Chapter 1

Organic Naturalism

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

While ethical naturalism has a variety of expressions, the common problem is how to relate ethical and otherwise normative facts with non-normative facts. The term 'normative' refers to 'ought' talk. As Alan Gibbard says:

> What's special about morality is that it operates in the 'space of reasons;' it concerns justification and oughts. The term 'normative' is central to much current philosophical discussion. There's no agreement on what this technical term in our discipline is to mean, but it involves, in a phrase drawn from Sellars, being somehow 'fraught with ought.'[1]

So the problem is to explain how the way things *are in fact* relate to the way things *ought to be*. I shall call this the 'is-ought gap.' Hume is often credited with (or blamed for) the insight that an 'ought' can never be derived from an 'is.'[2] When it comes to ethics, how

1. Allan Gibbard, "Normative Properties," *The Southern Journal of Philosophy* 41, no. S1 (2003): 321.

2. In a famous passage, Hume 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

could mere facts motivate me to act, without any evaluative commitment? How could mere facts entail some moral truth? How could mere facts *be* values? As Stephen R. Brown suggests, "when all is said and done, [the is-ought gap] might be *the* problem of ethics."[3] Thankfully, if natural norms exist, then they undercut the is-ought gap. Natural norms would not "bridge" the is-ought gap; rather, they would show that the putative gap is spurious.

The purpose of this chapter is to argue that there are such things as natural norms. At least *some* normativity is discoverable in natural life forms and functions themselves and that is not projected by human evaluators. These natural formal and teleological facts are just as real and familiar as other scientific facts. My hypothesis is that the set of natural norms includes some human norms which can form the basis for a plausible ethical naturalism.

The controversy over normativity is an old one and is not likely to be settled here. My goal, instead, is to present a case that is plausible to the undecided, and that is sensitive to the concerns of normative anti-realists (who are zealous defenders of scientific realism) and the concerns of normative non-naturalists (who are zealous defenders of moral realism).

Section 1 explains in more detail the two kinds of is-ought gap that philosophers have taken to render ethical naturalism impossible. It explains how one notion of natural normativity makes ethical naturalism at least possible.

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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." (*A Treatise of Human Nature* book III, part I, section I.) Nevertheless, 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 deserves more of the blame (or the credit).

3. R. Stephen Brown, *Moral Virtue and Nature: A Defense of Ethical Naturalism* (Continuum, 2008), 95.

Section 2 presents a novel case for what I call "organic normativity." I first summarize Philippa Foot's and Michael Thompson's case for natural norms of two types: formal and functional norms. I augment the case on the basis of generic propositions, that organisms have a real life form and a natural teleological process.

Section 3 considers the three possible explanations of the phenomena of natural norms: realist, anti-realist, and reductionist. I show how the realist is free to accept the simpler explanation. I concede that the anti-realist has an explanation that is worth exploring further, but leave it aside since that explanation is not necessarily as attractive to the scientific naturalist.

Section 4 tackles the alternative to my view that is most popular among scientific naturalists: reductionism. I aim to show that while reductionism cannot be fully rebutted, it is, at the very least, no more scientifically respectable or rationally necessary to believe than naturalistic, normative realism.

1. Two Challenges

Consider a few pretty uncontroversial normative propositions: '*better to be Socrates dissatisfied than a pig satisfied*' or *'tolerance of people with different views is essential to democracy'*. Supposing these are true, *why* are they true? The non-naturalist has a good explanation: such propositions pick out fundamental, non-natural, moral facts. The naturalist anti-realist also has a good explanation: such propositions express something about the speaker, his or her individual values, or 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.

The is-ought gap has at least five dimensions. There is an *ontological* gap between normative facts and natural facts; a *logical* gap between normative claims and non-normative claims; a *semantic* gap between normative concepts and non-normative concepts; an *epistemological* gap between the way normative claims are justified and the way non-normative claims are justified; and a *motivational* gap between how norms motivate to action and how facts motivate or fail to motivate to action.[4] All these gaps draw the contrast between bald nature on the one hand – McDowell's "realm of law" – and normativity on the other – McDowell's "space of reasons." The point is that when it comes to human evaluations, 'is' statements may be interesting but they seem useless for practical purposes.

To simplify matters, we can use the epistemological form of the is-ought gap to express the **Is-Ought Challenge:**

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.

The first premise of the is-ought challenge sets out a criterion for ethical naturalism: the normative propositions that feature 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. It is difficult to imagine how the challenge could be met. If it cannot be met, then ethical naturalism, and neo-Aristotelianism, is a non-starter.

The is-ought gap seems to me fatal to some forms of ethical naturalism. Namely, it is fatal if we concede that nature is "bald" – a purely descriptive, mathematical matrix of non-normative facts and laws. However, the is-ought gap can be *undercut* if we deny that picture.

4. Ibid., 75–76.

Of course, I can concede that nature consists of *merely natural facts*. The concession is a tautology. I do not concede, without argument, that all natural facts are non-normative. To concede that nature is purely descriptive would be to allow my opponent to beg the question. My opponent might likewise complain that I beg the question in my own favor. It is true that, if I were to merely 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, are there such things as natural norms? We can use the ontological form of the is-ought gap to express 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 second challenge, like the first, sets out a criterion that ethical naturalism must satisfy. Namely, ethical naturalism must offer an account of some natural norms that are both real and brutely natural, not derived from other (descriptive) facts.

Foot argues that features of nature 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]

Two clarifications are required before attempting to meet this challenge. First, natural normativity is an indeterminate concept that might include a variety of different kinds of norma-

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

tivity that are not obviously moral normativity. For example, notions such as the proper, the healthy, the advantageous, the adaptive, the mature, and so on, might be genuinely normative without being sufficient as ethical norms. Even if some natural norms were intrinsic to mundane biological species such as the white oak (Quercus alba) or the sloth bear (Melursus ursinus), more work would be needed to argue that natural norms are intrinsic to the human (Homo sapiens sapiens) and that our ethical life depends on conforming to them. Secondly, natural normativity might be only a feature of human nature, as John McDowell argues, or it might be a feature of any organic life. I shall return to this dispute in later chapters. For now, I only wish to emphasize that even if natural normativity can be shown to be plausible, then ethical naturalism is *possibly* true.

2. Generic Truths, Natural 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 morphology and physiology. The distinction between structures and their functions – between what natural organisms *are* and what they *do* – is a distinction between formal and teleological normativity. Both kinds work for my purposes.

First, start with natural formal facts. Scientists and non-scientists alike easily observe that nature is full of kinds: sunflowers are not oxygen; wolves are not bears; lead is not gold; and so on. Kind concepts allow us to both distinguish x from y and to gather together all the x's. Wolves and jackals are both dogs; lead and gold are both elements; ice and steam are both water, and so on. Classifying entities into categories and kinds is

intuitive and natural.[6] Though I shall not explore the expansive literature on essentialism, it is prima facie plausible to affirm that categorial thinking is a constitutive feature of human thought and possibly a feature of nature itself.

Secondly, scientists and non-scientists alike also observe that nature is 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 end-directed processes are *non-intentional*. Non-intentional processes are sometimes called 'teleonomic.'[7] Teleonomic phenomena may not have a *director* but they do have a *direction.*

Kinds and their ends can be conceptually distinguished but are intrinsically related. Is the shape of a hip bone adaptive for its purpose or is that purpose conducive to the development of such-and-such a shape? Is this knife sharp because *knives are sharp* or because it is used for cutting? It is better to allow that the structure and function of natural organisms (and their organs, limbs, etc.) are inseparable aspects of a single entity. Forms and functions, structures and activities, are two aspects of one thing. Indeed, philosopher of science Tim Lewens summarizes the folk biological conception of a "kind" by linking together the concept of a life form or "essence" with the concept of a function or "telos:"[8] a kind is a

6. Susan Gelman and Lawrence 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.

8. The Greek word '*telos*' is commonly translated as "end," but it is bursting with an array of possible meanings, including: "definite point," "goal," "purpose," "cessation," "order," "prize," "highest point," "realization," "decision," and "services." See Henry George Liddell and Robert Scott, *An Intermediate Greek-English Lexicon: Founded Upon the Seventh Edition of Liddell and Scott's Greek-English Lexicon* (Harper & Brothers, 1896). Strong fills out this already rich picture with a wider array of related meanings from the Koine Greek: "from a primary *tello* (to set out for a definite point or goal); properly, the point aimed at as a limit, i.e. (by implication) the conclusion of an act or state (termination (literally, figuratively or indefinitely), result (immediate, ultimate or prophetic), purpose);

"teleo-essence," a thing with an end.

How do philosophers explain the apparent existence of kinds and 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 anti-realist argues that kinds and ends don't ultimately exist; there are only concrete particulars and in various stages of a mechanical process. The reductionist argues that *some* kinds exist, but they do not correspond to our initial scientific categorization; and that *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. Philippa Foot argues that human virtues are instances of a broader class of natural properties: 'natural goodness.'[9] 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 calls 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.

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. Eval-

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specially, an impost or levy (as paid); continual, custom, end(-ing), finally, uttermost." See *Strong's Exhaustive Concordance: New American Standard Bible.* Updated ed. La Habra: Lockman Foundation, 1995. Entry 5056.

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

uation 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.* In reference to organisms and other natural objects, 'good' always needs a complement.[10] 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.

Foot agrees on this point with Michael Thompson's groundbreaking work.[11] 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.[12] 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."[13] When we observe and examine living things we rightly employ some shared categories and our conclusions

10. One might say that some things – God or people or platonic forms – are *good full stop*. I shall concede that God, say, would not have a complement like this. But is any creature good simpliciter? Even so, calling God *good full stop* is a way of indicating that he is good *for everyone and everything*. He is the unqualifiedly desirable, or rather, he is desirable *to anything capable of desiring*. The Psalmist says "let everything that has breath praise the Lord." Presumably, objects without breath are relieved of the obligation, even if their authorship and grounding is in him.

11. 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.

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

13. Ibid., 57.

rightly share a logical structure.

What is that common structure? Thompson reviews and refutes a variety of crude definitions of life one finds in biology textbooks: life is a property of anything that is alive, such as capacities to reproduce, grow, metabolize, etc. The problem is that even though such properties are co-extensive with the property of being alive, they are wildly insufficient for the task of *defining* life. Indeed, 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*. Each species has its characteristic actions, but the important point here is that organisms as a whole are characterized by being the source of their own action. As John Haldane says, quoting the medieval motto: "things are specified by their power."[14]

Thompson says that "action in this sense is a specific form of *life process*."[15] Since living beings are characterized by *acting*, each particular species engages in *its own* particular activities. Beavers build dams and robins build nests as part of their own life process. If this is so, then there are life-form specific *successes* and *failures* to act. Each life-form is subject to its own normative appraisals: something would be wrong with a 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

14. John Haldane, "A Return to Form in the Philosophy of Mind," *Ratio* 11, no. 3 (1998): 262.

15. Thompson, *Life and Action*, 27.

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 conclusion is not the natural presumption.

A much more natural starting point is 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'."[16] 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

16. Foot, *Natural Goodness*, 39.

for a Californian but doing well as a human being. 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 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.[17]

I should make two clarifications about the scope of my thesis thus far. First, the 'good' is a good-of-a-kind, not good simpliciter. 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.[18] 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 quiet about the broader metaphysical or cosmic significance of the fact.

A second clarification is this: when I talk of the 'human good' I intend to refer to the species *Homo sapiens sapiens*, the way that talk about a robin's egg being *blue* is to predicate a blue-of-a-kind. Folk ontology tends to classify people by preferences or nationalities akin to the way it classifies leopards and bears; but my analysis trades on the concepts used in biology. Hence, my good-of-a-kind analysis is intended to refer to organisms and biological species, which are most plausibly understood as natural kinds, rather than social groups,

17. Rosalind Hursthouse, *On Virtue Ethics* (Oxford University Press, 1998), 195.

18. 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.

which are not. There is more to be said about these two clarifications, but exploring them would take us too far afield.

I would now like to augment Foot's case with a novel argument for natural normativity. Like her case, my argument depends on a minimal commitment to scientific realism[19] and on "Aristotelian categoricals." But I believe the case can be made stronger by utilizing a feature of language called '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"[20] and "natural-historical judgments."[21] Less common are references to "norms"[22] or "bare plurals."[23] I prefer the shorter and less adorned term *generic.*[24]

My postulate is this: **some generics about human beings are true.** If this is true

19. 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 modest scientific realism, as we shall see in chapter 6.

20. Foot, *Natural Goodness*.

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

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

23. 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

24. 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 Brandone, and Susan 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: e.g., how many birds have to lay eggs before we agree to the assertion 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.

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 chapter 4 to indicate how certain traits are virtues or vices for human beings. 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.

Andrew Bailey's recent paper provides a helpful (and humorous) introduction to the topic of generic statements. He asks:

> What are generics? A fine question, but a difficult one. 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, 'mosquitoes carry dengue fever' may be true even if only a very few mosquitoes carry that virus, and so on). We are now positioned to observe one curious property of generics: they admit of exceptions.[25]

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 existed has hunted or will hunt in a pack." Rabid wolves hunt alone, and injured, or very

25. Bailey, "Animalism," 869.

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."[26] 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."[27]

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)."[28] 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.

Prasada says that, "Much of our conceptual knowledge consists of generic knowl-

26. 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.

27. Leslie, "Generics," sec. 1.

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

edge – knowledge about kinds of things and their properties."[29] We can approach generics through what Prasada calls "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.[30] 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 and definite generics. For example, "tigers are striped" admits of specification ("that tiger over there is striped") while definite generics do not ("domestic cats are common" does not license "that domestic cat is common.") Finally, indefinite generics are trickier: "Ducks lay eggs" is a true generic while "ducks are female" is a 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 eighty percent of books are

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

30. Ibid., 3.

paper backs.[31] How do we sort through these correlations between generic connection and statistical prevalence?

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 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."[32] 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.[33]

31. Leslie, "Generics."

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

33. 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. A penguin is not a defective flyer but an excellent swimmer. These truths obtain in 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.

The first kind of natural normativity I am defending is the mere idea of a natural, normative 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."[34]

While some philosophers of science have thought that teleological normativity could 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

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

biological functions under review are teleological, or at 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.[35]

Ernst Mayr (following Colin Pittendridgh) calls a process "teleonomic" if it is not a process of intentional purposes.[36] 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."[37]

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:

> 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

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

36. 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.

37. Ibid., 123.

> 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.[38]

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 later be complete. As Waddington puts it, "the end state of the process is determined by its properties at the beginning."[39] 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."[40]

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."[41] 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. 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 psy-

38. Ibid., 125.

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

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

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

> chology, sociology, economics, medical research, and neuroscience, rest on appeals to the function and/or malfunction of things or systems.[42]

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.[43] 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."[44] 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 we describe such processes 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."[45] 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 *penguins are countershaded in order to avoid predators from above and below.*[46] Since an individual penguin may fail to be countershaded in the way that expresses its form, it

42. Mark Perlman, "The Modern Philosophical Resurrection of Teleology," *The Monist* 87, no. 1 (2004): 1–4.

43. Mayr, "The Idea of Teleology," 127–8.

44. Ibid., 128.

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

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

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."[47]

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 what have 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 assumes that some traits are adaptive – that is, adaptive for *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-millennia but about species-qua-fixed or apparently fixed within a given period. The fluidity of species over time, like a slow-motion film with 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 counterexamples

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

to premise 2 of the **Bald Nature Challenge** above. That challenge asserted that no facts are genuinely both natural and normative. Generics describe such facts. Generic facts are natural, in that a large percentage of scientific knowledge consists of scientists predicating generic truths of natural kinds. Generic facts are also normative in at least two ways: first, an individual organism may exemplify or fail to exemplify its life-form; and secondly, *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, the most scientifically respectable option is to accept the straightforward, generic truths delivered by such sciences as biology and physiology about forms and functions.

3. Three Paths Forward

My case begins with the indisputable natural phenomena that organisms appear to exist in natural kinds and, secondly, that organisms engage in teleological or teleonomic end-directed behaviors. Scientists and non-scientists can and should attempt to explain these appearances. There are three possible responses we shall consider.

The first, and most plausible, is to simply accept normative realism. I call this view 'organic naturalism' to distinguish it from an "enchanted" view of nature wherein even rocks, chemicals, and stars instantiate normative properties.[48] While realism about kinds and teleological phenomena is disputable, it seems to be the simplest explanation and the one most consonant with scientific realism. When Kant denies realism about natural teleology he admits we cannot help acting as if it were true.[49] If we cannot help acting as if

48. The proponent of a view of nature in which all material objects instantiate normative properties would reject the label 'enchanted.' The term 'enchantment' presumes that an object has no intrinsic evaluative properties but receives them, like a spell, from the evaluator. The issue cannot be settled by presumption. Nevertheless, this issue is not my main focus.

49. Philippe Huneman, "Naturalising Purpose: From Comparative Anatomy to the 'Adventure of Reason'," *Studies in History and Philosophy of Science Part C: Studies in*

p were true, it seems a fine hypothesis that p is, indeed, true.

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 all putative natural kinds and teleonomic phenomena in nature. (It might also require explaining away practical reasoning and intentional, end-directed action in 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." Arthur Ward draws this conclusion:

> Perhaps the most provocative conclusion of the dissertation is that there is no such thing as good eyesight or bad hearing *per se*. Or equivalently, that it is strictly speaking false (without further qualification) that humans have ten fingers and ten toes. Both sorts of claims rely on teleological norms that entail good-of-a-kind evaluation, the application of the attributive "good," which I argue can only be legitimately applied to artifacts… some people find the denial that "humans have ten fingers" or the possibility of "good hearing" to be so implausible as to be a reductio of my entire argument.[50]

Denying the existence of (normatively significant) good eyesight does indeed seem to me a reductio of such anti-realism. Even if a position is 'absurd,' that doesn't mean it is automatically false or not worth considering. It might well be true. But if it is true, then absurdity is true and truth is absurd. There have been many philosophers who have thought so. 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

History and Philosophy of Biological and Biomedical Sciences 37, no. 4 (2006): 649–74.

50. Arthur Ward, "Against Natural Teleology and Its Application in Ethical Theory" (PhD thesis, Bowling Green State University, 2013), 82.

anti-realism is not likely to appeal to the scientific naturalists in my intended audience, for present purposes, I shall proceed on the assumption that modern scientific reasoning is capable of grasping the non-absurd intelligibility of nature.

The third path, and the most plausible rival to realism, is to develop a reductionist 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.[51] Arguing for or against teleoreductionism has become a cottage industry.[52]

I find the fervor for reductionism in philosophy of science and philosophy of mind odd. Perlman is right to be surprised. He says: "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 and purposes."[53] I do not think that the appeal of teleological reductionism is due to its intrinsic plausibility; its appeal is mainly due to the mistaken assumption that it is the only scientifically respectable option. When compared

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51. Barham, "Teleological Realism in Biology," chapter 3. My discussion will closely follow this chapter; however, Barham's discussion is far too rich to be condensed into the space available here.

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

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

with another view that is equally scientifically respectable and more plausible, that appeal wanes.

Nevertheless, the arguments for teleoreductionism are sophisticated, and some proponents hold out hope for even better arguments to 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 the reductionist argument, which amount to the charge of non-sequitur, are unlikely to overturn someone's background beliefs. Barham's summary of the dialectic seems to me correct:

> 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.[54]

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.

4. Against Teleology Reductionism

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

54. Barham, "Teleological Realism in Biology," 110.

> 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.[55]

The two primary candidates for teleoreduction are causal-role reductions and natural selection reductions. 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.[56]

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."[@ 741] 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 blood-circulating part of the human body; it is also the "thumping sound" part. Heartsounds and circulation are both effects of the heart's beat. It is obvious,

55. Ibid., 109.
56. ibid., 111.

however, that making heartsounds is not the function of the heart, but (at best) a side-effect of performing its function. So the question 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 within 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 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 is simultaneously true that the heart *causes* blood circulation and that the heart pumps *in order to* circulate blood. The heart 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 even the reductionist's notion of a "role" is essentially teleological. The thought that the heart "plays a role" within the organism's circulatory system seems to be conceptually identical to the thought that the heart *has a function* within the circulatory system. So the reductionist must be wary not to smuggle in teleological concepts into a putatively non-teleological account. If all available reductionist strategies *did* somehow smuggle in teleological concepts, this fact would be somewhat telling. One cannot be blamed for wondering if reduction is not just difficult but impossible.

The second major candidate for teleological reduction is the "natural-selection" strategy which appeals to the historical genesis of the organ in question. This reductive strategy is perhaps best viewed as a supplement, rather than alternative, to the causal-role strategy. Natural selection reductions provide a causal-historical explanation of a present day teleo-

nomic function.[57] There are a few different sub-strategies on this front.

One sub-strategy argues that *natural selection itself* is a teleonomic or quasi-teleological process that can produce organisms with functional properties. How exactly does this work? We first define survival and reproduction as the goal-state of organisms (however this came to be); then, we distinguish effects that tend toward the organism'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 heart-sounds. 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.

My objection to this sub-strategy is this: have we even produced the *right kind of explanation* for a phenomenon such as the pumping of the heart? Obviously, natural selection is not a *selection* in the sense that *some agent* is "selecting." Natural selection is rather a scientific description of a process wherein generations of populations are either extinguished or preserved. 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.[58]

So much is clear in outline. However, the details of the case are philosophically important. Specifically, natural selection explains heritable traits that (i) varied in the past and which

57. Ruth Garrett Millikan, "In Defense of Proper Functions," *Philosophy of Science* 56, no. 2 (1989): 288–302.

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

(ii) played a role in the reproductive rates of the population.[59] Natural selection is not supposed to and does not explain the bare existence of an initial population. Rather, the initial organism or population – with a complete set of formal and functional traits – is taken for granted. So the worry is that the process of 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 discernible 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 is that 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 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 processes. He calls "phenotypic accommodation" the distinct process of "inherent compensatory or adaptive capacity of organisms" – or simply homeostasis.[60] The scientific hypothesis some are

59. 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) 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.

60. Barham, "Teleological Realism in Biology," 131.

investigating[61] 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.

A second popular sub-strategy with natural selection reductions is that of Ruth Millikan.[62] Millikan argues that a "proper function" by definition refers to an object's empirical history. She says that "definition of 'proper function' looks to history rather than merely to present properties or dispositions to determine function."[63] A function is a "recursive" concept, since the function of a present day organ is defined in reference to ancestor's functions; and "non-historical analyses" fail in important ways. Barham summarizes Millikan's definition of a proper function: "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 the ancestral trait of the same type from which the present trait-token is descended."[64]

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.

Millikan's view entails an implausible corollary: 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 ma-

61. 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.

62. Ruth Garrett Millikan, *Language, Thought, and Other Biological Categories: New Foundations for Realism* (MIT press, 1984).

63. Millikan, "In Defense of Proper Functions," 289.

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

terial 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:

> Take any object, then, that has a proper function or functions, a purpose or purposes, and consider a double of it, molecule for molecule exactly the same. Now suppose that this double has just come into being through a cosmic accident resulting in the sudden spontaneous convergence of molecules which, until a moment ago, had been scattered about in random motion. Such a double has no proper functions because its history is not right. It is not a reproduction of anything, nor has it been produced by anything having proper functions.[65]

On Millikan's view, then, such an organ with an identical structure that causes identical effects would not have any "proper function" at all. Millikan is well aware of the seeming absurdity of this conclusion, and defends her view against wild hypothetical counterexamples. Nevertheless, it still seems to me the counterexample cuts against her view, despite being fanciful.

It is more plausible, in light of such counterexamples, to accept the thought that an organ function and historical genesis are non-identical. We can support this intuitive conclusion by showing a few ways that the two concepts come apart: Useless vestigial organs have an empirical history but no present day functional capacity; spandrels have a present-day functional capacity with no direct, primary selection history; the language capacities in say, the right hemisphere of the brain *can* be taken over by the left hemisphere in the case of injury or lobotomy, presumably because the brain is (present-day) adaptable 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.

65. Millikan, "In Defense of Proper Functions," 292.

What is the alternative? In Barham's view, functions are "essentially modal, not historical, concepts."[66] Barham 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."[67] 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."[68] "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 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."[69] 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.

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66. Barham, "Teleological Realism in Biology., 139.

67. 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.

68. Ibid., 140.

69. 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.)

My conclusion, based on these considerations, is that reductionist strategies are not very promising. 'Not very promising' is a far cry from 'hopeless.' There may be a successful reduction *one day*. But today is not that day. It may turn out to be possible to find an explanation of teleonomic phenomena "that is both empirically and theoretically adequate and that neither employs any teleological concepts nor presupposes any other teleological phenomena." Until then, the scientific perspective of empirical biology conforms most closely to the commonsense conclusion that *hearts are for pumping blood.*

Part of the resistance to this conclusion is a deeply-rooted anxiety about the prospect of accepting naturalistic normative realism whole clothe. Teleological realism in biology fell into disfavor about the same time as Francis Bacon declared that the search for final causes "defiles" science.[70] This anxiety is misplaced. The proper reply to Bacon is that the 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. 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."[71] Thomas Nagel's recent philosophical defense of scientific, Darwinian, natural teleology received wide criticism.[72] However, one critical view by Michael Chorost pointed out that Nagel's main error was not in defending naturalistic teleology but failing to cite the *existing scientific literature*:

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70. "Although the most general principles in nature ought to be held merely positive, as they are discovered, and cannot with truth be referred to a cause, nevertheless the human understanding being unable to rest still seeks something prior in the order of nature. And then it is that in struggling toward that which is further off it falls back upon that which is nearer at hand, namely, on final causes, which have relation clearly to the nature of man rather than to the nature of the universe; and from this source have strangely defiled philosophy." Cf. *New Organon*, Book I. XLVIII.

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

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

> 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…"[73]

In addition to Huxley, we can point to Arnhart's persuasive argument that teleology is an irreplaceable assumption in medical science,[74] or Zammito's defense of the ongoing relevance of natural teleology in biology, since organisms seem to be intrinsically purposeful.[75] Darwin himself might have been a teleologist.[76] And, as Stephen Brown argues, "Neo-Darwinism… can actually be seen as underwriting teleological explanations in biology, that is, as playing a crucial theoretical role in explaining certain kinds of telic phenomena."[77] I have done anything to place my account on neo-Darwinian footing; instead, my aim is to rebut the charge that such a footing is unthinkable. While natural teleological realism is still controversial, it is not a controversy between philosophy and science but a controversy *within science*.

5. Conclusion

The goal of this chapter has been to argue that there are such things as natural norms. The naturalistic normative anti-realist and the non-naturalistic normative realist agree that all natural facts are non-normative facts. This gives rise to the is-ought gap as a matter of

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

74. 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.

75. 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.

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

77. Brown, *Moral Virtue and Nature*, 109.

logical necessity. But the is-ought gap might simply turn out to derive from an obsolete view of nature that cannot account for biological science, let alone the social sciences. The neo-Aristotelian view of natural normativity does not *bridge* the much vaunted is-ought gap but rather undercuts it. Natural norms serve as counterexamples to the common belief that all natural facts are descriptive (non-normative) facts.

Instances of natural normativity include familiar scientific facts about organisms: they bear a life form and they engage in natural teleological processes. The three possible responses to such putative natural norms are to accept them (as I have recommended), reject them, or reduce them. Conceding to global normative anti-realism would require adopting scientific anti-realism as well, which is a formidable philosophical view I have not attempted to consider here. Scientific realists tend to choose a reductive strategy, but I have given reasons to think reduction has not yet been accomplished and is not likely to. In the mean time, it seems clear that naturalistic normative realism is not only the view commended by best philosophical reflection but also, interestingly, the view assumed in normal scientific inquiry.

The argument thus far has attempted to demonstrated that it is at least *possible* that ethical naturalism can derive normative human 'oughts' from other, basic, natural 'oughts.' The next chapter aims to demonstrate that it is *plausible*.