# Chapter 1: Organic Normativity

> Biology cannot, or at least in practice does not, eliminate functions and purposes.
>
> —Mark Perlman, "The Modern Resurrection of Teleology in Biology,"6.

## Introduction

This chapter argues that there are such things as natural norms; at least *some* normativity is discoverable in natural life forms and functions themselves, and is not projected or invented in human evaluators. These natural formal and teleological facts are just as real as other familiar, scientific facts.

The major alternatives to naturalistic normative realism are normative anti-realism or reductionism. Although I shall here exclude non-naturalisic normative realism ex hypothesi, both normative non-naturalism and normative anti-realism are motivated by *the is-ought gap*. The is-ought gap begins with the belief that nature consists only of descriptive facts.[1] It follows that normative facts must either be real (but non-natural) or else not real at all. If putative natural norms are not real, anti-realists argue they are either reducible to non-normative facts or else simply projected onto nature by humans – be they scientists or philosophers or regular folk. The controversy over normativity is an old one and is not likely to be settled here. My goal, instead, is to present a plausible case that is both intelli-

1. The a picture of nature as a manifold of purely descriptive and non-normative facts, entities, properties, and laws is what McDowell calls "bald nature". A better term would be "Laplacian nature," since the notion that the cosmos is coldly factual, bald of values, and disenchanted from any supernatural esoterica, aligns more closely with Pierre-Simon Laplace's mathematical picture of nature. Laplace pictured nature as a set of cold, abstract, and necessary relations. Realism about natural normativity is incompatible with the Laplacian picture. But his picture is, I would dare to say, unscientific. At the very least, it is not *the only* scientific picture. Regardless, Laplacian nature emphatically does not include natural norms.

gible to normative anti-realists and normative non-naturalists and that is persuasive to the undecided.

There are three sections in this chapter that build to my conclusion that there are real, natural, irreducible norms. The first section distinguishes the two kinds of is-ought gap that philosophers have taken to render ethical naturalism impossible. It explains how some notion of natural normativity makes ethical naturalism at least possible. The second section begins with a summary of Philippa Foot and Michael Thomspon's case for natural norms of two types: formal and functional norms. This section also includes a novel case for what I call "organic normativity", on the basis of generic propositions, that organisms have a real life form and a natural teleological process. The third section considers and rebuts anti-realist or reductionist interpretations of these natural phenomena. Admittedly, these phenomena can be acknowledged by both the realist and anti-realist. The anti-realist would want to offer a roundabout explanation of them, while the realist accepts the straightforward explanation.

The upshot of these considerations is this: if there are some natural norms governing organisms, then there might be natural *human* norms governing humans. The neo-Aristotelian might be able to explain ethical norms as extensions of, or tokens of, natural norms, which are both binding on human beings as practical rational animals and not merely invented by human individuals or human cultures. These norms would be natural without being crassly biological; they would be both biological and practical. Or so I shall argue.

# I. The Is-Ought Gap Challenge

Rosalind Hursthouse says that ethical evaluations of humans and non-ethical evaluations of plants and animals "both depend upon our identifying what is characteristic of the species

in question."[2] In other words, the normative evaluation depends on the descriptive facts of the species: its activities, its life form, and so on. Evaluating things on the basis of what they are is central to the kind of neo-Aristotelian naturalism.

For example, consider a few pretty uncontroversial normative propositions: '*you ought to be wise*' or *'It is good to be tolerant of people with different views'* or *'It is bad to bring a gun to school and start shooting people'*. Supposing these are true, *why* are they true? The non-naturalist has a good explanation (they pick out fundamental, non-natural, moral facts) and the naturalist anti-realist also has a good explanation (express the speaker's individual and cultural norms). The ethical naturalist's explanation is a bit trickier. He or she must show how such statements relate to the *natural* facts. The most straightforward path would be to argue that "you ought to be wise" is a normative truth derivable from some other fact that is natural. In general, ethical naturalism states that some ethical facts are grounded in natural facts or are identifiable with natural facts.

Insofar as neo-Aristotelians like Hursthouse and Foot proffer a form of ethical naturalism, a challenge must be stated. Philosophers have challenged to the very possibility of such ethical naturalism in this form:

1. If ethical naturalism is possibly true, then descriptive statements can serve as premises in arguments with normative conclusions.
2. But descriptive statements cannot serve as premises in arguments with normative conclusions.
3. Therefore, ethical naturalism is not possibly true.

If this challenge cannot be met, then ethical naturalism is futile. And it is difficult to imagine how the challenge could be met. Consider, for example, a candidate natural fact, such as the apparent goodness of pleasure. Perhaps, if pleasure *is* universally pursued, pleasure *ought* to be pursued. Hume is often credited with (or blamed for) insisting that an 'ought' can

2. Rosalind Hursthouse, *On Virtue Ethics* (Oxford University Press, 1998), chap. 10, abstract.

never be derived from an 'is.'[3] He says:

> In every system of morality, which I have hitherto met with, I have always remarked, that the author proceeds for some time in the ordinary ways of reasoning, and establishes the being of a God, or makes observations concerning human affairs; when all of a sudden I am surprised to find, that instead of the usual copulations of propositions, is, and is not, I meet with no proposition that is not connected with an ought, or an ought not. This change is imperceptible; but is however, of the last consequence."[4]

The point is that when it comes to human evaluations, 'is' statements may be interesting but they seem useless for practical purposes. So the first premise of the is-ought challenge sets out a criterion for ethical naturalism: the normative propositions that features as conclusions of ethical arguments must be derived from descriptive premises. The second premise seems to render hopeless the thought that we can evaluate things on the basis of what they are. Is neo-Aristotelian ethical naturalism a non-starter?

The is-ought gap is fatal to *some* forms of ethical naturalism. Namely, those that assume the bald picture of nature as purely descriptive. There is, however a second path.

The is-ought gap can be undercut in a different way by neo-Aristotelians. We can deny the assumption that nature is purely descriptive. For example, it might be that some normative propositions such as "you ought to be wise" are brutely normative *natural* facts. It sounds rather odd to say that an 'ought' can be a brutely normative natural fact. In a later chapter, I will more fully explain how the purely descriptive concept of nature is problematic.

The point for now is to understand how, in general, one might undercut the is-ought gap: start with basic, scientifically respectable natural norms. From these, derive further

3. Arnhart and MacIntyre argue that Hume himself allows for a kind of inference from "is" to "ought" in other places. (Cf. Larry Arnhart, "The New Darwinian Naturalism in Political Theory," *American Political Science Review* 89, no. 02 (1995): 389–400; Alasdair MacIntyre, "Hume on Is and Ought," *The Philosophical Review*, 1959, 451–68) I think Moore is the one to blame (or to give the credit).

4. *A Treatise of Human Nature* book III, part I, section I.

ethical norms. If these were possible, the result would be both ethical and naturalistic.

In order to explicate this option, begin with Philippa Foot's notion of "natural normativity". Some features of nature are properties, she says, are instances of 'natural goodness' or 'natural defect.' About such qualities, she says:

> …we might equally have been thinking in terms of, say, strength and weakness or health and disease, or again about an individual plant or animal being or not being as it should be, or ought to be, in this respect or that. Let us call the conceptual patterns found there, patterns of natural normativity.[5]

Natural normativity is an indeterminate concept. It might include a variety of different kinds of normativity that are not obviously moral normativity, such as the proper, the healthy, the advantageous, the adaptive, the mature, and so on. This indeterminacy is a strength rather than a weakness. When Foot uses the term 'natural normativity' she means that normativity exists wherever organic life is found. Wherever evaluative properties like health and disease appear, there are real instances of natural goodness and natural defect, then some evaluative properties are *primary qualities of nature* just like weight, color, size, relations of time and space, and so on.

There is another sense in which 'natural normativity' is used by neo-Aristotelians like John McDowell. The neo-Aristotelians are of two minds about which sense is a more promising foundation for ethics. Where they agree, though, is in thinking that natural norms overcome or rather undercut the is-ought gap. Call this the **Bald Nature Challenge**:

1. If ethical naturalism is possibly true, then some natural facts are genuinely both normative and natural – there are natural norms.
2. But there are no facts that are genuinely both normative and natural – there are no natural norms.
3. Therefore, ethical naturalism is not possibly true.

This argument like the first one sets out a criterion that ethical naturalism must satisfy. Namely, ethical naturalism must offer an account of some natural norms that are both real

5. Philippa Foot, *Natural Goodness* (Oxford University Press, 2001), 38.

and brutely natural, not derived from other (descriptive) facts. The second premise says that all norms are non-natural and all nature is non-normative. So it seems to be impossible to be an ethical naturalist.

Everything depends on whether or not nature consists of merely non-normative facts. I will grant that nature consists of merely *natural* facts. That nature consists of no non-natural facts is, of course, a tautology. I grant the tautology. I do not grant, without argument, that all such facts are descriptive and not normative; that would be to allow my opponent to beg the question. My opponent might likewise complain that if he or she allows me to stipulate that there *are* natural norms, this stipulation would beg the question in my favor. The only thing for it is for me to *argue* from agreed upon premises that there are such things as natural norms. Having done so, it is fair of me to request an argument to the contrary. If the critic merely insists on reaffirming that all nature is non-normative, that would be mere question-begging.

So our first task is to supply an adequate defense of the existence of natural norms. Even if such a notion can be defended philosophically and scientifically, we should remember that all that logically follows is that ethical naturalism is possibly true. What we need, beyond mere possibility, is to defend in general natural normativity and then to apply patterns of natural normativity and how these form binding ethical normative structures.

## II. The Case for Natural, Organic Norms

The burden of proof is on the neo-Aristotelian to furnish examples of natural norms that would undercut the is-ought gap. As it turns out, there are several plausible ones. The two candidates for natural normative facts I shall defend are life forms or natural kinds, and teleological facts or natural function. Although these two kinds of facts are related, it is helpful to distinguish between formal and teleological normativity, between morphology

and physiology, between structures and their functions – between what things *are* and what they *do*.

Nature is full of kinds; sunflowers are not oxygen; stars are not organisms; lead is not gold; water is not soil; and so on. Kind concepts allow us to both distinguish x from y and to gather together all the x's. Zebras and horses are both Equidae; lead and gold are both elements; ice and the sea and steam are all water. Thinking in kind categories is intuitive and natural.[6] Thinking in categories is probably a constitutive feature of thought.

Nature is also full of end-directed activity. Each thing does its own thing: sunflowers grow toward the sun, wolves hunt deer and deer flee wolves; hearts pump blood and eyes see; the sun warms the planet; phytoplankton oxygenates the atmosphere. Such processes are non-intentional end-directed processes. Non-intentional processes are sometimes called 'teleonomic.'[7] Teleonomic phenomena do not have a *director* but they do have a *direction.*

Kinds and their ends can be conceptually distinguished but not very far. Forms and functions, structures and activities, are two aspects of one thing. Is the hip bone shape adaptive for a purpose or is the purpose conducive to the development of such-and-such shape? It is better to allow that the structure and function of natural organisms and at least some of their parts are an inseparable whole. Indeed, philosopher of science Tim Lewens summarizes the folk biological conception of a "kind" by mashing together the concept of a life form or "essence" with the concept of a function or "telos": a kind is a "teleo-essence", a thing with an end.

My initial hypothesis, which will be explicated further, is that formal facts (natural kinds and their natural properties) and teleological facts (natural functions) are both in-

6. Susan A Gelman and Lawrence A Hirschfeld, "How Biological Is Essentialism," *Folkbiology* 9 (1999): 403–46; Stefan Linquist et al., "Exploring the Folkbiological Conception of Human Nature," *Philosophical Transactions of the Royal Society of London B: Biological Sciences* 366, no. 1563 (2011): 444–53.

7. Ernst Mayr, "The Idea of Teleology," *Journal of the History of Ideas* 53, no. 1 (1992): pp. 117–35.

stances of natural norms. We have not yet said anything about human ethical norms, which is our ultimate aim. Human ethical norms, if they can be said to be natural, will turn out to be formal and teleological facts about our life form identifiable as instances of a broader pattern of natural normativity. But the argument must proceed in stages; the goal for now is simply to defend natural normativity.

What are we to make of kinds and their teleonomic behaviors? The explanations may be either realist, reductionist, or anti-realist. Realist explanations argue that kinds and their ends are what they seem to be: fundamental facts of nature. Reductionist or anti-realist explanations argue that kinds and their ends are not what they seem. The nihilist argues that kinds don't exist, there is only one thing; ends don't exist, there is only one mechanical kind of process. The reductionist argues that *some* kinds exist, but they do not correspond to our initial scientific categorization; and *some* end-directed teleonomic processes are real but it is reducible to non-end-directed processes. Before discussing these options in full, let's explore the neo-Aristotelian treatment of natural normativity in more detail.

## Foot's Case for Natural Normativity

Philippa Foot argues that human virtues are instances of a broader class of natural properties: 'natural goodness.'[8] Foot is well aware that her offering is likely to offend the ears of some listeners. Her defense is the thought (drawn from Wittgenstein) that crude beginnings are often a necessary first step on the way to something refined. To earn an audience for her argument, her first chapter (which she call a "fresh start") clears away some shaky assumptions inherited from Hume and Moore. Many modern ethicists treat human valuations as unprecedented, almost miraculous, new appearance in the cosmos. Instead, we should expand the scope of our inquiry to examine the status of humans as natural entities.

8. Foot, *Natural Goodness*; cf. Sanford S Levy, "Philippa Foot's Theory of Natural Goodness," in *Forum Philosophicum*, vol. 14, 1, 2009, 1–15.

Moore assumed that, in philosophical ethics, 'good' is the ultimate predicate under review. This is one of the "shaky assumptions" Foot wishes to clear. She argues that statements like "pleasure is good" are not good paradigms for philosophical reflection. Evaluation of human creatures and evaluation of plants and animals follow *the same logical pattern*. In such evaluations, good is good *for*. Contrast 'good' with other predicates like 'red' or 'beautiful.' In a statement such as 'the house is beautiful', the predicate 'beautiful' doesn't need a complement. The house is *beautiful* – full stop. But 'good' has a different logical function. 'Good' is more like 'useful.' The phrase 'The house is useful' *does* need a complement. When we say 'the house is useful' we must specify what it is useful for – *for a mom of six, or useful for an artist,* or what have you. Likewise, 'good' always means *good for someone* or *for something.* 'Good' always needs a complement. If this crude beginning is anywhere near to correct, we can distance ourselves from Moore's starting point and build on another starting point: the life-form of human beings.

In this Foot agrees with Thompson's groundbreaking work.[9] Thompson argues that the concept of "life" is not, as it may seem to some, a property of some beings where *being* is the fundamental concept; rather "life" is a fundamental concept.[10] He says, "Vital description of individual organisms is itself the primitive expression of a conception of things in terms of 'life-form' or 'species', and if we want to understand these categories in philosophy we must bring them back to that form of description."[11] When we observe and examine living things we rightly employ some shared categories and our conclusions rightly share a logical structure.

What is that common structure? Thompson reviews and refutes a variety of crude

9. Michael Thompson, "The Representation of Life," in *Virtues and Reasons*, ed. Lawrence Hursthouse Rosalind and Warren Quinn (Oxford: Clarendon Press, 1995), 247–96. Thompson works out the arguments of this article more fully in his 2008 monograph.

10. Michael Thompson, *Life and Action* (Harvard University Press, 2008), chapter 1.

11. Ibid., 57.

definitions of life such as that anything that is alive reproduces, grows, metabolizes, etc. Such properties may be co-extensive with the property of being alive, but they are wildly insufficient for the task of *defining* life because such properties depend on a prior understanding of life. Thompson's alternative is that life is a fundamental concept. We recognize things as alive before we learn about their shared traits; indeed, we can only ascribe a set of traits *living things* share if we are already in possession (absent that set of traits) of a concept of living things under which we gather a sample.

On these considerations, it is most reasonable to hypothesize that life is a fundamental concept, along with 'being', 'quantity' and others. Once we accept that intuitive conclusion, then the argument gets interesting. For every individual living being is a member of a species or life-form. And living beings are not just *acted upon*; they *act*. Species have characteristic actions. Thompson says "action in this sense is a specific form of *life process*."[12]. Since each particular species engages in its own characteristic activities: beavers build dams, and robins build nests. There are, then, life-form specific *successes* and *failures* to act. Each life-form is subject to its own normative appraisals: something would be wrong with beaver that built a tiny nest or a robin that tried to build a massive dam.

By introducing the term 'natural normativity', Foot is insisting on a point that is both interesting and controversial. If evaluative properties like health and disease are really instances of natural goodness and natural defect, then some evaluative properties are *primary qualities of nature*.

McDowell and others will object to this characterization of natural normativity. They think it "queer" that nature should exhibit such properties, and they find it easier to judge that human beings are the only evaluators. It might be that terms like 'good' and 'bad' are sui generis evaluative terms, and that evaluative properties are "in people's heads" as it were. But Foot's analysis of language about plants and animals indicates that such a

12. Ibid., 27.

conclusion is not the natural presumption.

A much more natural starting point is that to assume that such terms are used relative to natural kinds – and especially life-forms and their activities or functions. The natural goodness under discussion is not just a human ascription but seems to be something humans *recognize* in all living things. Certainly, some properties are human ascriptions only. Other properties are in the world and only show up in human ascriptions insofar as we accurately reflect the facts. Foot's point is that *some* instances of natural goodness seem much more plausibly instances of this latter kind. For, there is "no change in the meaning of 'good' between the word as it appears in 'good roots' and as it appears in 'good dispositions of the human will.'[13] The identification of what is *good for* a non-human organism is sometimes identical to the identification of what is *good for* a human being. Foot's theory explains this in the simplest way. Foot concludes that this point holds about"goodness and badness", and therefore about evaluation in its most general form."

By contrast, McDowell and those who would draw a sharp contrast between "moral" and "non-moral" uses of the term must give long and sophisticated explanations for why it makes sense to describe a healthy plant and a moral person both as "doing well." The plant is not just doing well *for my garden* but doing well as itself. It is doing what such plants are supposed to live. The human being is not just living well *for a westerner* or *for a Californian* but doing well as what human beings are supposed to live. Rosalind Hursthouse articulates Foot's insight in this way:

> The starting point is an idea that she has never lost sight of, and which figures in her early attack on Hare. It is the idea that 'good', like 'small', is an attributive adjective. What that entails is that, although you can evaluate and choose things according to almost any criteria you like, you must select the noun or noun phrase you use to describe the thing you are calling good advisedly, for it determines the criteria of goodness that are appropriate. Hare can call a cactus a good one on the grounds that it is diseased and dying, and

13. Foot, *Natural Goodness*, 39.

> choose it for that reason, but what he must not do is describe it as a good cactus, for a cactus is a living thing. He can describe it as a good 'decorative object for my windowsill' or 'present to give my detestable mother-in-law', but not as a good cactus.[14]

There are two qualifications I should make about the scope of my thesis here. First, the 'good' in question here is a good-of-a-kind, the way that typical robins are blue-of-a-kind. The good-of-a-kind analysis works for all organisms and all biological species, which are most plausibly understood as natural kinds, rather than social groups, which are not. Folk ontology does tend to group nationalities and ethnicities as natural kinds along with leopards and bears; but my analysis trades on the concepts used in biology. Secondly, it would be a natural leap to assume that the good-for-us is an instance of the good simpliciter, but this is a different question altogether. Blackman argues that there *is* no good other than goods of kinds.[15] Others would argue that the good-of-a-kind is an instance of the good simpliciter. I wish to remain agnostic on this issue. While my thesis identifies what is good for us as an instance of something *truly good,* it remains agnostic about the broader metaphysical or cosmic significance of the fact. These are both interesting and important questions but they would take us too far afield of the main point.

## A Novel Case

A defense of natural normativity would render ethical naturalism possible. A defense of natural normativity would have to furnish instances of natural norms from widely agreed upon premises from common sense and science. My case for natural normativity depends

14. Hursthouse, *On Virtue Ethics*, 195.

15. Reid D. Blackman, "Meta-Ethical Realism with Good of a Kind," *European Journal of Philosophy* 23, no. 2 (2015): 273–92. Blackman also disputes the kind of biological foundation of ethics I am trying to defend here. Nevertheless, his article is a good introduction into the sort of "kindism" being discussed.

on two notions: the first is a minimal scientific realism.[16] The second basic notion is a little-utilized feature of language called "generic propositions," which I shall explain below. The case in brief is this:

1. If some generic statements describing natural entities are true, then some facts are both genuinely natural and normative – there are "natural norms."
2. Some generic statements describing natural entities are true.
3. Therefore, some facts are genuinely both natural and normative – there are "natural norms."

## The Special Logic of Generics

Michael Thompson is one of the first to work out "the special logic of judgments we make about living things, and then to indicate its application to ethics." Such judgments have a variety of names in the recent neo-Aristotelian literature: the most common are "Aristotelian categoricals"[17] and "natural-historical judgements,"[18]; less common are "norms,"[19] or "bare plurals."[20] I prefer the shorter and less adorned term *'generic.'*[21]

16. While scientific realism is not uncontroversial per se, my intended audience are committed scientific realists or sympathetic to realism. McDowell, as a sort of idealist, will dispute even my modset scientific realism, as we shall see in chapter 6.

17. Foot, *Natural Goodness*.

18. Thompson, "The Representation of Life"; Thompson, *Life and Action*.

19. Elizabeth Anscombe, "Modern Moral Philosophy," *Philosophy* 33, no. 124 (1958): 1–19

20. Greg N Carlson, "A Unified Analysis of the English Bare Plural," *Linguistics and Philosophy* 1, no. 3 (1977): 413–57. Carlson's essay is an early attempt to account for a variety of linguistic forms under one concept of reference to kinds

21. Cf. Francis Jeffry Pelletier and Greg N Carlson, *The Generic Book* (University of Chicago Press, 1995); Sarah-Jane Leslie, "Generics: Cognition and Acquisition," *Philosophical Review* 117, no. 1 (2008): 1–47; Andrew M Bailey, "Animalism," *Philosophy Compass* 10, no. 12 (2015): 867–83 for a discussion of a specific generic: "we are animals" in metaphysics and philosophical anthropology; Andrei Cimpian, Amanda C Brandone, and Susan A Gelman, "Generic Statements Require Little Evidence for Acceptance but Have Powerful Implications," *Cognitive Science* 34, no. 8 (2010): 1452–82 for an experiment in cognitive psychology that seeks to quantify the prevalence levels at which subjects tend to agree to generics, i.e., how many birds have to lay eggs before we agree to the assertion

My postulate is this: **some generics about human beings are true.** If this is true then, I shall suggest, we have good hope of cutting up nature at the joints. When combined with a moderate scientific realism, generic truths from sciences such as biology, physics, and anthropology (and perhaps others) support a modest natural normativity which will be further articulated (in a later chapter) to indicate which traits are virtues or vices for human beings.

## Generics are neither universal nor particular

Now, what are generics? "A fine question, but a difficult one," Andrew Bailey says. His recent paper provides a helpful (and humorous) introduction to the topic of generic statements:

> Start with this sentence: 'Buddhists are way into meditation'. This first sentence is, let us suppose, true. So far so good. But is it equivalent to 'for every x, if x is a Buddhist, x is way into meditation'? It does not appear to be. For the second sentence might be false (some Buddhists might not be way into meditation) even if the first sentence is, as we have supposed, true. The first sentence could be true, somehow, even if not all Buddhists are way into meditation (similarly, 'ducks lay eggs' may be true even if not all ducks lay eggs, 'mosquitos carry dengue fever' may be true even if only a very few mosquitos carry that virus, and so on). We are now positioned to observe one curious property of generics: they admit of exceptions.[22]

Thus, generics are statements of the form "S is F" or "S has or does F" where S is not an individual but a class or natural kind. The logical form of "all S's φ" does not predicate φ-ing to all members of the category S without exception, nor does it simply assert that some "S's φ", which is true but uninteresting. For example, consider the true statement, "wolves hunt in packs" as opposed to the clearly false statements "every particular wolf that has ever

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that "birds lay eggs"? Manfred Krifka, "Bare NPs: Kind-Referring, Indefinites, Both, or Neither?" in *Semantics and Linguistic Theory*, vol. 13, 2003, 180–203; Ariel Cohen, "On the Generic Use of Indefinite Singulars," *Journal of Semantics* 18, no. 3 (2001): 183–209.

22. Bailey, "Animalism," 869.

existed has hunted or will hunt in a pack." Rabid wolves hunt alone, and injured, or very old wolves don't hunt at all. Furthermore, it is true but trivial that *a large number of wolves hunt in packs*. The generic proposition is a unique logical expression, neither universal nor particular.

A generic is interesting because it is, or we treat it as, a truth about forms, or species. The subject of the statement is not all S's nor merely some S's, but the "infima species."[23] In this way, generics pick out what we might call formal facts, facts about the life form in question. Thus Sarah Leslie: "It is widely accepted that [definite] generics are singular statements which predicate properties directly of kinds. For example, "tigers are extinct" predicates the property of being extinct directly of the kind Panthera tigris, and would be true just in case Panthera tigris had the property of being extinct."[24]

McDowell thinks that such exceptions are a "logical weakness" in deriving ethical conclusions from generics about human beings. He cites the example from Anscombe (and Aristotle) that "humans have 32 teeth", saying "there is a truth we can state in those terms, but from that truth, together with the fact that I am a human being, it does not follow that I have 32 teeth. (In fact it is false)."[25] McDowell accepts that generics are generally true. His objection to their application seems to be that the relation between a normative expectation and reality fails to reach deductive certainty. If this is his objection, it rather misses the point. Aristotelian-categoricals are not half-hearted universal judgments; they are not universes with widely-acknowledge counterexamples. They are judgments of a logically different kind. Far from being a logical weakness, generics are what enable us to capture truths about natural kinds that help explain statistical variation and inconsistency.

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23. Christopher Toner, "Sorts of Naturalism: Requirements for a Successful Theory," *Metaphilosophy* 39, no. 2 (2008): 222. "Infima species" is the narrowest cut in a genus-species tree, or the most determinate determinable.

24. Leslie, "Generics," sec. 1.

25. John McDowell, "Two Sorts of Naturalism," in *Mind, Value, and Reality* (Cambridge: Harvard University Press, 1998), 171–2.

Prasada says that, "Much of our conceptual knowledge consists of generic knowledge — knowledge about kinds of things and their properties."[26] We can approach generics through a "formal, quantificational" semantics or through "principled connections". Principled connections support formal explanations, normative expectations, and a statistical expectation of prevalence. In other words, we explain that the dog has four legs *because* it is a dog (formal explanation); we expect that Fido should have four legs *unless something is wrong* (normative expectations); and we expect that if we counted up a population of dogs, *most* dogs would in fact turn out to have four legs (statistical expectation).

Generic truths, once discovered, set a normative expectation by which we evaluate individual members on how well or badly they exemplify their life form.[27] The normative expectation cannot, it seems, be reduced to statistical correlations. Rather, statistical correlations can be a sign of (or can be an illusion of) a principled connection.

There is much to be learned about the linguistic features of generics, but none of the unexplored frontiers render generics useless for applications in neo-Aristotelian ethics. A few examples of what needs to be learned include the correlation between statistical prevalence and normative identity; many generic truths describe what is statistically prevalent but not all. What is the difference? Is one reducible to the other? Furthermore, Leslie distinguishes between indefinite generics such as "tigers are striped" which admits of the specification "that tiger over there is striped" and definite generics such as "domestic cats are common" which does not admit of specification, "that domestic cat is common". What is the difference here? Finally, indefinite generics are trickier: "Ducks lay eggs" is a true generic while "ducks are female" is false one, even though only female ducks lay eggs. And "mosquitoes carry the West Nile virus" is true even though less than one percent of mosquitoes carry the virus while "books are paperbacks" is false even though more than

26. Sandeep Prasada et al., "Conceptual Distinctions Amongst Generics," *Cognition* 126, no. 3 (2013): 405.

27. Ibid., 3.

eighty percent of books are paper backs.[28] How do we sort through these correlations between generic connection and statistical prevalance?

These unexplored frontiers represent fascinating puzzles but do not render generics unsuitable for use in normative and ethical arguments. Nor should the presence of outstanding questions lead one to believe generic propositions are confusing or confused. Rather, their normal acquisition and usage is a very familiar, and perhaps inevitable.

Generic truths are acquired via a normal scientific means of empirical observation, rational reflection, and discussion. This familiar process is certainly revisable. For example, an ethologist who discovers a wolf hunting along may have a normative expectation that the wolf is not healthy. But she cannot know certainly in advance that this is so. She must test the hypothesis. A few reasonable interpretations are available: perhaps the lone wolf is unhealthy; perhaps the initial generic that 'wolves hunt in packs' was false; or perhaps this wolf is actually a new species of wolf. As it happens, in the case of wolves, no known species of wolf hunts alone so there is very strong reason to conclude that a lone wolf is rabid. But the point more generally is that generics are acquired and modified by a familiar, if complicated, process of scientific reasoning. Michael Thompson points out that: there is a "general and thoroughgoing reciprocal mutual interdependence of vital description of the individual and natural historical judgment about the form or kind."[29] Put differently, Micah Lott says:

> At each stage of an empirical investigation, our observations are mediated by our current understanding of the life form whose members we are observing. At the same time, our observations of those individual members will in turn improve our understanding of the life form itself, which then makes possible even more accurate and extensive future observations.[30]

28. Leslie, "Generics."

29. Michael Thompson, "Apprehending Human Form," *Royal Institute of Philosophy Supplement* 54 (2004): 52.

30. Micah Lott, "Moral Virtue as Knowledge of Human Form," *Social Theory and Practice* 38, no. 3 (2012): 414.

Again, the fact that generic truths are revisable is not a weakness but a strength of the case I am building. It may be, for all we know, that penguins can fly (in the air), that some species of penguin can fly, or that all penguins are really just defective birds. But the most reasonable belief thus far is the generic truth that penguins don't fly; that they are excellent swimmers, not defective flyers; and that these truths hold of penguins *as a kind* – a biologist or zoologist who discovered the first flying penguin would become (justifiably) famous because we would all be (justifiably) surprised. The surprise would not originate merely from something out of the ordinary — new and extraordinary creatures, both living and extinct, are discovered every year. The surprise would originate from the upending of a firmly established scientific fact.

## Generics are teleological

The first kind of natural normativity I am defending is the mere idea of a life-form. Knowing what a thing is, knowing about its species or life-form, is to know something descriptive and something normative about any member of that species. Knowing what a thing is, furthermore, licenses a range of normative expectations. But we can make the case for natural normativity stronger. There is another, related kind of normativity in the natural teleological features of life-forms. Such natural teleology can also be captured in generic propositions.

To see this second kind of natural normativity, begin with the concept of a function. Eyes perform the function (in an organism) of seeing, hemlock trees perform the function (in an ecosystem) of shading rivers, and so on. Thompson, for example, cites the scientific observation that "flowers have blossoms of such-and-such type in order that such-and-such insects should be attracted and spread their pollen about."[31]

While some philosophers of science have thought that teleological normativity could

31. Thompson, *Life and Action*, 293–94.

be explained in terms of function, I would suggest that the reverse is rather true: the structure of a function is teleological. There are many senses of the term 'function', but the kind of biological functions under review are teleological, or least teleonomic, in that it is an arrangement of parts toward a particular purpose or end.

A functional process is not necessarily *willfully* undertaken. But it does have a beginning, an end (in time), and an end (telos). Clarifying that functions need not be intentional, we can understand the natural functions of organisms and organic systems as instances of natural teleology. James Barham explains the notion of natural teleology in this way:

> By "teleology," I have in mind such words and concepts as "purpose," "end," "goal," "function," "control," and "regulation," as well as the real-world biological phenomena to which these words and concepts refer. This means that the word "teleology" should always be construed here in its internal or "immanent" sense—purposiveness existing in living beings themselves—and never in its external or "transcendent" sense of an overarching cosmic principle.[32]

Ernst Mayr (following Colin Pittendridgh) calls a process "teleonomic" if it is not a process of intentional purposes.[33] He says, "I have therefore refrained from using anthropomorphic language, Particularly the terms of purpose and intention, when explaining teleonomic phenomena in animals and plants."[34]

Mayr further distinguishes between teleological (purpose-driven end-directed processes), teleonomical (non-intentional end-directed processes in living things) and "teleomatic" (non-intentional processes in non-living things). A teleomatic process is an "automatic" process governed by natural law:

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32. James Barham, "Teleological Realism in Biology" (PhD thesis, University of Notre Dame; Web, 2011), 1.

33. Mayr, "The Idea of Teleology." Cf. Colin S. Pittendridgh, "Adaptation, Natural Selection, and Behavior" in Anne Roe and George Gaylord Simpsons (eds.), *Behavior and Evolution* (New Haven, 1958), 390-416.

34. Ibid., 123.

> All objects of the physical world are endowed with the capacity to change their state, and these changes strictly obey natural laws. They are end-directed only in a passive, automatic way, regulated by external forces or conditions… All teleomatic processes come to an end when the potential is used up (as in the cooling of a heated piece of iron) or when the process is stopped by encountering an external impediment (as when a falling object hits the ground). The law of gravity and the second law of thermodynamics are among the natural laws which most frequently govern teleomatic processes.[35]

For my purposes, however, even teleonomic programs would count as instances of natural normativity insofar as the development of an organism at one time is incomplete but will be complete in future. As Waddington puts it, "the end state of the process is determined by its properties at the beginning."[36] Normative, in my sense, is not the antonym of "descriptive"; normative is the antonym of descriptive *at present*. "The egg is not a chicken" is true at present. But "chickens start their life as eggs" is also generically true. Hence "the egg is a chicken" is a kind of teleological judgment about what it may, under proper conditions, become. As Chris Toner says, "natural-historical judgments readily admit of combination into teleological judgments."[37]

Taken broadly, then, the first point is to realize that talk about functions and ends is just as scientific as talk about life-forms, species, and natural health or disease. Mayr quickly rebuts many of the common objections (I should rather say prejudices) against teleonomic processes. For instance, teleological statements and explanations, he says, do not "imply the endorsement of unverifiable theological or metaphysical doctrines in science."[38] Rather, as Mark Perlman says:

> Many objects in the world have functions. Some of the objects with functions are organs or parts of living organisms… Hearts are for pumping blood.

35. Ibid., 125.

36. Conrad Hal Waddington and others, *The Strategy of the Genes. a Discussion of Some Aspects of Theoretical Biology.* (London: George Allen & Unwin, Ltd., 1957).

37. Toner, "Sorts of Naturalism," 222.

38. Mayr, "The Idea of Teleology," 122.

> Eyes are for seeing. Countless works in biology explain the "Form, Function, and Evolution of …" everything from bee dances to elephant tusks to pandas' 'thumbs'. Many scientific explanations, in areas as diverse as psychology, sociology, economics, medical research, and neuroscience, rest on appeals to the function and/or malfunction of things or systems.[39]

Mayr's highly suggestive alternative to conscious purposes is natural "programs". A program is "coded or prearranged information" that regulates an organism's behavior or development up to a pre-defined end-point.[40] Mayr's examples include the development of bones, organs, and shapes that come with physiological maturity, migration. Programs are "the result of natural selection". However, they contain information: "not only blueprints of the goal but also the instructions of how to use the information of the blue print."[41] The concept of a program, he assures us, is similar to concepts deployed by geneticists and computer programmers. The point is that the telos is not some mysterious spirit hovering above the organism, beckoning it to reach its full potential but coded into the organism from the beginning.

Regardless of the details of Mayr's proposal for explaining teleonomic processes, the mere fact that natural processes occur is indisputable. And (to return to the main point) such behaviors are expressed in generic propositions.

Generic propositions usefully capture the functional or teleological properties of natural organisms. As Chris Toner says, "natural-historical judgments readily admit of combination into teleological judgments."[42] This kind of combination of generic truths is very familiar. No sooner have I learned the formal facts about a penguin (that it is a bird, that it can swim, that it has a countershaded white belly and dark back etc.) do I learn that

39. Mark Perlman, "The Modern Philosophical Resurrection of Teleology," *The Monist* 87, no. 1 (2004): 1–4.
40. Mayr, "The Idea of Teleology," 127–8.
41. Ibid., 128.
42. Toner, "Sorts of Naturalism," 222.

*penguins are countershaded in order to avoid predators from above and below.*[43] Since an individual penguin may fail to be countershaded in the way that expresses its form, it would be defective. This defect is not a judgment made by scientists and "imposed" as it were, from the outside, on the penguin. It is rather a normative fact about the penguin. As Hursthouse says, "Wolves hunt in packs; a 'free-rider' wolf that doesn't join in the hunt fails to act well and is thereby defective."[44]

There is one objection that is easy to forestall. Someone might point out that genetic drift results in species evolving every which way, including the emergence of adaptive, maladaptive, and adaptation-neutral traits. This is true, so far as it goes, but not really an objection. Two replies are, I think, sufficient. First, it is an inextricable part of the scientific process to reason out which traits are instances of natural goodness and which are not. Just because one hundred percent of organisms eventually die doesn't mean that death is naturally good for them. Just because a high statistical number of organisms have a particular feature – a stripe or a scale or whathave you – doesn't necessarily mean that the feature is a formal one of the species. Rather, one must keep an eye open to larger samples, possible counterexamples, and one must keep one's generics tentative until they are very well grounded. Similarly, part of the scientific process is reasoning out which traits are *adaptive*. Even the way the objection is phrased assumpes that some traits are adaptive – that is adaptive *survival and reproduction.* Allowing even this minimal sense of normativity concedes my point that the normativity is discovered by the scientist rather than purely ascribed by him or her. A second response is that the generics under discussion are not about species-qua-fluid-across-millenia but about species-qua-fixed or apparently fixed within a given period. The fluidity of species over time, like a slow-motion film with

43. A shark looking up may miss a penguin, because its white belly blends in with the sunlight surface waters; a shark looking down may miss a penguin, because it blends in with the pitch dark waters of the abyss.

44. Hursthouse, *On Virtue Ethics*, 201.

thousands of frames, requires countless generations. For all we can observe of most species in the course of a human lifetime (say) or even since the birth of modern science in the 16th century, the species-at-present are fixed enough.

In my overall argument, generic truths are intended to serve as countererexamples to premise 2 of the **Bald Nature Challenge** above. That challenge asserted that no facts are genuinely both natural and normative. Generics are both genuinely natural and normative: natural, in that a large percentage of scientific knowledge consists of scientists predicating generic truths of natural kinds; normative, in that the life-form in question is one which an individual may or may not "live up" to, and in that *some* generics pick out natural functional or teleological facts about life forms (that penguins are counter-shaded *to avoid* predators, that hearts are *for* pumping blood, etc.). On my view, accepting the straightforward, generic truths delivered by such sciences about forms and functions is quite simply the respectable thing to do.

# III. Three Paths Forward

I have made a case for normative realism that identifies some normative properties (such as formal and teleological properties of organisms) as respectable natural properties. I call this normativity 'organic normativity' and the resulting naturalism 'organic naturalism'. This label distinguishes my view from an "enchanted" view of nature wherein even rocks, chemicals, and stars instantiate normative properties.

While my case is disputable, the natural phenomena in question are indisputable: first, that organisms *very strongly appear* to exist in natural kinds (birds are not bacteria and crystals are not organisms at all); secondly that organisms exhibit "teleonomic" or *apparently teleological* phenomena such as striving to reproduce.

My point has been that realism about kinds and teleological phenomena is the sim-

plest explanation of these phenomena. There are three paths forward. The first, and most plausible, path is that we can simply accept normative realism.

## Reject

The second, and least plausible, path is that we could embrace full-scale normative anti-realism and deny the objective reality of any such norms in nature (and indeed, even in human beings). This path requires us to explain away not only natural kind, teleonomic phenomena in nature, but the apparently teleological actions of human beings.

For example, we would have to deny that animals, plants, insects, all living things (and even ecosystems) exhibit end-directed or teleonomic behavior: eyes see, hemlock trees offer shade to fish, stomachs digest, deer leap to avoid predators. This denial is almost incredible. If all generics are false (or only conventionally true) then it is in some important sense false that 'wolves hunt in packs' and false even that 'penguins are birds'. It is false not only that "eyes see" but even that "humans are primates". Such denials are, I think, absurdities.[ˆ25.] Even when Kant denies natural teleology – the biological theory that the form of an organism causes the parts to grow and relate to each other in a particular way – he admits we *cannot help thinking so*.[45] To categorically reject *all truths* about natural kinds and natural functions, I contend, is untenable. And some generics are, it seems, necessarily normative propositions.

If we accept the truth of at least some generics, then Perlman's surprise is well founded: "It is surprising that analytic philosophers, with their strong focus on science, would reject a notion that is so central to some areas of science, most notably, biology and engineering sciences… Biology cannot, or at least in practice does not, eliminate functions

45. Philippe Huneman, "Naturalising Purpose: From Comparative Anatomy to the 'Adventure of Reason'," *Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences* 37, no. 4 (2006): 649–74.

and purposes."[46] One might suppose that Perlman's qualification "or at least in practice does not" leaves open space for the normative anti-realist. I welcome the critic who would try to show that biology *can* eliminate functions; what I have tried to suggest, and what Barham argues in great detail, is that the attempt has been made and has failed. A few failed attempts at reduction does not prove that reduction is impossible. But it does make the more plausible view, teleological realism, a better candidate for the default view.

Despite my inability to see the plausibility of global normative anti-realism, I must acknowledge that it has impressive defenders who deserve a fuller response than I can give here. Since anti-realism is not likely to appeal to the scientific naturalists in my intended audience, I must let these comments suffice.

## Reduce

The third path, and the most plausible rival to realism, is to develop a reductionistic account of apparently natural norms. This path accepts the appearance of such things as natural kinds, natural teleology, natural functions, etc., but *reduces* these phenomena to less spooky (read: more mechanistic) phenomena consistent with a conception of bald nature. For this section, I ignore natural kinds and focus simply on teleological normativity. So we can call reductionism of such natural norms "teleological reductionism" or "teleoreduction", following James Barham.[47] Arguing for or against teleoreductionism has become a cottage industry.[48]

I do not think that teleological reductionism is as plausibile as teleological realism; nor that is is very plausible in its own right. Nevertheless, the arguments for teleoreductionism are sophisticated, and some proponents hold out hope for even better arguments to

46. Perlman, "The Modern Philosophical Resurrection of Teleology. 6.

47. Barham, "Teleological Realism in Biology. chapter 3. My discussion will closely follow this chapter; however, Barham's discussion is far too rich to be summarized.

48. Cf. Perlman, "The Modern Philosophical Resurrection of Teleology., section III; and Barham, "Teleological Realism in Biology., chapter 3.

come. More to the point, some of its proponents affirm reductionism because of an operating background belief that, globally, reductive physicalism is a victorious view, despite ongoing local skirmishes. My objections to teleological reductionism amount to the accusation of a non-sequitur. But I do not think these objections are likely to overturn someone's background beliefs. Since I agree pretty well with Barham's analysis, I will summarize his view of the dialectic:

> If someone were comfortable with a purely physicalist worldview that had no place in it anywhere for teleology in any form, then nothing I will say here would do much to discomfort that individual. All I claim is that, if one is already convinced of the rationality of taking at face value at least some of the teleological concepts that we employ both in everyday life and in biological discourse, then one is not required to relinquish that conviction on the basis of the notion that molecular biology and the theory of natural selection, either severally or jointly, have already settled the matter by providing us with a successful means of eliminating such concepts from biology.[49]

This seems right to me. I am content to defend the claim that naturalistic teleological realism (and more broadly normative realism) is a live option even for the non-reductive scientific naturalist. Hence, the remainder of this chapter will examine some reasons for preferring realism to reductionism when considering normative realism in isolation, even if these reasons are not enough to overcome someone's background commitment to the contrary.

First, what does would it mean to "reduce" teleology? Barham's definition of teleoreduction, which I find adequate to my purpose, is this:

> To reduce a putative teleological phenomenon is to give an account of the phenomenon that is both empirically and theoretically adequate and that neither employs any teleological concepts nor presupposes any other teleological phenomena.[50]

The two primary candidates for teleoreduction are causal-role reductions and natural selection reductions.

49. ibid., 110.
50. Ibid., 109.

## Causal-Role Reduction

Causal-role or causal-contribution explanations (endorsed by Donald Davidson, Robert Cummins and others) reduce teleological relations such as "in order to" and "for" and "to the end of" to bare cause-effect relations. For example, the function of the heart is defined in reference to its role in the oxygenation of a vertebrate's blood.

Barham summarizes the causal-role positions in the recent literature on teleological and natural functions:

> The first position, stemming from a seminal article by Cummins (1975), views being a function fundamentally as making a causal contribution (in the efficient-causal sense) to the maintenance of a larger system of which the function in question is a component part.[51]

In that seminal article, Cummins attacks the assumptions that "(A) The point of functional characterization in science is to explain the presence of the item (organ, mechanism, process or whatever) that is functionally characterized" and "(B) For something to perform its function is for it to have certain effects on a containing system, which effects contribute to the performance of some activity of, or the maintenance of some condition in, that containing system."[52] Essentially, this path explains a natural function as a relation between parts and wholes.

The natural function is not reducible to just any relation, nor even to any *causal* relation, for there are many part-whole relations that are obviously not functions. For example, the heart is not just the heart pumping part of the human body; it may also be correctly described as the "thumping sound" part of the human body. Obviously, making thumping sounds is not the function of the heart (it is at best a side-effect of its performing its function). Yet "heartsounds" and circulation are both effects of the heart's beat. So the question

51. ibid., 111.

52. Robert Cummins, "Functional Analysis," *The Journal of Philosophy* 72, no. 20 (1975): 741–65 741.

is how one can determine *before identifying the function* exactly which part-whole relation is the functional one?

It does no good to assert that part A has a causal role witin organism B *after one has already presupposed an irreducibly functional analysis*. The teleoreductionist is obliged rather to show how one can distinguish teleological and non-teleological part-whole relations in absence of or prior to such presuppositions. The teleological realist also affirms that hearts, say, play a causal role in the vertebrate's body. The teleological realist's point is that the heart is a part of the body with an irreducibly functional part – it pumps *in order to* circulate blood. It is *the blood pump* of the body. The teleological realist is free to identify the function of a particular body part, and then to characterize the part-whole relation in irreducibly functional terms; the teleological reductionist cannot do likewise. Relatedly, we should note that the notion of a "role" seems to be teleological. The proposition that 'the heart plays a role within the organism's circulatory system' seems, on the face, synonymous with the proposition that 'the heart *has a function* within the circulatory system.'

## Natural Selection Reduction

The other alternative (or perhaps supplement) to the causal-role answer is by appealing to the historical genesis of the organ in question. natural selection stories (endorsed by Ruth Millikan and others) provide a causal-history explanation of a present day teleonomic function. Similarly, purely mechanistic natural selection pressures may result in the construction of a genetic "program" or action that has some adaptive or useful otucome without consisting of teleological process.

One natural selection reduction strategy is to show how natural selection itself is a teleonomic or quasi-teleological process that can produce organisms with functional properties. So, to put the picture simply: define survival and reproduction as the goal-state of organisms (however this came to be); then, distinguish effects that tend toward the organ-

ism's survival and reproduction from those that do not or those that are irrelevant to that end. Circulation contributes to survival and hence is a more plausible candidate for the heart's function than making heartsounds. Simply put, we can describe the present state of the heart (including its causal-role in bodies) by referring to its historical genesis: the heart evolved *because* it tended to the survival of certain kinds of organisms.

The question is whether natural selection is even the right kind of explanation for, say, the pumping of the heart. Natural selection is not really a *selection* at all in the sense that *no one* is doing the selecting. Instead, natural selection is a scientific description of the process by which present day populations were preserved while others died out. So much is clear in outline, but the details matter. Specifically, natural selection explains heritable traits that (i) varied in the past and which (ii) played a role in the reproductive rates of the population.[53] It does not (and is not even supposed to) explain the bare existence of an initial organism or population of organisms. Rather, the initial organism or populatuion is taken for granted, along with its complete set of reproductive and other traits. Natural selection comes in to show how the organism varies, passes on heritable traits, and gives rise to new phenotypes. Thus Barham says:

> …the functionally coordinated organism must already exist before it can be selected. On this view, we assume that the functional coordination of the organism is *prima facie* evidence of teleological determination, and since that functional coordination is presupposed by the theory of natural selection, the theory is in no position to reduce the apparent teleology in biology to mechanism.[54]

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53. Thus Godfrey-Smith's summary: Evolution by natural selection is change in a population due to: (i) variation in the characteristics of members of the population, (ii) which causes different rates of reproduction, and (iii) which is inherited. (Peter Godfrey-Smith, "Conditions for Evolution by Natural Selection," *The Journal of Philosophy* 104, no. 10 (2007): 489–516 515). This is only one of Godfrey-Smith's two descriptions: the more general description excludes particular real organisms in exchange for a useful degree of generality.

54. Barham, "Teleological Realism in Biology. 125.

The worry is that the process natural selection is not the *right kind* of explanation to serve as a candidate for the reduction of apparently teleological activity within individual organisms.

When we are wondering how or why it is that the heart seems to have a definite function (to circulate blood) that is discernable from other side-effects (to make heartsounds), the question is about organismic behavior in general. Chemicals and compounds do not grow and develop and perform characteristic activities in the structured way that organisms do. My answer is that such normativity is a fundamental natural feature of organic life, a kind of brute natural law discovered a posteriori by the scientific method. The natural selection reductionist's answer that the the teleonomic function of hearts emerged out of a long history of phenotypic variation. My question is: so what? Mechanistic forces that are taking place between a population and its environment (droughts, famines) or within a population's genetics (genetic drift, normal reproduction) are compatible with a parallel teleological forces. Indeed, Barham suggests that the burgeoning field of evolutionary developmental biology might be able to supply some of the connections between these two kinds of process. He calls "phenotypic accommodation" the distinct process of "inherent compensatory or adaptive capacity of organisms" – or simply homeostasis.[55] The scientific hypothesis some are investigating[56] seems to be that these two processes are separately necessary but only jointly sufficient causes to explain the presence of a trait (like pumping hearts) in a population.

Another proponent of natural selection reduction strategies is Ruth Millikan.[57] Barham arues that: "a present trait's being a function to be equivalent to its having been naturally selected due to the fitness advantage conferred on an organism by the physical effects of

55. ibid., 131.

56. James A Shapiro, "Revisiting the Central Dogma in the 21st Century," *Annals of the New York Academy of Sciences* 1178, no. 1 (2009): 6–28.

57. Ruth Garrett Millikan, "In Defense of Proper Functions," *Philosophy of Science*, 1989, 288–302.

the ancestral trait of the same type from which the present trait-token is descended."[58]

The idea here is that ancestral organisms had such-and-such phenotypes which, after many generations of reproduction, conferred hearts upon present-day vertebrates. A consequence of Millikan's view is that an organism's "proper function" simply cannot be read off its present capacities; we can't just observe that hearts *seem to be for circulating blood* and infer from this observation that they are, indeed, for circulating blood. Rather, the proper function of a (present-day) heart can only be identified by its empirical history.

Two implausible corollaries are that if we discovered two heart-like organisms (suppose one is extraterrestrial) with distinct evolutionary parentages, then they would have to be classified as having different functions despite both circulating blood. More hypothetically, "Swampman" arguments press a similar point. Suppose an exact material replica of Donald Davidson spontaneously emerged from a swamp; on Millikan's theory, even though the Swampman is equipped with a heart and lungs and legs and eyelids, none of these has *any* "proper function". Millikan bites the bullet on both of these implausible corollaries.

The point of these examples is not to challenge the details of empirical origin stories but to separate the *concept* of having a (present day) functional capacity from the *concept* of having an empirical, evolutionary history. These concepts come apart in several ways: Useless vestigial organs have an empirical history but no present day functional capacity; spandrals have a present-day functional capacity with no direct, primary selection history; the language capacities in say, the right hemisphere of the brain brain *can* be taken over by the left hemisphere in the case of injury or lobotomy, presumably because the brain is (present-day) adaptible and not because the brain function redundancy was selected for in every individual case. These counterexamples demonstrate *at least* that function and history conceptually can come apart.

What is the alternative? In Barham's view, functions are "essentially modal, not

58. Barham, "Teleological Realism in Biology., 9.

historical, concepts"[59]. He quotes Fodor's vivid statement that: "my heart's function has less to do with its evolutionary origins than with the current truth of such counterfactuals as that if it were to stop pumping my blood, I'd be dead."[60] If we made contact with extraterrestrials whose blood-like liquid was circulated by a pump-like organ, how could we discern whether it was a heart? We could query about the historical genesis of the organ on that planet, but we would first rightly query: *what would happen if that organ stopped pumping?* If the Alpha Centaurians, too, would die without the beating of that organ, we would justifiably call the organ a 'heart' even though it had a very different history.

Barham cautions against, "imagining that 'selection history' could confer normative value on a biological function in the same way that pedigree confers value on a horse, or provenance on a painting."[61] "History" is not a special power but is simply the set of physical interactions over time. The question about which set of physical interactions over time that produced X might be (and I think is) intimately related to questions about the function of X; the point is that they are two different questions. Michael Thompson, too, insists that judgments about natural teleology are made true from the form of life under question, not from "hypotheses about the past."[62] This seems right to me. It does not matter for present purposes *how* the function came to be, just whether or not it really *is* at present.] Barham is right to point out that the problem with Aristotle's views of biology (say, believing that the seat of perception was not in the brain) was not that he lacked knowledge of evolution, but that he lacked an adequate knowledge of physiology.

I can only conlude from this brief discussion that these reductionistic strategies are

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59. ibid., , 139.

60. Jerry A Fodor, *The Mind Doesn't Work That Way: The Scope and Limits of Computational Psychology* (MIT press, 2001), 86-7; cited in Barham, "Teleological Realism in Biology., 138.

61. Ibid., 140.

62. Cf. Thompson, "The Representation of Life. 293. Christopher Toner adds that judgments about natural teleological facts are made true regardless of the origin of the facts, "whether about creation or natural selection." (Toner, "Sorts of Naturalism. 223.)

not very promising. 'Not very promising' is a far cry from 'hopeless'. There may one day be a successful reduction of teleonomic phenomena "that is both empirically and theoretically adequate and that neither employs any teleological concepts nor presupposes any other teleological phenomena." But today is not that day. The scientific perspective of empirical biology conforms most closely to the commonsense perspective that hearts are for pumping blood.

## Coming to terms with teleology

The three paths I mentioned above are to accept, reduce, or reject natural normativity. I cited reasons to think rejecting and reducing are not promising paths. In closing, I would like to offer some reassurance to those who might be anxious about the prospect of accepting normative realism whole clothe. My reassurance boils down to the belief that appeal to natural normativity is a live *scientific* belief. While natural teleological realism is still controversial, it is not a controversy between science and philosophy but a controversy *within science*.

Thomas Nagel took a lot of heat for his recent philosophical defense of scientific, Darwinian, natural teleology.[63] However, Michael Chorost does not accuse Nagel of obscurantism but chastises him for *failing to cite the science*. He says:

> Natural teleology is unorthodox, but it has a long and honorable history. For example, in 1953 the evolutionary biologist Julian Huxley argued that it's in the nature of nature to get more advanced over time. "If we take a snapshot view, improvement eludes us," he wrote. "But as soon as we introduce time, we see trends of improvement…"[64]

Teleological realism in biology fell into disfavor with Francis Bacon's superstitious belief that the search for final causes corrupted science.[ˆ24] The proper reply to Bacon is that the

63. Thomas Nagel, *Mind and Cosmos* (Oxford University Press, 2012).

64. Michael Chorost, "Where Thomas Nagel Went Wrong," *Chronicle of Higher Education*, 2013.

teleological nihilism hypothesis has been tried and found wanting.

Modern science is no less teleological than it was in the 16th century; perhaps even more so. Arnhart persuasively argues that teleology is irreplacably assumed in medicine.[65] Zammito clarifies its ongoing relevance in biology, since organisms seem to be intrinsically purposeful.[66] Fitzpatrick says that, "While neo-Darwinian evolutionary theory does soundly reject any appeal to teleology in the process of evolution itself, there is a large literature in contemporary philosophy of biology defending the legitimacy of employing teleological concepts in connection with adaptations."[67] Darwin himself might have been a teleologist.[68] Whether Darwin's theory of natural selection *undermines* and debunks or *underwrites* and justifies the teleological view at least debatable.

65. Larry Arnhart, "Aristotle's Biopolitics: A Defense of Biological Teleology Against Biological Nihilism," *Politics and the Life Sciences* 6, no. 2 (1988): pp. 173–229.

66. John Zammito, "Teleology Then and Now: The Question of Kant's Relevance for Contemporary Controversies over Function in Biology," *Studies in History and Philosophy of Science Part* 37, no. 4 (2006): 748–70.

67. William FitzPatrick, "Morality and Evolutionary Biology," in *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta, Spring 2016, 2016.

68. James G Lennox, "Darwin Was a Teleologist," *Biology and Philosophy* 8, no. 4 (1993): 409–21; James G Lennox, "Teleology," *Keywords in Evolutionary Biology*, 1992, 324–33.