploring possible ways of fleshing out the notion of flourishing, I conclude by considering the possibility that the distinction between organic and inorganic powers is not sharp.

Keywords Powers; Dispositions; Teleology; Organisms; Immanent causation; Purpose; Value

M. Tugby
Department of Philosophy, University of Durham, Durham, UK
e-mail: matthew.tugby@durham.ac.uk

13. 1 Introduction: Powers and Organisms

Recently, realism about powers has become a popular metaphysical theory about natural properties. According to this theory, most (if not all) properties are identical with or essentially characterised by causal powers. A distinctive feature of a power is that it is individuated by the manifestation(s) that it is a power for, as when we say that solubility is the power *for* dissolving.[2] Realists about powers are strongly opposed to theories on which properties have a primitive and self-contained 'categorical' essence and on which the laws of nature are contingent. The recent rise of the powers theory represents a turn away from the empiricist metaphysical tradition and a return to the idea that causal potentialities are fundamental features of individuals.

There are several metaphysical reasons for finding the powers theory attractive. For example, it has been argued that the rival categorical theory of properties leads to implausible modal consequences, because it implies the metaphysical possibility of properties being able to swap their causal profiles. It has also been argued that with power realism in play, we can provide satisfactory metaphysical analyses of a range of phenomena, such as the laws of nature (e.g. Bird 2007 and Mumford 2004), counterfactuals (Jacobs 2010), causation (Mumford and Anjum 2011), natural kinds (Ellis 2001), and modality (Vetter 2015).

Although much research has been undertaken to reveal the core metaphysical implications of the powers theory, less work has been done on how the theory affects our understanding of specific phenomena in the natural sciences. When this latter work has been attempted, it has usually focused on phenomena in physics (e.g. Bird 2007 and Nolan 2015). Powers-based analyses of phenomena in the special sciences, such as chemistry and biology, are few and far between. My aim in this article is to help to redress this imbalance by considering a fundamental metaphysical question within the philosophy of biology from the perspective of power realism: what distinguishes organisms from non-organisms? At first glance, this might not seem a particularly interesting question. One might think that the concept of an organism must be commonplace in biology (not to mention everyday discourse) and must thereby be a well understood concept. However, as Nicholson (2014) explains, in the second half of the twentieth century biologists seemed to largely ignore the concept of an organism, shifting their focus to 'sub-organismic entities (like genes) on the one hand, and to supra-organismic entities (like populations) on the other', and questions about the nature of organisms were often 'dismissed as too metaphysical' (Nicholson 2014, p. 347). Other philosophers of biology have even questioned whether organisms exist at all (see Ruse 1989). Thus, it is far from clear that the concept of an organism is in good standing. Moreover, once we acknowledge that organisms are very diverse—ranging from plants to human beings—it is not at all easy to see what they all have in common. And therefore, it is far from clear what the necessary and sufficient conditions are for being an organism.

[2] According to some theories, powers are also individuated by the stimuli which are able to trigger the manifestation of the power (Bird 2007, p. 145).

If we take the view that powers are fundamental components of reality, then we might expect that the difference between an organism and a non-organism consists in the kind of power that each has. The aim of this chapter is to explore this possibility. The challenge before us, then, is to identify a type of power that all and only organisms share. As we shall see, this challenge is formidable. The structure of the chapter is as follows. In sections 2 and 3 I introduce the notion of teleological powers and introduce the idea that organisms exhibit a distinctive form of teleology. In section 4 I explore the problem of how to characterise organic teleological powers in a way that draws a sharp distinction between organic powers and inorganic powers. In section 5 I then consider whether the concept of an organism could still be in good standing even if the boundary between organic and inorganic powers is not sharp. I argue that it could. Although I cannot hope to conclusively settle these debates here, my hope is that the discussion will identify and clarify some of the key issues on which the status of organisms is likely to turn for the powers theorists.

As mentioned above, few powers theorists have considered the nature of organisms using the powers framework. However, I think that the metaphysical work of David Oderberg (2007, 2008) is a natural place to start. Although Oderberg does not always frame his theory in terms of powers,[3] I believe that the teleological aspect of his theory is one that powers theorists should find attractive. According to Oderberg's theory (2008), organisms exhibit a distinctive form of teleology in the sense that they exhibit *immanent* causal processes, which consist in a certain form of *self-directed* behaviour. Within a powers framework, this theory would amount to the view that organisms are distinguished by the possession of immanent powers to act *for their own sake*. I find this immanence hypothesis appealing, and the notion of immanence seems to closely resemble the notion of autopoiesis that is found in the philosophy of biology literature. However, I shall argue that the notion of *immanent* power needs to be spelt out very carefully if it is to delineate organisms and non-organisms. One of the main challenges is that it is difficult to define immanent powers, and the manifestations they give rise to, in a way that precludes them from occurring in inorganic cases of systemic teleology. After considering several ways of characterising organic immanent processes, I shall tentatively suggest that if the theory is to sharply distinguish organisms and non-organisms, it may require an *evaluative* conception of flourishing that has moral import. Some of the challenges facing this approach will then be explored. First, though, we must spell out more of the details of the teleological approach to powers.

13. 2 Powers Theory as a Teleological Metaphysics

Teleological metaphysical theories are ones which take certain activities to exhibit 'finality', which is to say they are end-directed in some sense. According to the theistic teleological theories of the medieval period, end-directedness is imposed externally by the intentions of God. Alternatively, one might claim that end-directedness is *immanent* in the world, grounded

[3] In his 2008 paper, which is about the difference between organic and inorganic teleology, the terminology of powers is not used at all. However, in more recent work, Oderberg (2017) argues that the contemporary notion of final causation, on which teleology depends, is underpinned by the reality of powers. I shall say more about this later.

in the properties of things. According to Aristotle's version of this view, end-directed behaviours are best explained by the kind essences or 'substantial forms' of things. Oderberg also favours this essentialist view, but it is plausible that the existence of powers alone is sufficient to generate a suitable notion of natural teleology, given that powers are precisely characterised by a directedness to their manifestations. However, to be clear, this teleological notion of end-directedness does not imply the presence of a conscious intention or desire. Rather, this is a naturalistic, non-mental notion of end-directedness. As we shall later in section 4, this notion of end-directedness is closely related to the idea of a thing having a natural *function*.

At the heart of any teleological metaphysics is what Aristotelians call 'final' causation. A final cause is precisely a cause which acts or exists for the sake of its natural end or goal. To use Aristotle's biological example of teleological causation, one could say that one of the natural ends of walking is to become healthy (2008, *Physics* II 194b32-195a3). Hence, we might explain (in part) a person's act of walking by reference to the fact that it helps the person to be healthy. But again, not all cases of teleological causation involve the presence of human intentions. According to Aristotelians, non-sentient entities like trees also have powers which exhibit end-directed action, such as an apple tree's power to grow leaves (Cooper, 1982, p. 108).[4] What these cases supposedly have in common is that the (teleological) causal explanations involved are forward-looking and this feature generates a contrast with mechanistic causal explanations, which are backward-looking. To explain a state of affairs mechanistically is to explain how that state has arisen from a previous physical structure and the forces governing it. The example of a leaf moving due to the forces imparted on it by a gust of wind embodies the mechanistic paradigm. On the purely mechanistic theory of causation, there are no natural ends, but rather external forces that physical entities blindly obey. Aristotelians do not go as far as to reject mechanistic or 'efficient' forms of explanation, however. Aristotle did not deny that there are mechanistic causes, but his view was that mechanistic regularities are *explained* precisely by the end-directedness or *finality* of things' powers.

In the early-modern period of philosophy (from 1650 onwards), theories of teleological causation were thought by most philosophers and scientists to be of little more than historical interest. The scientific revolution seemed to put mechanistic (or 'efficient') causes at the heart of natural science, making final causes redundant. According to most historical commentators, this early-modern hostility towards natural teleology was generated primarily by scepticism about Aristotelian essentialism and its concept of substantial forms (see e.g. Garrett 1999). The Aristotelian tradition is one which embraces the idea that many things in nature have an intrinsic telos, in virtue of their intrinsic natures. However, as acknowledged earlier, within the Aristotelian tradition this reference to 'intrinsic natures' represents a commitment not merely to powers, but to something more: an essentialist thesis concerning substantial forms. For instance, on Aristotle's account the power that an acorn has to become a tree is ultimately explained by the substantial form of being an acorn, where such a form is thought to be

[4] As Cooper (1982, p. 125) explains, Aristotle was even willing to extend teleological explanations beyond organic cases, as in the case of the frequency of rain in winter and heat in summer. This point will be of importance in the discussion to follow.

irreducible to the attributes that characterise acorns. What is important to note for our purposes, though, is that it is far from clear that a commitment to final causation and natural teleology entails a commitment to the metaphysics of substantial forms. This is a point that is often overlooked, even by powers theorists themselves. A certain theory of powers is arguably sufficient by itself to generate the notion of final causation on which natural teleology relies.[5]

Oderberg (2017) spells out the end-directedness of powers in terms of the notion of specific indifference, which he explains as follows:

> Finality as specific indifference involves two components: (i) a specific range of possible manifestations of a power, and hence a specific range of possible kinds of behaviour by the object having that power; (ii) indifference with respect to the circumstances of manifestation within that range (2017 p. 2394).

Although Oderberg's theory of powers has its nuances, the basic point about powers being directed towards their possible manifestations is shared by most (if not all) power theorists. As we saw earlier, it is in the nature of a power to tend towards certain manifestations rather than others. Molnar (2003) even argues that the directedness of powers has all of the marks of intentionality (see also Martin and Pfeifer 1986). More recently, Kroll (2017) argues that disposition concepts should be *defined* in terms of end-directedness, leaving us with what he regards as a teleological analysis. It would hardly be surprising, then, if the powers theory led us naturally towards a teleological account of natural phenomena such as organisms.

If the points above are correct, then it seems that Oderberg's own preference for a theory of substantial forms is dispensable as far as the theory of final causation is concerned, providing we are realists about powers. This is a point that Oderberg himself acknowledges when he says that 'one might hold both that particular kinds of directedness were real phenomena of particular kinds of object and that they were merely accidental to those kinds' (2017, p. 2398).[6] I think it is all to the good that the powers theory can accommodate finality in nature without taking a stance on the controversial issue of whether there is a distinct ontological category of substance kind essences. This allows the powers theorists to evade most early-modern critiques of Aristotelianism and the difficult questions that substance kind essentialism invites. I do not have the space to discuss these issues in any detail but one obvious difficulty concerns what the essence of a substantial form is like if it is irreducible to, and something-over-and-above, the attributes that characterise it. Moreover, how can a substantial form's essence, which is supposedly simple, explain something complex like an object's causal profile? Of course, if such difficulties are insurmountable, this would not mean that powers theorists are not entitled to speak of natural kinds. Indeed, the property of being an organism looks precisely like a high-level natural kind. But as the powers theorist Mumford explains, it is perfectly coherent for an anti-essentialist powers theorist to talk seriously about natural kinds. In Mumford's view, all

[5] Oderberg is clear that he thinks organic teleology can be understood in terms of final causation, even though he prefers the terminology of immanent causation (2008, p. 263).

[6] Similarly, in his 2008 paper Oderberg mentions in passing that his account of the distinction between organic and inorganic teleology does not presuppose Aristotelian essentialism (2008, p. 264). For example, all that his account of inorganic teleology requires is 'the thought that for something that is recognizably the rock cycle or the water cycle on Earth to occur, certain kinds of thing have to play certain kinds of role, and certain kinds of processes have to take place' (2008, p. 272).

that talk of kinds requires is that 'each kind-member instantiates the appropriate properties' (2005, p. 420).

A further feature of a powers-based teleological approach to organisms that is worth mentioning is that it can remain silent about how organisms come to *have* the powers that characterise them. I think this neutrality is to be welcomed. We know through the work of Darwinians that organic species like ours acquire their characteristics through natural selection. But it would seem too hasty to build a requirement into our metaphysical theory of organisms that organic powers *must* be naturally selected. This would rule out the metaphysical possibility of organisms whose powers have not evolved through natural selection. Ruling this out seems too strong. Even if, in worlds like ours, all life arises through natural selection, distant possible worlds seem conceivable in which beings like us have a different causal history.[7] Moreover, it might even be the case in the actual world that there will be entities that are alive but which have been designed rather than evolved. For example, if powers are the building blocks of reality, then the functionalist theory of mind (or something like it) has some plausibility, which means that powers theorists should be not be too hasty in ruling out the metaphysical possibility of artificially intelligent agents that are alive.[8]

Now that the basic motivations for a powers-based natural teleology have been sketched, let us consider in more detail what Oderberg says about the sort of teleology exhibited by organisms, and begin to clarify the notion of *immanence* on which it relies.

13.3 Organisms and Immanent Powers

What, then, does a promising powers-based teleological account of organisms look like? As mentioned earlier, Oderberg's view is that all and only organisms engage in *immanent* causation:

> Speaking now in causal terms, living things, unlike non-living things, exercise immanent causation: this is a kind of causation that begins with the agent and terminates in the agent for the sake of the agent (2008, p. 261).

Although Oderberg does not always spell out his theory using the terminology of powers, we can easily construe the theory as proposing that all and only organisms have *immanent powers*. The causation that immanent powers generate is contrasted with what Oderberg calls 'transient' causation (2008, p. 262), which occurs when a cause and its effect involve distinct entities. The paradigmatic cases of immanent causation are those in which an organism '…acts so as to produce, conserve and repair its proper functioning as the kind of thing it is' (2008, p. 261).[9]

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[7] For instance, perhaps there is a possible world in which an organism is formed through a purely chance encounter of different fundamental particles.

[8] A more pragmatic reason for avoiding debates about natural selection in the current context is that it is far from clear how Darwin's theory sits with respect to teleology. Opinions on this issue differ widely (see e.g. Ariew 2007 and Lennox 1993). For current purposes, we shall simply understand teleology in terms of the end-directedness of the powers of individual organisms. Whether or not the mechanisms of natural selection at the level of species can be regarded as involving a form of teleology is a question we need not address here.

[9] Again, talk of kinds here need not be interpreted in strong essentialist terms, even though that is the view that Oderberg prefers.

Oderberg does not deny that some organic immanent processes involve transient interactions between an organism's parts, such as the causal exchanges between different digestive organs. Digestive processes may also have transient effects which go beyond the organism, as when an organism excretes. Hence, it would not be correct to say that the powers of organisms are *purely* immanent. Nonetheless, certain aspects of the digestive process are immanent to (say) a human being, in the sense that they take place within, and for the benefit of, that same human being. The basic idea behind an immanent powers criterion, then, is that it is only organisms which *act for themselves.* Feser calls this a Scholastic view of organisms: 'For Scholastic writers, a capacity for this sort of "immanent causation" (to use the Scholastic jargon) *just is* what makes something a living thing' (2010, pp. 149-150).

In order to assess the plausibility of this theory, we must first consider the sufficiency of the immanent powers proposal. Is it really the case that all entities which have the capacity for immanent activity are organisms? As immanent powers have been characterised thus far, it is far from clear that they are distinctively organic. If the account is to be plausible, we need to say more about what is meant by 'immanent causation'. Care is needed here because, as shall now see, the terminology of immanent causation is often used in a different way by other metaphysicians. What this shows is that immanent causation in Oderberg's sense has to be understood in a specific way.

One of the features of immanent powers that we have focused on thus far is that their causes and effects concern *one and the same entity.* However, surely the biological realm is not the only realm in which immanent causation in this broad sense takes place. The immanent/transient (or 'transeunt') distinction is well known in the general causation literature, as Armstrong's work illustrates. Armstrong (1997, p. 73) says of immanent causation that it is a 'remaining within' causality, whereas 'transeunt' causation is a 'going across' causality. Importantly, Armstrong goes on to offer examples of immanent causation in this broad sense which do not involve organisms. One example concerns the decaying powers of a radioactive atom. Such cases involve radioactive emissions that do not appear to be triggered by any events external to the atom. (1997, p. 74). Another putative example of immanence offered by Armstrong concerns the persistence of an object through time. Armstrong claims that if one accepts a perdurantist temporal parts account of persistence, then one requires a principle of unity 'by which non-overlapping temporal parts of the one particular are welded together to constitute the single thing that exists through time' (1997, p. 74). Armstrong concludes that in the face of this challenge, the best thing to say is that persistence is always a matter of an entity immanently causing itself (including its properties) to exist from one moment to the next.[10]

Now, it must be acknowledged that Armstrong's examples of immanent causation are controversial. Cases in fundamental physics are notoriously difficult to interpret, and one might follow Cartwright (1989, p. 109) and Ellis (2001, p. 129) in thinking that spontaneous radioactive emissions are uncaused events. However, it seems to me that there are examples of inorganic immanent causation in Armstrong's broad sense that are less controversial than the ones he appeals to. For example, in a critical discussion about the transference theory of causation, Dowe (1995, p. 367) refers to the case of a space ship's inertia being the cause of its

[10] On questions regarding persistence and dispositionalism see also Williams (2020, this volume) and Meincke (2020, this volume).

continuing motion. In this case, there is no transfer of energy from one object to another, and so this example does not appear to involve any transient causation. Yet, it seems plausible that causation is taking place: unlike Armstrong's examples of static persistence, something *is* clearly happening in the inertia case and the movement involved obeys well known dynamic laws.

In summary, it seems that if organisms are to be characterised as all and only those things which possess immanent powers then we will have to provide a more specific notion of immanent causation than that which is ordinarily employed in the causation literature. In the next section, we shall examine the specific features that Oderberg attributes to immanent causation in the organic sense. The main conclusion of that section will be that Oderberg's concept of organic flourishing is crucial, and two possible ways of fleshing out this concept are scrutinised—one of which is normative and one of which is evaluative.

13.4 Organic Immanent Behaviour: Possible Interpretations

13.4.1 Immanent Powers as Autopoietic Functions

If the observations above are correct, then cases of immanent causation in Oderberg's sense, which are supposed to be the mark of the organic, represent a mere proper subset of what many metaphysicians think of as examples of immanent causation. What, then, distinguishes organic immanent powers from other powers? As mentioned earlier, Oderberg's idea is that immanent causation is his sense is 'a kind of causation that begins *with* the agent and terminates *in* the agent for the sake *of* the agent' (2008, p. 261). Given that the cases discussed in the previous section are ones in which the causation begins with and terminates in one and the same entity, it has to be the notion of *acting for one's own sake* which distinguishes Oderberg's notion of immanent causation from that discussed by people like Armstrong. What, though, does it mean to act for one's own sake? Oderberg's answer is that a living thing acts for itself in the sense that it 'acts so as to produce, conserve and repair its proper functioning as the kind of thing it is' (2008, p. 261). At the heart of this account, then, is the notion that immanent causation in the organic sense has a *self-maintaining* role, in the sense that it ensures the organism survives and continues to behave in ways that are normal for it as the kind of thing it is. In line with our comments earlier, although Oderberg favours an essentialist view of kinds, one could interpret this reference to kinds in a milder way that does not involve essentialist commitments.

Although Oderberg does not use the following terminology, it seems that this initial characterisation of immanence resembles what philosophers of biologists call *autopoiesis* (following Maturana and Varela 1980). As Nolt (2009) explains, autopoietic functions are those which promote the survivability of an entity. More precisely, the autopoietic functions of organisms

> establish, maintain or enhance their survivability—functions such as capturing sunlight or prey, resisting disease, obtaining water from the environment, respirating, healing injuries, eliminating wastes, and so on (Nolt 2009, p. 149).[11]

In short, both Oderberg's notion of immanent processes and the notion of autopoietic processes concern behaviours which allow an organism to maintain *itself* in a systematic way. However, it would be a mistake to think that *all* the functions of an organism are autopoietic or immanent in Oderberg's sense. For example, Nolt (2009, p. 261) contrasts autopoietic functions with 'exopoietic' ones, an example of the latter being the power to reproduce. Although the power to reproduce allows an organism's species to survive, it is not autopoietic because reproduction may not aid the survival of the organism that reproduces. For example, successful reproduction comes at the cost of death for some organisms, as in the case of some female octopi, which starve while protecting and caring for their eggs.

Is it plausible, then, that the capacity for immanent or autopoietic behaviour is the mark of an organism? Oderberg's discussion of immanence suggests that it is, but there are two worries about this criterion that need to be addressed. First, it is questionable whether the immanent powers characterised thus far can be found only in organic cases. Second, even if Oderberg's account of organisms is extensionally correct, it is questionable whether it can be articulated in a non-circular way, a way which does not presuppose the concept of being an organism.

Surprisingly, my reasons for thinking that immanent powers (in Oderberg's sense) might not be restricted to organic realms are inspired by putative examples of inorganic systemic teleology that Oderberg himself discusses. Oderberg wants to maintain that inorganic systemic teleology is in some way second-rate, in the sense that it does not involve *bona fide* immanent behaviour. But as we shall see, this move is not easy to make.

Oderberg's examples are those of the water cycle and the rock cycle (2008, pp. 266-8). These are cases in which there is ordered, systematic behaviour that leads to the stable recurrence of certain processes (2008, p. 271). In the case of the water cycle, there is a three stage cyclic process of condensation, followed by precipitation, and finally evaporation, which then leads back to condensation and the regeneration of the cycle.[12] Because each step in the cycle is dependent on others in a specific way, Oderberg concludes that the steps in the cycles have *role specific* functions (2008, p. 272), which ensure the stability and maintenance of the entire system. He defines this notion of function as follows:

> x performs an inorganic function with respect to y = def. x is inorganic and y is inorganic and x contributes causally to some entity, event or process in y and y is a stable, systematic process. (2008, p. 273)

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[11] As Anne Sophie Meincke has pointed out to me, the resemblance may not be perfect because Maturana and Varela's understanding of autopoietic functioning seems to be more specific than that employed by Nolt. For Maturana and Varela (1980), it is not merely that autopoietic functions promote the survival of the organism but rather the functions themselves are continually realised and regenerated through the structural organisation of the organism. On this definition, autopoiesis can only be said to occur when certain processes of production of material components are in place—processes which ensure the stability of the organism through time. For a fuller discussion of this concept of autopoiesis and some of its ontological implications, see Meincke 2019.

[12] This is a simplified explanation, but it will suffice for our purposes. Clearly, each step described above is constituted by many complex sub-processes.

Now, one might react to this functional analysis of the water cycle in one of two ways. First, one might agree that talk of performing a function is appropriate in the water cycle case and accept that the water cycle exhibits teleology in some sense. This is the route that Oderberg takes. Alternatively, one might resist the notion of inorganic teleology and insist that talk of performing a function is only applicable in organic cases. As Oderberg (2008, p. 270) points out, this is the route that most teleologists would take (see e.g. Bedau 1992). However, as acknowledged earlier, I do not think powers theorists should question this part of Oderberg's analysis. For current purposes, the important question is whether, if we accept a teleological analysis of the water cycle, a robust distinction can be maintained between organic and inorganic powers.

The problem is that the water cycle seems to have many of the hallmarks of immanent or autopoietic powers characterised earlier. Cases of immanent causation are initially characterised by Oderberg as those which 'produce, conserve and repair' the other proper functions of a thing (2008, p. 261). Elsewhere Oderberg (2008, p. 263) also associates immanent causation with processes which ensure the *continued existence* of a thing. The problem is that the example of the water cycle seems consistent with these features. Crucially, the notion of systemic stability is used by Oderberg to explain why the water cycle is teleological. For instance, Oderberg writes that 'I contend that the mere stability and recurrence of certain processes such as the rock and water cycles license teleological talk in terms of functions and roles going beyond mere causation' (2008, p. 271). The important point to note here is that the stability and recurrence that Oderberg speaks of ensures the continued existence/survival of the relevant systems and their proper functioning. Hence, it is far from obvious that this kind of teleology differs significantly from the immanent or autopoietic activity characterised earlier.[13] Moreover, Oderberg's notion of role-specific functions in the water cycle arguably allows us to make sense of the idea of the elements of the system acting *for the sake* of the whole of which they are parts: the role-specific functions are defined in terms of their contributions to other stages of the cycle, all of which mutually sustain the system.[14]

Fortunately, Oderberg does have more to say about what distinguishes organic teleology from the sort of systemic teleology that (we are assuming) is present in the water and rock cycles. Oderberg's response to the sort of challenge just outlined is that the notion of function that is applicable in inorganic cases '… is divorced from the idea of any intrinsic purpose, immanence or principle of flourishing' (2008, p. 269). What becomes clear, then, is that immanent behaviour in Oderberg's sense is laden with intrinsic purpose. For Oderberg, this is to say that organisms act for their own sake in the sense that they promote their own

[13] Perhaps one could place significant weight on Oderberg's notion of repairing as way of distinguishing inorganic and organic teleology. However, it is far from obvious that the notion of repairing is inappropriate in the case of a water cycle, if repairing means returning oneself to normal functioning following a disruption. For example, the natural rhythm of a water cycle is disrupted during periods of extreme drought, which typically occurs when the atmospheric conditions of the cycle block the upward forces necessary for moisture to precipitate. What is important to note, though, is that the water cycle is disposed to return to its natural rhythm as soon as the obstructions are no longer there.

[14] For example, Oderberg notes that 'If water is to be precipitated, then condensation or something very like it has to take place. Evaporation of surface water is going to produce clouds or something very like them' (2008, p. 272).

flourishing.[15] It is arguable that by appealing to the notion of flourishing, Oderberg's notion of immanence moves away from the notion of autopoiesis, which relies more on the notion of systematic regeneration than flourishing, at least in its orthodox formulations. If this is right, then we could accept that the water cycle exhibits something like autopoietic powers while insisting that those features are not immanent in Oderberg's sense.[16] According to this proposal, which we shall explore in the next section, organic powers remain distinctive due to their immanence.

13.4.2 Organic Powers, Intrinsic Purpose, and Flourishing

Let us consider in more detail how one could defend the claim that the notions of intrinsic purpose and flourishing are inapplicable in cases of inorganic teleology. It should be noted that when applying the concept of function to the examples of the rock and water cycles, Oderberg does acknowledge that there is a way of reading

> 'X has a function of doing Y' that makes it equivalent to saying either that X has a purpose for which it does Y, or that the thing in respect of which Y is done has a purpose for which X does Y in respect of it (2008, p. 270).

However, Oderberg asserts that if this is what someone meant by 'function', then he would retract his claim that the rock and water cycles have functions. This again illustrates his idea that the concept of inorganic function is 'divorced from the idea of any intrinsic purpose, immanence or principle of flourishing' (2008, p. 269) I find this move difficult to justify, however. The main problem is that Oderberg must already accept that there are different kinds of purpose because he urges that purposes do not only arise in cases where there are intentions or desires. For instance, the fact that the pumping of the heart helps to fulfil an organism's purpose to stay alive '… does not imply conscious activity, or any idea to the effect that the organism *tries* or *seeks* to keep itself alive by using the heart as a means' (Oderberg 2008, p. 263). Indeed, some organisms, such as plants, are not capable of having thoughts at all. This is why intentions cannot be necessary for purposeful action, because if they were then even plants would not count as organisms on Oderberg's account. My point, then, is that Oderberg must have a liberal account of what counts as purposeful action, as any biological teleologist should. Even very basic organisms such as bacteria have intrinsic purposes on Oderberg's account. However, once this is acknowledged, it is far from obvious why some inorganic systems cannot also be said to display purposeful action in some non-intentional sense. I admit this is not a conclusive argument, but what it does suggest is that more needs to be said about the notion of 'intrinsic purpose' and 'principle of flourishing' that is in play before we can draw a firm verdict.

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[15] Another possible difference that Oderberg alludes to is that inorganic systems can be instrumental causes for both inorganic and organic entities whereas organic systems cannot be instrumental causes for inorganic entities (2008, p. 266). However, we shall not discuss this suggestion here, because even Oderberg acknowledges later in his paper that there may be exceptions to this rule. For example, 'some organic things respire, and respiration is part of the water cycle. So to that extent one could say that organic things and processes can instrumentally serve inorganic ones' (2008, p. 276).

[16] This would be consistent with Nolt's view about autopoiesis, which is that some non-biological artefacts such as robots might come to exhibit it (2009, p. 143).

When discussing a slightly different issue, Oderberg makes some comments which could potentially be used to assuage the problem just outlined. In one place he considers the worry that functional talk cannot be applied in inorganic cases because talk of functions implies purpose. Here, Oderberg's objector agrees that there is no purpose in inorganic cases but, unlike Oderberg, thinks for that reason that such cases cannot be teleological. Oderberg's reply is that talk of functions does not commit one to the existence of purposes because in his description of the water and rock cycles, he was able to describe their respective functions without ascribing intrinsic purposes to them (2008, p. 274). Perhaps this same comment could also help with the worry raised toward the end of the previous paragraph: the argument would be that there are no purposes in inorganic cases because their functions can be described adequately without the ascription of purposes. I have a couple of related concerns about this kind of response, however. First, surely it is possible to describe the functions of very simple organisms, or even complex organisms like plants, without ascribing intrinsic purposes to them. But it would clearly be a mistake for Oderberg to conclude from this fact that these organisms lack purpose, for then they would not count as exhibiting organic teleology by his own lights. Second, and relatedly, Oderberg is open to the charge that by describing the water and rock cycles in the way he does—by omitting talk of purpose—he has merely provided a partial characterisation of the relevant functions. Compare: Aristotelians think we can (and often do) describe natural processes in terms of mechanistic or 'efficient' causation, without ever mentioning final causation. However, this does not show that final causation does not exist. For the Aristotelians, the full metaphysical story is that final causation is an underlying precondition for efficient causation.[17]

However, even if my responses here are strong, perhaps Oderberg would emphasise that his specific notion of intrinsic purpose is tied to the notion of flourishing. For Oderberg, the notions of intrinsic purpose and flourishing are two sides of the same coin: the flourishing of an organism requires that it 'has an intrinsic telos, a principle of natural fulfilment, such that it characteristically behaves in such a way as to achieve or seek to achieve that fulfilment' (2008, p. 265). This strategy involves insisting that purposeful action is only ascribable in cases in which it is intelligible to say that a course of action is *good for* the object. On this account, the existence of purpose entails the existence of natural goods which the object pursues.[18] Oderberg is clear that, in this sense, all organisms have powers to flourish, as when he says that 'Bacteria seek to flourish every bit as much as human beings' (2008, p. 265). In contrast, Oderberg insists it is absurd to think that inorganic entities flourish: 'Rocks do not flourish; there is nothing that is good for evaporation…' (2008, p. 274).

[17] Indeed, Oderberg (2017, p. 2396) endorses this point in a recent paper: 'Final causes are the precondition of the very possibility of any efficient causality'. Nonetheless, properties of finality may not be the direct object of scientific investigation (ibid. p. 2400).

[18] It is worth noting another possible way of justifying the idea that all and only organisms have natural purposes, which is to argue that all and only organisms have awareness and that awareness entails purpose. This is not a strategy that is available to Oderberg, however. Oderberg is happy to say that simple non-vegetative organisms have a primitive awareness of their surroundings (2007, p. 192), but he does not extend this claim to plants (2007, p. 187) because they only have motor organs (as opposed to sense organs). Hence, if the presence of primitive awareness were the underlying criterion for being an organism, then plants would not qualify as organisms on Oderberg's theory.

What, though, is meant by 'flourish' and 'good for'? This is not always clear. Moreover, it may that the notion of organic functioning is conceptually prior to the notion of flourishing, so that the former cannot be reductively analysed in terms of the latter. Indeed, Oderberg seems to gesture in this direction when he writes:

> If there were such a thing as inorganic teleology, what differences would we expect to see between it and the organic case? They should be derived from our prior understanding of what is characteristic of the living and the non-living (2008, p. 264).

Since Oderberg's notion of organic teleology is inextricably linked with his notion of flourishing, this quote suggests that we might not be able to understand the notion of flourishing independently of what it is to be alive.

Where does all this leave us? I think the foregoing observations indicate that we face a dilemma. If we cannot understand the notions of purpose/immanence/flourishing independently of what it is to be an organism, then although it will be true by definition that all and only organisms have immanent powers, we will not be able to give a non-circular explanation of what it is to be an organism *in terms of* those powers.[19] On the other hand, if these notions are not conceptually tied to the notion of being organic, it is difficult to see why it is absurd to say that the water cycle is flourishing when the role-specific functions of its parts are performing successfully. Hence, if we are to accept that inorganic teleological systems do not flourish or act for the good of themselves, it would be helpful to have an informative and non-circular account of flourishing that explains why this is the case. In the next section I shall consider a couple of possible options in this direction, the most plausible of which ties the notion of flourishing to the notion of inherent value.

13.4.3 Autopoietic Powers, Normativity, and Value

One obvious route to take is to explicate the notion of flourishing in terms of a concept of natural normativity. Often when we ascribe goodness to an action, we intend our claim to have normative force. For instance, when we tell children that eating greens is good for them, we intend to convey that for their own good they *ought* to eat greens. With this in mind, one might try to define organic immanent powers as those which their possessors ought to manifest for themselves. The thought would then be that all processes which are inorganic fail to have this normative aspect. For instance, we might argue that although the water cycle exhibits teleological features, in virtue of the powers involved, there is no sense in which the water cycle *ought* to evaporate (or precipitate) water. There seems to be something right about the normative criterion, but if it is to be defensible we need a metaphysical account of how a natural organic process can exhibit normative features.

[19] Again, Oderberg might not be unhappy with this result, because the primary aim of his 2008 paper is to show that there are inorganic as well as organic cases of systemic teleology. Nonetheless, in the current context this is not a welcome consequence, because our hope was that an appropriate notion of power could help to provide a non-circular analysis of what it is to be an organism.

The best attempt that I know of to generate a naturalistic notion of normativity within the powers framework is found in the work of E. J. Lowe (1980, 1982) through his theory of laws.[20] Lowe's basic idea is that if laws reside in the inherent powers of things, then there is a sense in which an entity ought to behave in one way rather than another in a given environment. On this account, law statements are not merely descriptive, as they are on Humean regularity theories. Rather, laws are generated by the essences of things, which play a *regulative* role. The essential powers of things dictate how they ought to behave, if they are normal exemplars of their kind. Consider, for instance, the claim that bees are disposed to fly. This seems like a law statement in some sense, and yet it is not equivalent to the regularity statement that all actual bees fly. Clearly, a bee could live without flying. For instance, a bee might get stuck in a hive, or it might decide to crawl up to the flowers on which it feeds rather than fly between them. However, according to Lowe's theory, it remains the case that the bee *ought* to fly, in virtue of its nature as a bee. In explaining the connections between disposition ascriptions and normativity, Lowe draws an analogy with legal laws. Legal laws have a prescriptive rather than descriptive force. They do not describe how people actually behave but rather dictate how they should behave.

Can the Lowean approach help to underpin an account of organisms that is based on the normativity of certain powers? Unfortunately, it is far from clear that this approach is workable. The first salient point is that Lowe's normative theory of laws is underpinned by his four-category ontology, which contains the category of substantial forms or kinds (Lowe, 2009). On Lowe's theory, it is the essences of substantial kinds, such as 'beehood', which ultimately grounds facts about how exemplars of that kind ought to behave. As we saw earlier in section 2, this is a considerable metaphysical commitment that goes beyond power realism, and it is one that many metaphysicians may not be prepared to make. But pushing that detail aside, what is more problematic is that if Lowe's theory of natural normativity is successful, it provides us with a *general* account of laws. Since not all laws concern organic entities, the Lowean approach entails that there are also normative facts about how members of inorganic kinds ought to behave. For example, Lowe's theory implies that a lump of salt ought to manifest its power to dissolve when placed in water, in virtue of being a lump of salt. In short, then, Lowe's normative theory of powers and laws would not allow us to draw a distinction between organic and inorganic powers where natural normativity is concerned.

Fortunately, even if we deny that natural normativity is the defining feature of organic power, surely there might be other ways to maintain that there is an important difference

[20] Oderberg's own theory of laws (2010) is not dissimilar to Lowe's, but as far as I can tell his theory of organic flourishing does not rely on it, at least not explicitly. I should also note that there is a lively debate in the philosophy of biology about whether a naturalized notion of normativity is applicable in biological contexts. For example, Barandiaran and Moreno (2008) argue that organisms exhibit intrinsic normative functioning on the basis of their autonomous adaptive organisation, while Barham (2012) argues that organisms exhibit normative agency on the basis that they act to preserve their own existence. Since space is limited I shall focus only on Lowe's metaphysical account here. And for the purposes of this chapter, we need not deny that there is normative organisation and behaviour in the biological realm. I note, however, that for the sorts of reasons discussed below and also by Walsh (2008, pp. 120-121), there are reasons for doubting that the normative aspect of biological organisation is what distinguishes organisms from non-organisms, because normativity will plausibly occur in the inorganic cases of systemic teleology discussed earlier. And if the normative claim about certain biological cases is meant to capture something stronger, such as the presence of intentional action, then we must accept that some organisms will not exhibit the relevant normative behaviour (Walsh 2008, p. 121).

between organic and inorganic activity. One route is to adopt a strong evaluative criterion for organic powers, which would say (roughly) that the difference between organic and inorganic powers is that only the manifestations of the former are of *inherent value* to their possessors.[21] Within the power realism framework, the idea would be that all and only organisms have certain powers whose activation realises the second-order property of *being valuable* for the possessor of those powers, where such a property is regarded as being human-independent and irreducible. It seems that, first and foremost, it will be the manifestations of autopoietic powers that are of value to their possessors, given that they ensure their survival. However, such an account can leave it open as to whether other kinds of power manifestation are of inherent value for organisms. As we saw earlier, exercises of transient causal relations often arise from autopoietic processes (as when excretion occurs through digestion), which suggests that some transient relations might also be of value in a derivative sense.

An evaluative account of organic behaviour is of course consistent with a normative understanding of organic behaviour. Indeed, on Bedau's (1992) account, a goal is only something a subject ought to attain if that goal is good for them. However, Bedau's own understanding of goal value seems too liberal to distinguish organic teleology from the cases of inorganic teleology that we accepted earlier. In particular, for Bedau teleological goodness need not consist in moral goodness. Rather, organic goals are good in some cases merely insofar as they are 'useful or beneficial' (1992, p. 791). But if, as discussed above, it is intelligible that inorganic teleology goal-directed behaviour, then there is no obvious reason why the concept of usefulness cannot be applied in those inorganic cases too. The same goes for Ayala's evaluative account of teleological goals, which takes such goals to be good merely in the sense of having utility, where utility means contributing 'to the reproductive efficiency of the organism itself' (1970, p. 13).

With the preceding points in mind, it is natural to consider a stronger theory of value in organic cases, for example one which says that the value realized by organic powers makes moral demands upon those capable of moral deliberation. This proposal is supported by the fact that humans capable of moral deliberation normally feel morally obliged not to prevent (say) a horse from exercising its power to eat grass, suggesting that we tend to regard the eating of grass to be of value to the horse—even if the horse is not consciously aware of this. The same cannot be said of inorganic entities such as rocks, however.

Before considering one of the challenges facing this strong evaluative theory, some further clarifications are in order. If this evaluative criterion is to provide a plausible account of the organic/inorganic distinction, then, we cannot accept that the value claims about organic powers (and only organic powers) are the result of humans projecting their own values onto the world. If we accepted this, then the organic/inorganic distinction would itself be human-dependent, which is implausible. This is not to say that we do not also have perfectly good human-dependent reasons for valuing plants and animals. Clearly, we need plants to sustain oxygen levels for our own survival. However, if the evaluative criterion is to provide an

[21] For the sake of brevity, I will sometimes speak of the organic autopoietic powers as being of value to their possessors rather than the manifestations of those powers. However, strictly speaking perhaps we should say that the powers themselves are valuable in a derivative sense, insofar as they are responsible for bringing about inherently valuable manifestations which maintain the organism.

objective account of the distinction between organic and inorganic entities, the distinction should not rest on values which depend on contingent facts about what is instrumentally good for humans, not least because inorganic systems such as the water cycle might also be of instrumental value to beings like us.

What these considerations show is that if the evaluative criterion of organisms is to succeed, we must commit to a realist view about value and defend the claim that it is only organic powers whose manifestations are *inherently* valuable for their subjects, unlike inorganic powers. To be clear, these value properties would be irreducible and so not themselves susceptible to a reductive analysis in biological terms. For this reason, the theory would not leave us with a circular account of what it is to be organic. Since, on this picture, the value realized by certain powers will be ontologically primitive, the theory does not depend on a prior grasp of what it is to be organic. Rather, our grasp of such properties will depend only on our having the right sorts of moral sensibilities. We shall now explore this evaluative account of flourishing in more detail.

13.4.4 The Evaluative Account of Flourishing: Costs and Challenges

Perhaps the main theoretical cost of the evaluative criterion is that the notion of inherent value will strike some as obscure, because it has to be taken as a primitive notion. However, this seems like an inevitable feature of the evaluative theory of flourishing that I am considering, precisely because of the difficulty of distinguishing organisms and non-organisms in any other terms. As we have seen, it is far from obvious that the notion of autopoiesis as defined by Nolt can be used to generate the distinction between organic and inorganic activity. Nolt for one would agree, since he sees no reason why autopoiesis could not be exhibited by artefacts such as machines (2009, p. 143). Moreover, it is difficult to see how the notion of inherent value in play can be explained in terms of other properties, such as the property of being sentient. It is true that when people feel morally obligated in various ways towards other organisms, it is usually because those organisms are capable of suffering[22] when their natural ends are frustrated, and this capability for suffering plausibly arises from their being sentient. So, one might be inclined to think that the inherent value of some powers is ultimately grounded in sentience. However, the problem in the current context is that a sentience-based account of inherent value would not go far enough. Unless we adopt a radical form of panpsychism, it is not at all plausible that all organisms are sentient, at least not in the sense that they can be said to experience suffering. Nor would it help to insist that all organisms (sentient or not) have a primitive awareness of their environment and to explain the presence of inherent value in terms of the presence of primitive awareness. The problem is that if we say that simple organic entities such as single cells have primitive awareness, then we have watered down the notion of awareness so much that it would arguably occur in inorganic cases, as in the case of machines which are sensitive to changes in their environment. In that case, the notion of inherent value could not be used to distinguish cases of organic and inorganic powers. It seems plausible, then, that if the evaluative criterion is to be successful, we will need to accept a full-blooded value

[22] See Singer 1990 on the connection between the capability of suffering and moral relevance.

realism on which it is an irreducible fact that the manifestation of a certain power (and, derivatively, the power itself) is inherently valuable for the possessor of that power in a morally relevant sense.

Assuming that we are happy to accept that inherent value is fundamental, what challenges does the evaluative theory of organic power face? One puzzle concerns the extent to which different autopoietic powers in the organic realm have the same amount of inherent value. On the one hand, it seems implausible to suppose that the autopoietic processes of organisms like single cells or plants have the same moral significance as those of human beings. But on the other hand, some philosophers are reluctant to accept that the activities of different organisms have varying moral status. This last point is of particular concern to some environmental ethicists. In line with the theory we have sketched above, both Taylor and Regan maintain that certain courses of events are valuable *for* organisms in some objective, morally relevant sense (e.g. Taylor 1986 and Regan 2004). However, Regan is reluctant to deny that the flourishing of all organisms has equal moral worth because if we maintain that the value realized by organic powers comes in degrees, this might pave the way for 'ethically unacceptable forms of subjugation' with respect to animals and some human beings (2004, p. 247). How, then, can this dilemma be resolved?

Nolt's response to this issue is to question the claim that all kinds of organic autopoietic behaviours are of equal value to their possessors. Nolt's worry (2009, p. 146) about Regan's equality claim is that it implicitly appeals to an anthropogenic (i.e., human dependent) standard of justice. Nolt's argument is that the equality claim is not plausible if we base it purely on the intrinsic features of organisms. For example, it seems clear that not all autopoietic processes carry the same degree of self-concern when we compare, say, a human being with a plant. Nolt concludes, therefore, that in so far as (say) claims about animal equality are plausible, they must rest on an anthropogenic theory of justice. If Nolt is right about this, then it seems that claims about the value of certain power manifestations reflect facts about humans as much as they do the world. This, in turn, would make our evaluative criterion for organisms implausible, for what is needed is a human-independent notion of organic value, if the organic/inorganic distinction is to be an objective one.

How, then, can a value theorist deal with the question of relative moral worth? I do not have a detailed solution to offer here because settling the issue would take us deep into bioethics and the metaphysics of value. It would be unrealistic to attempt that work here, but we can nonetheless try to advance the debate by identifying three strategies that could be employed in order to defend the view that all (and only) organic autopoietic powers are of inherent value to their possessors. My hope is that this will provide a platform for future philosophical research on the topic.

One strategy is to agree with the claim of Regan and others that the autopoietic powers of different organisms carry equal inherent value for them and to insist that this judgement is not based on anthropogenic standards of justice. Nolt fails to find any biological properties which can plausibly ground the equality claim, given that organisms are biologically so diverse. However, if we accept the strong form of value realism that we have outlined, we can insist that value properties are irreducible and cannot be explained *in terms* of biological concepts. Rather, we will think of inherent value as a fundamental second-order property that is realized for an organism when it acts for itself, using its autopoietic powers (and perhaps certain others).

Biology by itself will not reveal these second-order evaluative properties. Rather, such properties would only come into view through the lens of moral deliberation. According to this theory of value, value properties are akin to secondary qualities, realistically construed (McDowell 1985). Just as eyes are necessary for bringing the (real) colours of things into view, a certain moral sensitivity is needed to bring the irreducible and inherent value of certain powers into view. Note also that, importantly, the powers theory seems particularly conducive to this approach given that secondary qualities are typically thought to be dispositional in nature.[23]

A second and alternative strategy is to accept that all organic autopoietic powers carry inherent value for their possessors, but to reject the claim that such powers exhibit *equal* inherent value. In order to avoid Regan's ethical unease about such a proposal, one would have to argue that it does not follow that unacceptable forms of subjugation are morally permissible. The first part of this response could be supported by examples that Nolt himself discusses. When considering cases in which human bodies are in a permanent vegetative (i.e., non-sentient) state, Nolt (2006, p. 363) admits to no longer feeling confident that the organism demands the same level of moral reverence as a fully functioning human. If this intuition is correct, does it follow that unacceptable forms of subjugation are permissible? Perhaps there are various ways of blocking this inference. For example, in a footnote Nolt acknowledges that one must still have a high level of respect for a non-sentient human body because it is '… something significant to those who cared about the person of whom it is the remains … Similarly, one might owe it respect for what it once was…' (2006, p. 363). In short, this strategy would require us to assess different moral scenarios on a case by case basis.

A third strategy is to accept that not all autopoietic powers are valuable to organisms in the same way, but to deny that they are of value in varying degrees. Such a position would be coherent providing that the values of various autopoietic powers to various possessors are incommensurable.[24] To help motivate this claim, perhaps one could maintain that because the autopoietic powers of different kinds of organism are so diverse, it would be unrealistic to suppose that they are all valuable to their possessors in a comparable way. Both the second and third strategies would help to accommodate the intuition that many people no doubt have, which is that the autopoietic powers of some very simple living beings, such as a unicellular organism, are surely not of value to them in the same way that survival is of value to, say, a human being.[25]

There is much more to be said about each of these strategies, and as mentioned above, my aim is not to adjudicate them here. Indeed, my aim is not to endorse the inherent value account of organic power but rather to identify it as a hypothesis for future investigation by teleologists. It is a highly revisionary proposal in the sense that it implies that the notion of an organism is not *purely* a biological concept, but in part a metaphysical one since it has evaluative and moral

[23] Most powers theorists will of course insist that primary qualities are also conferrers of dispositions.

[24] This is a strategy that Nolt acknowledges briefly in a footnote (2009, p. 146, fn. 25).

[25] As Anne Sophie Meincke has pointed out to me, in the case of cells that are part of a larger organism, the case is much less clear. For example, there is the phenomenon of self-sacrifice of cells in multicellular organisms. Hence, it may be that part-whole relations affect the evaluative status of a cell's own autopoietic powers. Unfortunately, I must postpone a detailed discussion of such cases for another paper.

import. But in defence of this feature, it should be noted that Oderberg's notion of flourishing and intrinsic purpose, on which his account of immanent causation turns, is itself steeped in metaphysics. Moreover, if the notion of an organism were in part a metaphysical one, this might explain why biologists and philosophers of biology sometimes do not agree on what falls under the concept of an organism. The explanation would be that the disagreements arise from a difference in underlying metaphysical assumptions.

13.5 Might the Organic/Inorganic Distinction be Fuzzy After All?

In the previous section we considered how one might try to refine the account of immanent causation by tying the notion of flourishing to the idea of autopoietic powers (and perhaps others) being of inherent value to their possessors. Such an account allows us to give a powers-based criterion for organisms, providing that only organic powers are inherently valuable to their possessors. However, we also identified some costs and concerns regarding this theory. It is therefore worth considering the state of play if we are forced to abandon the idea that a sharp distinction can be drawn between organic and inorganic powers. Would this abandonment mean that the notion of an organism is useless or that we must be anti-realists about organisms? Fortunately, I believe the answer is 'no' and that this is best seen by briefly considering John Heil's (2003) theory of higher-level powers. Importantly, such a view would allow us to preserve the idea that the organic/inorganic distinction has something to do with powers of self-maintenance, which following Nolt we have called autopoietic powers. However, the theory would say that the difference between organic and inorganic powers is not sharp. Such a view would also support our earlier suggestions that notions like 'intrinsic purpose' seem to apply in different ways in different cases. Surely plants have purposes in a weaker sense than a human being with conscious intentions.

The discussion of the water cycle also suggested that it is not easy to find a significant difference between the kind of teleology which (we are assuming) is displayed in some inorganic systems and the kind of teleology which is present in organic cases. This again might lead us to think that the difference between various cases of teleology is not a sharp one. Perhaps the ways in which the water cycle maintains itself are simpler and less diverse than the structurally complex self-regulating powers we find in paradigmatic organic cases, which is why we are less inclined to count the cycle as organic and not inclined to count the water cycle flourishes in the same way that paradigmatic organisms do. However, if the difference is not sharp, we might expect there to be borderline cases, and this seems to be borne out by the fact that not everyone in biology and philosophy of biology agree on what counts as an organism. For example, historically there has been disagreement between philosophers of biology about whether ecosystems should be regarded as high-level organisms. Clements (1905) was of the first to argue that ecosystems are organisms of sorts, though this proposal has fallen out of favour in recent times. At lower levels there is, for example, the ongoing debate about whether viruses are alive (see Villarreal 2004 for an introduction to this debate).

If we abandon the thought that the distinction between organic and inorganic powers can be clearly delineated, does this mean that the concept of being an organism should be eliminated? I do not think so. To see why, it is instructive to consider Heil's theory of powers in the special sciences. Heil (2003) urges that it is a mistake to think that any special science predicates pick

out unique properties which are strictly shared by all the subjects satisfying the predicate. To think otherwise is to be seduced by the 'picture theory of language' (2003, pp. 5-7) according to which all predicates pick out distinct unitary properties. According to Heil, the picture theory typically leads to a 'levels' conception of reality, on which each special science concerns a distinct level of nature containing a unique set of autonomous powers. I shall not discuss Heil's reasons for thinking that the levels conception is problematic, nor shall I discuss the claim that the picture theory leads to such a conception. The important question for our purposes concerns what would follow if there is no one property (such as 'having an autopoietic power') which all and only organisms share.

Heil's theory of higher-level predicates is that they do not pick out identical properties that things satisfying the predicate share, but rather they track 'similar-but-not-precisely-similar properties' (2003, p. 27). Since Heil is a powers theorist, for him these less-than-perfect-similarities are similarities in respect of the powers of things.[26] To illustrate, Heil explains the higher-level phenomenon of redness as follows: 'By virtue of possessing similar-but-not-precisely-similar-properties, red objects possess similar-but-not-precisely-similar 'causal powers' or dispositionalities, and so behave (colourwise) in similar-but-not-precisely-similar ways' (2003, p. 28). What Heil is keen to emphasise, though, is that these similarities are not invented by us but rather are out there in the world: 'We do not 'carve up' the world in the sense of manufacturing divisions where none previously existed, but we do commemorate boundaries that, for us, stand out' (2003, p. 49). Importantly, because higher-level predicates track similarities which are objective, Heil insists that he remains a realist about higher-level entities. Higher-level predicates truly apply to the world and so we can still say that there are tables, trees, and so on (Heil 2003, p. 58). The point is just that these higher-level concepts do not mark 'hard-edged features of the world' and are to a large degree 'vague or non-specific' (2003, p. 58). In other words, the boundaries between high-level kind concepts are fuzzy: 'Concepts, and words used to express these, are in most cases satisfied by endless *similar* things; and similarity grades off imperceptibly to dissimilarity' (2003, p. 49).

Although Heil does not discuss the specific property of being an organism, it is not difficult to see what this concept would look like within Heil's framework. The idea would be that organisms share similar-but-less-than-similar powers. If what we have been saying about organic powers earlier is plausible, the powers in question will, first and foremost, be the autopoietic ones. However, since the concept of autopoiesis is itself a high-level one, there will be no one thing that different autopoietic powers strictly have in common. They will each differ in some ways but not in others.[27] Nonetheless, these less-then-precise-similarities will be objective and hence it will be true to say that there are organic powers. Importantly, this framework would allow there to be inorganic cases involving powers which have much in common with those in organic cases (as in the case of sophisticated robots), but not quite similar enough in, say, organisational structure to merit being called organic. We would also

[26] Heil (2003, Ch. 11) maintains that powers are identical with qualities, but this detail is unimportant for our purposes.

[27] To use a term famously introduced by Wittgenstein (1953), we might say that the concept of autopoiesis—and hence the concept of an organism—is a family resemblance concept that is not susceptible to strict analysis in terms of necessary and sufficient conditions.

expect there to be borderline cases in this framework, in which it is unclear whether a given power is sufficiently similar to those in paradigmatic organic cases to merit being classed as organic.

This is only a sketch of a possible position but it is important to note that the earlier discussion of the water cycle lends some weight to this approach, especially if the notion of organic flourishing cannot be developed in a sharp and informative way. My main criticism of Oderberg was that it is unclear why the notion of flourishing and intrinsic purpose is applicable in all organic cases but no inorganic cases. If this is right, it may suggest that the difference between organic and inorganic systemic teleology is not sharp. Perhaps such a position would leave us with a happy compromise. It would free us from the need to draw a sharp distinction between the organism kind and other kinds of systemic teleological system. At the same time, the Heilean framework would arguably still allow us to be realists about organisms.

The approach outlined will also have implications for questions about value, some of which we discussed in the previous section. According to some theorists, only living creatures have intrinsic value (e.g. Regan 2004, Nozick 1981). However, if there is no sharp boundary between organic and inorganic systemic teleology, and intrinsic value is grounded in teleology, then the question of what is and is not intrinsically valuable is no longer clear-cut. This would help to motivate Davison's intuition (2012, Ch. 4) that there is no clear 'cut-off' between that which is valuable and that which is not, and open up new debates about the intrinsic value of different parts of nature. Although I do not have space to explore this here, I suspect that this picture could have profound effects on ethics and lend weight to the idea that many environmental systems are themselves worthy of respect to some degree, for non-instrumental reasons.

13.6 Conclusions

In this chapter I have explored some possible ways of developing a powers-based theory of organisms and the challenges they face. It would be unrealistic to try to settle the debate here, but we have identified some of the key issues on which the debate is likely to turn. We have seen how the powers theory is highly conducive to a teleological world view of both systemic and non-systemic final causes (one which need not rely on a controversial commitment to Aristotle's substantial forms). A powers-based theory of organisms is likely to turn on the distinction between organic and inorganic systemic teleology, and we examined possible ways to draw this distinction in a sharp way using a specific notion of immanent causation. We then compared the notion of immanent power with the notion of an autopoietic function. However, the problem is that it is far from clear that immanent causation cannot occur in inorganic realms, as the example of the water cycle illustrates. Oderberg's response is that it is only in the organic cases that the exercise of immanent causation exhibits intrinsic purpose and leads to flourishing. We therefore explored some possible ways of fleshing out the notion of flourishing in an informative and non-circular way, such as the proposal that organisms flourish when their autopoietic powers (or more directly, their manifestations) are of inherent value to them in a morally relevant sense. This theory faces its own challenges, however. In the light of all these problems, we concluded by considering the state of play if powers theorists are, after all, unable to draw a sharp distinction between organic and inorganic powers. We argued that this would not be a disaster, by considering the matter from the perspective of John Heil's metaphysical

framework. Even if the distinction between organic and inorganic powers were to some extent fuzzy, this would not mean that it does not track real similarities and differences in the world.

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