Chapter 1

Natural Teleology[1]

"Biology cannot, or at least in practice does not, eliminate functions and purposes."

–Mark Perlman, "The Modern Resurrection of Teleology in Biology", 151.

The Is-Ought Gap

Rosalind Hursthouse argues that although ethical evaluations of human beings are "disanalogous to non-ethical ones in various ways, both depend upon our identifying what is characteristic of the species in question."[2] The notion that natural, descriptive facts can serve as premises in arguments with normative conclusions is central to ethical naturalism. If normative evaluations can be grounded in factual descriptions of the identity and characteristics of a species, this would be momentous: "is" statements would underwrite "ought" statements. We can put the challenge in this form:

Is-Ought Gap Challenge to Ethical Naturalism

1. Alternate title: Natural, Organic, and Practical Teleology: Natural Norms and Human Nature

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

1. If ethical naturalism is possibly true, then "ought" conclusions can be derived from "is" premises.
2. But no "ought" conclusions can be derived from "is" premises.
3. Therefore ethical naturalism is not possibly true.

The second premise seems to render hopeless the thought, articulated by Hursthouse, that we can evaluate things on the basis of what they are. Call this the "is-ought" gap.[3] Simply put, the is-ought gap is the intuitive notion that one cannot learn anything about *what ought to be* simply by examining *what is*.[4] For example, suppose your friend Jim will be attending his first Oscar ceremony, but doesn't know what to wear. Suppose we observe that *most male celebrities wear black ties to the Oscars.* It simply does not follow from the premise that most men in fact wear black ties that *Jim ought to wear a black tie to the Oscars*. At least, it does not follow unless we supply an additional, brutely normative premise such as that *He ought to wear whatever most people wear*. And *that* premise is not one we learned from observation. More broadly, one cannot deduce from anthropological facts (say, that all humans in all cultures wear some type of clothing) any normative conclusions (that humans *ought* to wear clothing. We cannot settle a controversy among nudists by citing statistical generalities.)

In ethics, the is-ought gap seems devastating. For even supposing we gathered a whole collection of reliable scientific truths about humans – from anthropology, psychology, sociology, and also biology, chemstry, physics – we would not be a wit closer to establishing any ethical truths. A detailed and scientific description of human nature could hope to supply a "descriptive ethics" that narrates what such-and-such a culture approves of or finds worthwhile compared to what they find worthless and reprehensible. At its best, a descriptive ethics might identify universal moral approp-

3. The major problem I shall address has various names, but the name I prefer is "the is-ought gap". G. E. Moore had a different name for this problem, but his name would just muddy the waters. If absolutely necessary, I shall only call Moore's version "The Fallacy That Shall Not Be Named."

4. Thus, Hume: "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." (*A Treatise of Human Nature* book III, part I, section I).

bations and disapprobations. For example, while habits and attitudes toward drinking alcohol vary dramatically from culture to culture, there seems to be a universal (cross-cultural) disapprobation for continual drunkenness, even among cultures (like the Bolivian Camba) that drink regularly and drink heavily.[5] Such findings might be interesting, but the is-ought gap reminds us that they are a far cry from *ethical* insights.

The is-ought gap objection is fatal to many forms of ethical naturalism, but not to the neo-Aristotelian type Hursthouse and others are pursuing. For there exists a second, and more promising way to underwrite "ought" statements. From basic, fundamental, scientifically respectable *natural norms*. Call this the the possibility of natural normativity.[6] We can put the challenge, in the following form:

Bald Nature Challenge to Ethical Naturalism

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

This challenge parallels the first one in that everything depends on whether nature consists of *merely* natural facts. If so, then it follows that normativity is either *non-natural* (i.e., supernatural) or else un-real.

If some facts are genuinely both natural and normative, then ethical naturalism is at least *possible*. (There will be other challenges to address, of course.)

The candidates for natural normative facts I shall defend are natural formal and functional

5. "It is important to realize that drinking problems are virtually unknown in most of the world's cultures, including many where drinking is commonplace and occasional drunkenness is accepted." Dwight B Heath, "Sociocultural Variants in Alcoholism," *Encyclopedic Handbook of Alcoholism*, 1982, 426–40.

6. The concept of 'natural normativity' is indeterminate, which means I run the risk of unclarity; that indeterminacy is necessary for us to discuss these issues without begging the question in favor of the view that all norms are unnatural and all nature is non-normative. If natural norms could be discovered, then it would be *at least possible* that the is-ought gap is not a fatal problem for ethical naturalism.

properties of organisms. Hursthouse, Philippa Foot, John McDowell, MacIntyre, and Stephen Brown are united in the thought that some natural formal or teleological facts – whether that is Hursthouse's "characteristic", or a "life-form"[7] or "form of life"[8], or "human nature", or a human telos – are inherently normative enough to license normative conclusions.

Rather than overcoming the gap between "is" and "ought", they defy the strict separation between the two. Hume (and others) assume that all nature is not normative; this assumption renders some kinds of ethical naturalism impossible. But it is open to dispute.

Natural, Biological Norms or Cultural, Rational Norms?

Although the neo-Aristotelians are united in the affirmation that some norms can serve as a natural grounding of ethical facts, there are two competing strategies as to which "norms" are up to the task.

There are two or three competing strategies to be found among the neo-Aristotelians for pre-emptively undercutting the is-ought gap via natural normativity. The two strategies go under many names.[9] The basic difference is between those who discover natural normativity in *human nature* – culture, or rationality, or practical agency – and those who hope to find natural normativity more generally in all organic life. As Thomas Nagel puts it, with the existence of life in the cosmos

7. Michael Thompson, *Life and Action* (Harvard University Press, 2008), 57

8. John McDowell, "Virtue and Reason," *The Monist* 62, no. 3 (1979): 339.

9. Annas distinguishes two sorts of naturalism, one that emphasizes the biological nature of humanity (at the expense of the odd normativity of reason) and another that emphasizes the rational nature of humanity (at the expense of the mundane descriptivity of biology). Christopher Toner distinguishes between the "biological naturalism" of Thompson and Foot (and Hursthouse) on the one hand from the "second naturalism" or "excellence naturalism" or 'culturalism' of McDowell and MacIntyre, each of which has its strengths and problems. Cf. John McDowell, *Mind, Value, and Reality* (Harvard University Press, 1998); Hans Fink, "Three Sorts of Naturalism," *European Journal of Philosophy* 14, no. 2 (August 2006): 202–21; Christopher Toner, "Sorts of Naturalism: Requirements for a Successful Theory," *Metaphilosophy* 39, no. 2 (2008): 220–50; Julia Annas, "Virtue Ethics: What Kind of Naturalism?" in Stephen Mark Gardiner, *Virtue Ethics, Old and New* (Cornell University Press, 2005).

arises the existence of "beings of the kind.. for which things can be good or bad."[10] (The third group defends the view that natural normativity is intrinsic to the whole cosmos.) Let's examine each one a bit more.

Normativity of Human Nature On this option, something about humanity is naturally and inherently teleological. For example, perhaps one of the natural functions of being a practically rational creature is that humans construct for themselves goals and attempt to achieve them by various means.[11] On this view, ethical conclusions are irreducibly based upon human facts such as human rationality, human culture, or human excellence. Since these human facts are contrasted with broader natural facts, call this view "Social" or "Practical Teleology."[12] This kind of social or rational teleology is certainly the safer of the two strategies, and is followed by McDowell, Hursthouse, and the early MacIntyre.

Normativity of Organic Nature The second strategy is more ambitious and more risky. It is to defend the view that other parts of nature (such as living creatures) are naturally and inherently teleological. For example, perhaps one of the functions of *being alive at all* is that plants and animals act to survive and perform whatever instinctual actions are necessary for them to grow and develop into the state of species-specific maturity. At least some natural entities – living organisms – have ineliminable, irreducible, normative properties. Call this view Natural Teleology. Natural Teleology is the preferred strategy of Foot, Thompson, and the later MacIntyre, and others.[13]

10. Thomas Nagel, *Mind and Cosmos* (Oxford University Press, 2012), 117.

11. Compare with Christine M Korsgaard, *The Sources of Normativity* (Cambridge University Press, 1996). Korsgaard's argument about the "Authority of Reflection" builds a case that human autonomy – the ability to be a law to oneself – is the source of normative authority. In other words, my own identity as a rational human agent obligates me to behave morally.

12. Compare with Marinus Farreira, "Reasons from Neo-Aristotelian Naturalism," 2011 calls this "excellence naturalism" as opposed.

13. Keith Ward, "Kant's Teleological Ethics," *The Philosophical Quarterly* 21, no. 85 (1971): 337–51; 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; Monte Johnson, *Aristotle on Teleology* (Oxford University Press, 2005); 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; R. Stephen

Normativity of the Cosmos I should mention a third – even more ambitious – sort of strategy is to defend the view that *all* of nature is teleological. This is the notion that everything – including stars and rocks – "has a purpose", as if the cosmos were somehow organized and *going somewhere*. Call this Cosmic Teleology. Though such natural normativity in the form of natural teleology has its recent defenders.[14] I shall not pursue this strategy.

Problems for each strategy

Each of these (first two) predominant strategies faces its major challenge. For example, even if the first strategy of *human* natural normativity could pre-emptively undercut the is-ought gap, the major worry is no such thing as a universal human nature from which we might derive normative conclusions. Even the singular noun phrase "human nature" is liable to sound mystical, like a platonic universal underlying all human beings. Bernard Williams summarizes the antiquated worldview that many are suspicious of:

> The idea of a naturalistic ethics was born of a deeply teleological outlook, and its best expression, in many ways, is still to be found in Aristotle's philosophy, a philosophy according to which there is inherent in each natural kind of thing an appropriate way for things of that kind to behave.[15]

The problem, of course, is that if human beings are a "mess" (as Williams puts it) then the normative conclusions to be derived would be equally messy. Humans are occasionally irrational and always

Brown, *Moral Virtue and Nature: A Defense of Ethical Naturalism* (Continuum, 2008); Mariska Leunissen, *Explanation and Teleology in Aristotle's Science of Nature* (Cambridge University Press, 2010); Mark Perlman, "The Modern Philosophical Resurrection of Teleology," *Philosophy of Biology. An Anthology*, 2009, 149–63; James Barham, *PhD Dissertation: Teleological Realism in Biology* (Web; University of Notre Dame, 2011).

14. Tim Mulgan, *Purpose in the Universe: The Moral and Metaphysical Case for Ananthropocentric Purposivism* (Oxford University Press, 2015); Nagel, *Mind and Cosmos*; Peter Kreeft, *Summa Philosophica* (St. Augustine, 2012).

15. Cf. Bernard Williams, in *Making Sense of Humanity: And Other Philosophical Papers 1982-1993* (Cambridge University Press, 1995), 109.

variable. Human beings posit themselves, create themselves, define their values, chart their destinies, and all in different ways.

The second strategy has its own, even bigger, problems. Not even all the neo-Aristotelians are optimistic about the strategy of grounding human ethics in natural normativity.

Pollyanna Objection. Norms can be discovered for both good and evil. Some animals protect their young while other animals abandon or even consume their young. Some humans are kind and gentle while others are vicious and cruel. Lott calls this the "Polyanna Problem" in that virtue ethicists are liable to be naively optimistic about what such a search through nature might discover.[16] Anscombe anticipates this worry when she says:

> The search for "norms" might lead someone to look for laws of nature, as if the universe were a legislator; but in the present day this is not likely to lead to good results: it might lead one to eat the weaker according to the laws of nature, but would hardly lead anyone nowadays to notions of justice.[17]

Irrelevance Objection. Natural norms are subject to rational reflection and are not necessarily action guiding or normatively binding. Even if natural teleological facts are among those facts that can be hypothesized and confirmed scientifically, there remains one final problem for this strategy. Which teleological facts are we to pick out? Empirically, some acorns become fully grown, mature oaks, but other acorns become stulted, sickly specimens. Most acorns never become anything other than acorns before they disintegrate into dust in the soil.

Scientific Facts Objection.Furthermore, even if natural normativity in the form of teleology in the non-human world *could possibly* underwrite normative conclusions about human ethics, how would we confirm the hypothesis that there is such a thing as natural normativity? Is the hypothesis scientific or not? For many, scientific naturalism just is the commitment to believe all and only the best deliverances of all the sciences. Abandoning the search for natural teleology was a

16. Micah Lott, "Moral Virtue as Knowledge of Human Form," *Social Theory and Practice* 38, no. 3 (2012): 407–31.

17. G. E. M. Anscombe, "Modern Moral Philosophy," *Philosophy* 33, no. 124 (1958): 14.

harbinger of modern science; Francis Bacon and others believed that the search for final causes corrupted science. So, if best science tells us that nature is *only* descriptive, natural normativity is dismissed out of court.[18] And many scientific naturalists do indeed think that the scientific conception of "bald nature" (McDowell's phrase for non-normative nature) is incompatible with the kind of natural normativity found in Foot's brand of neo-Aristotelian ethical naturalism. Evolutionary biology, for instance, tells us that genetically modern humankind is the latest in a series of species. This is prima facie in tension with the notion of human nature. Ernst Mayr puts the alleged tension between the flexibility of evolutionary species and a fixed human nature in this way:

> The concepts of unchanging essences and of complete discontinuities between every *eidos* (type) and all others make genuine evolutionary thinking impossible. I agree with those who claim that the essentialist philosophies of Aristotle and Plato are incompatible with evolutionary thinking.[19]

Other ethical naturalists like Richard Boyd and Peter Railton would be quick to observe, at this juncture, that natural kinds themselves are part of the vocabulary of natural science.[20] And indeed, part of my strategy for defending the truth and scientific credentials of Footian naturalism is to appeal to generic truths about natural kinds. But this objection is still considerable.

So what are we to make of these challenges? On the one hand, I think both strategies (social normativity and natural normativity) would work, and wish to defend them against ethical non-naturalists or ethical naturalists of different sorts.[21] On the other hand, I think natural normativity

18. Cf. Bacon, *New Organon*, Book I. XLVIII "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."

19. Ernst Mayr, *Populations, Species, and Evolution: An Abridgment of Animal Species and Evolution* (Harvard University Press, 1970), 4.

20. Richard Boyd, "Realism, Anti-Foundationalism and the Enthusiasm for Natural Kinds," *Philosophical Studies* 61, no. 1 (1991): 127–48; Richard N Boyd, "How to Be a Moral Realist," *Contemporary Materialism*, 1988, 307; Peter Railton, "Moral Realism," *Philosophical Review* 95, no. 2 (1986).

21. Such as functionalists and the Cornell realists just mentioned.

is the stronger of the two and is less subject to objections from cultural relativism. Hence, in the spirit of devil-may-care adventure seeking, I shall pursue the more ambitious strategy of defending natural normativity in all of organic nature, not just human beings.

However, in a later chapter I will examine the notion that human (and only human) normativity as a fail-safe. In the end, I do not think these two notions of normativity are *contradictory*. A "third type" of naturalism would combine and synthesize them.[22] For those who find the concept of natural normativity completely unpalettable, I hope to render it at least conceivable. For those who remain unconvinced, I shall hope to convince them that the facts of social or practical teleology are enough to ground the theory of virtue I develop in a later chapter. For now, I shall pursue the strategy according to which natural normativity in the form of natural teleology is sufficient to ground a theory of ethics in observations about human nature as practical, rational animals.

Here, I shall defend Foot's strategy of Natural Teleology against McDowell's strategy of Social or Practical Teleology. In doing so, I shall summarize and bolster her arguments, offering a more rigorous argument for the fundamental premise that some natural facts are brutely normative, teleological facts.

I. An Initial Case for Natural Normativity

Let's begin with Philippa Foot. Foot argues that human virtues are instances of a broader class of natural properties: 'natural goodness.'[23] to earn an audience for her argument, her first chapter (which she call a "fresh start") clears some shaky assumptions inherited from Hume and Moore. Instead of treating human valuations as sui generis, a miraculous new appearance in the cosmos that only appears with the existence of humans, hat we should expand our scope to examine our

22. Fink, "Three Sorts of Naturalism.. The criteria for this third sort of naturalism are sketched brilliantly by Toner, "Sorts of Naturalism.. Such third kind of naturalistic theory would be comprehensive. It would provide an anti-dualistic account of first nature and "second nature", of biology and culture, of animality and rationality. But more of these things later.

23. Philippa Foot, *Natural Goodness* (Oxford University Press, 2001); cf. Sanford S Levy, "Philippa Foot's Theory of Natural Goodness," in *Forum Philosophicum*, vol. 14, 1, 2009, 1–15.

status as natural entities. She 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 something refined.

The kind of "shaky assumption" she means is this: Moore assumed that "good" was the ultimate ethical predicate under review. By contrast, 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' (like 'useful') has a different logical function. 'The house is useful' does need a complement – the house is useful *for a mom of six, or useful for an artist,* or what have you. Similarly, '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 *Representation of Life*. There, he 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.[24] Thompson reviews and refutes a variety of biological definitions of life such as reproduction, growth, metabolisis, etc., for these properties depend on a prior understanding of life. 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."[25] 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? Every individual living being is a member of a species or life-form. And different life-forms are subject to different

24. Michael Thompson, "The Representation of Life," in *Virtues and Reasons*, ed. Lawrence Hursthouse Rosalind and Warren Quinn (Oxford: Clarendon Press, 1995), 247–96.

25. Thompson, *Life and Action*, 57.

normative appraisals.

Humans are certainly a unique *kind* of living being with a unique life-form. And we shall examine below what difference the differences make. As a preview, morality is (correctly) thought to be action-guiding. Hume and Moore (correctly) argue that moral principles cannot be merely descriptive; they must motivate us to act or refrain from acting. (Furthermore, moral theories must be able to retroactively explain *why* we acted or refrained from acting, and help us to evaluate actions or abstentions, in ourselves and others.) Call this the Practicality Requirement. But the Practicality Requirement is not necessarily best met by positing that moral reasons are inextricably tied to conative psychological states. Rather, the action-guiding facts in the case of natural goodness are facts humans, facts about objects in the world, and facts about our relation to those objects. But more on this below.

Foot concludes that:

> goodness and badness, and therefore about evaluation in its most general form; but 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.[26]

Another way of putting this point is that some properties we can call 'goodness' are primary qualities of nature. Obviously, some will worry that this picture of nature is not "the scientific picture" of nature. The objection from McDowell bears some similarities.

II. A Novel Case for Natural Normativity from Generics

What is the hope for "identifying what is characteristic of a species" and deriving from such characteristics normative judgments? The odds are quite good, I think. My case for natural normativity depends on a minimal scientific realism and on a little-utilized feature of language and conceptualization called "generic propositions" – or simply "generics."

26. Foot, *Natural Goodness*, 38.

The Case in Brief

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."

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." That 'special logic' is variously called "Aristotelian categoricals"[27], "natural-historical judgements"[28] "norms"[29] "bare plurals"[30]. I prefer the shorter and less adorned term 'generic.[31]

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.

27. Ibid.

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

29. Anscombe, "Modern Moral Philosophy," 14–15. Anscombe is not very optimistic about the project Thompson, Foot, and I are undertaking.

30. Greg N Carlson, "A Unified Analysis of the English Bare Plural," *Linguistics and Philosophy* 1, no. 3 (1977): 413–57.

31. Cf. ibid., . Carlson's essay is an early attempt to account for a variety of linguistic forms under one concept of reference to kinds; 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 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.

> Now, what are generics? Andrew Bailey's recent paper provides a helpful introduction:
>
> > What are generics? A fine question, but a difficult one. Start with this sentence: [all ducks lay eggs.] This first sentence is, let us suppose, true. So far so good. But is it equivalent to 'for every x, if x is a [duck], x [lays eggs]? '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.[32]

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. Generics refer not to all members of a category distributively nor about merely *some* but to the category itself; they are statements about natural kinds. Consider the statement "all wolves hunt in packs." Logically, the proposition expressed in this statement is neither strictly universal nor strictly particular. It is not a strictly true universal judgment (for some actual wolves hunt alone, and some don't hunt at all). Furthermore, it is true but trivial that *some wolves hunt in packs*. 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. The statement that "wolves hunt in packs" is only interesting to scientists if it is an item of conceptual knowledge about wolves as a *kind*. 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 "infama species."[33] As Leslie says:

> > 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 (Krifka et al. 1995).

As statements of natural kinds, generics are not merely statistical regularities. For example, it is a true generic that "California condors can fly for hours without resting."[34] But one could easily imagine a scenario in which every living member – in 1987 there were only 27 known condors – of the endangered species are too injured, old, or diseased to exemplify this attribute. It would

32. Bailey, "Animalism," 869.
33. Toner, "Sorts of Naturalism," 222, quoting Thompson.
34. Jeffrey P. Cohn, "Saving the California Condor," *BioScience* 49, no. 11 (1999): 864–68.

be strictly true of the individuals of the species that *none* can fly for hours; nevertheless the generic would still be true that "condors" (as a class) *can* fly for hours.

In this way, generics pick out what we might call formal facts. As Bailey notes, an exception to a universal judgment proves the judgment false. If a geometrician were to discover an exception to the proposition "All squares have four right angles", then the statement would be simply false. By contrast, exceptions (from defect, injury, illness, etc.) do not *invalidate* generics. If a biologist discovers an exception to the proposition "All reptiles lay eggs", then either the statement is false or she has discovered a new species of reptile that does not lay eggs. Confining ourselves to particular judgments like "Some reptiles lay eggs" would be radically unambitious science.

While there is much to be learned, still, about the linguistic and metaphysical implications of generics, their use and acquisition is actually very familiar. For instance, Generic truths are acquired via familiar means of empirical observation, rational reflection, and discussion. Michael Thompson poitns 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."[35] Micah Lott's comment on this same point is that:

> 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.[36]

This familiar scientific process may not be easy or free of dangers, but it is at least *a familiar scientific process*. To use a silly example, suppose that someone from a warm and landlocked country has never heard of penguins before. This person visits a zoo and sees penguins for the first time. He notices that these astonishing creatures are called 'penguins', and appear to be birds (for they have beaks, feathers, lay eggs, emit squawks, etc.). He reflects that most – if not all birds – have many

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

36. Lott, "Moral Virtue as Knowledge of Human Form," 414.

of these macro features. Fascinated, he consults encyclopedias, biology or zoology textbooks, and consult zoologist friends. All these sources confirm the categorization. Although I am not aware of when the first penguin was studied by a modern naturalist, we can easily imagine that it was from observations and reflections such as these that penguins long ago earned an entry in the annals of scientific knowledge. The biological community gave them a scientific name ('sphenisciformes') and began to fill in gaps with a detailed description of their evolutionary history, characteristics, genetics, environments, diet, predators, and so on. The scientific conclusion, upon initial observation, bolstered by reflection, underwrites the initial hypothesis: penguins are indeed birds.

In this way, generics pick out what we might call formal facts. Exceptions (from defect, injury, illness, etc.) do not *invalidate* generics. A wolf that hunts alone is not a new species but a defective wolf. I hope I have said enough to make it plausible that generics (when true) are genuinely *natural truths* about natural entities such as natural kinds and their members. The notion that generics are genuinely normative needs some arguing. While there is a kind of normativity in the mere idea of a life-form, we can make the case stronger.

Generics also illuminate natural, normative, teleological facts. Chris Toner says that "natural-historical judgments readily admit of combination into teleological judgments."[37] 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"[38]

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.* 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. Since an individual penguin may fail to be countershaded in the way that expresses its form, it would be defective. This defect is not

37. Toner, "Sorts of Naturalism," 222.
38. Thompson, *Life and Action*, 293–94.

a judgment made by scientists and "imposed" as it were, from the outside, on the penguin; but 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."[39] We might add that some formal features *of a normal, mature* animal exist merely potentially before full maturation. For example, a female reptile that cannot lay eggs might be injured, ill, or simply young. Eyes that cannot see might be injured, ill, or simply developing. Eyes that have had enough time

Three paths

There are three paths forward.

1. We can either reject generic truths about species and their formal and functional characteristics. If we accept scientific realism of any form, we cannot deny that some generics are true. Even more strongly, if we accept *any* form of conceptual knowledge, we are probably implicitly already committed to the truth of some generics, for much of our conceptual knowledge consists in generics.[40] Nevertheless, let's suppose for *reductio* that no generic statements are true. Then it would be false in some important sense false that 'wolves hunt in packs', and false that 'condors can fly for hours', false even that 'penguins are birds'. It is false, furthermore, that eyes see and humans are mammals. But such denials are, I think, absurdities. (That is not to say that the denial is not worth considering. It might well be true. My point in calling the denial 'absurd' is to say that if it is true, an absurdity is true. If it is true, then the truth is absurd. And reality itself might well be absurd. I don't think it is, but there have been many philosophers who have thought so, and such thoughts cannot be justly dismissed without consideration.) To doubt such statements, however, is to doubt the best deliverances of best science. The point is that a minimal scientific realism such as that McDowell endorses (about primary qualities) is compatible with a high degree of confidence To reject them, I contend, is to reject the best scientific deliverances of our best scientific evidence. "Biology cannot, or at least in practice does not, eliminate functions and purposes."[41]
2. Accept and reduce. Reducing them is an option I shall not consider here. I content myself to note that Thompson insists that judgments about natural teleology are made true from the form of life under question, not from "hypotheses about the past" (and

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

40. Sandeep Prasada et al., "Conceptual Distinctions Amongst Generics," *Cognition* 126, no. 3 (2013): 405–22.

41. Perlman, "The Modern Philosophical Resurrection of Teleology," 151. Cf also Barham, *PhD Dissertation*; Brown, *Moral Virtue and Nature*.

Toner adds "whether about creation or natural selection").[42]

3. Accept "as is." Thus far, all I have tried to show is that *some* of these generics are true. I have not yet tried to show which true generics about humans can serve as the basis for an ethical theory. The next step will be to apply the above argument to human beings. To those who disagree about the *very notion* of generics, I have tried to urge them to feel free to do so, but to count the cost. The great cost of throwing out generics *as a class* threatens to throw out a huge percentage of scientific statements in biology, organic chemistry, anthropology, psychology, sociology, economics, anatomy, and medicine.

Three alternatives to natural normativity (if not included elsewhere)

1. **Nature is purely descriptive, normativity is illusory.** Bald nature is a realm of pure, descriptive fact.[43] The problem with this picture is that human beings would not be natural. The other side of the same coin is the view that normativity, whatever it is, is not natural.[44] But then again, human beings would not be natural if we are in any sense irreducibly normative. For normativity is central to human consciousness and value, and perhaps even language and meaning. As Julia Annas puts it: "Non-naturalistic accounts of ethical terms assume that their function, prominently their normativity, is something that arises with humans, or is produced by humans, in a way which owes nothing to the nature which we share with other living things."[45] If nature cannot include irreducible normativity such as that which is essential to language and morality, surprisingly, it cannot include us. I think we ought to reject any picture of nature or of science that exiles naturalists and scientists.
2. **Nature is purely descriptive, normativity is reducibly descriptive.** Some zealous defenders of bald nature will be quick to assure me that normativity can and will be one day "reduced" to mere description. Beside the fact that such promises in philosophy of mind have been very long in the fulfilling, I think such assurances are especially misguided in this case. Telling me that normativity is, after all, *really* just descriptivity disguised or mistaken seems to me self-referentially incoherent. It is like arguing that one 'ought' not tell anyone what they 'ought to do.' Of course, arguing that one 'ought not' talk like that is an instance of telling me what I *ought* to do. Similarly, arguing that on best evidence everyone *ought* to believe that normativity is in principle reducible is

42. Toner, "Sorts of Naturalism," 223. Cf. Thompson, "The Representation of Life. 293).

43. John McDowell calls this kind of naturalism 'neo-Humean naturalism' (*Mind, Values, Reality*, 183, 194) or 'empiricistic naturalism', 'bald naturalism', 'naturalism of the realm of law' or 'naturalism of disenchanted nature'.

44. Russ Shafer-Landau, *Moral Realism: A Defence*, 4 (Oxford University Press, 2003) offers an argument that moral properties are "non-natural" in that they can be known without empirical help, but "natural" in that they are perhaps always realized in the physical, natural world.

45. Julia Annas, "Virtue Ethics, Old and New," ed. Stephen Gardiner (Cornell University Press, 2005), 12.

an instance of appealing to fundamental, irreducible normative considerations about evidence and reasons for belief. To quote Annas again: "it strikes me as ironical that such accounts often arise… From an excessive respect for science. Not only do they cut off our self understanding from the understanding we have of other things, they prevent us from seeing continuities between us and other living things, and in both these ways reveal themselves as profoundly anti-scientific."[46] Some may choose to wait (perhaps forever) for the promised reductions of the normative to the non-normative. I elect to move on.

3. **Nature is unknown**. A final alternative, this one more desparate, would be to argue that nature is mysterious and that we cannot know the truth of generic statements. But, such a skeptical move renders us safe from natural normativity but at the cost of endorsing absurdity: isn't it scientific knowledge that penguins are birds, that eyes are adapted for seeing? I'm not sure how to debate someone who seriously would deny such statements.
4. **Nature is partly descriptive, partly normative.**.

Neither of these worries are justified. I will offer one final argument that teleological generics are rationally permissible within our modern context. James Barham's recent work has argued that 'teleological realism' is a rationally permissible view to take on biology.[47] The very word 'teleology' is liable to sound quaint to modern ears. Barham clarifies the range of terms that denote identical or similar concepts:

> "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" (Barham 1). For a similar distinction, see Lennox (1992) and Brown (2001).

We can add "purposive" and "goal-directed" to the constellation of concepts in the offing.

Teleological realism in biology is making a come-back. There are those who protest teleological nihilism. Arnhart persuasively argues that teleology is assumed in medicine.[48] Zammito clarifies ongoing relevance in biology, since organisms seem to be intrinsically purposeful.[49] Barham

46. Ibid., 13.
47. Barham, *PhD Dissertation*.
48. Arnhart, "Aristotle's Biopolitics."
49. 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.

continues:

> In a series of important articles and books over the past decade or so, Bedau (1990, 1992a, 1992b, 1993), Cameron (2004), Christensen & Bickhard (2002), Jacobs (1986), Manning (1997), Maund (2000), McLaughlin (2001, 2009), Mossio et al. (2009), Mundale & Bechtel (1996), Nanay (2010), Nissen (1997), Perovic (2007), Walsh (2006), and Zammito (2006) have cast grave doubt on the coherence of any reductive analysis of function. Some of these authors (e.g., Jacobs, Maund, Zammito) call explicitly for a reconsideration of the possibility that teleological phenomena in biology might be both objectively real and irreducible.

Thomas Nagel is a third who has followed out the argument for natural teleology from a much broader, cosmic perspective, though he too denies that the cosmos is like an orchestra being played.[50] Though Nagel took a lot of heat for his argument, Michael Chorost's review of *Mind and Cosmos* reminds readers that natural teleology is not so scientifically heretical as it might first seem. 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."… [the furthermore] paleontologist Simon Conway Morris, at the University of Cambridge, has argued that natural structures such as eyes, neurons, brains, and hands are so beneficial that they will get invented over and over again. They are, in effect, attractors in an abstract biological space that pull life in their direction. Contingency and catastrophe will delay them but cannot stop them. Conway Morris sees this as evidence that not only life but human life, and humanlike minds, will emerge naturally from the cosmos: "If we humans had not evolved, then something more or less identical would have emerged sooner or later."[51]

If scientists can countenance natural normativity via natural teleology as respectable, cannot we philosophers do the same? Certainly natural teleology is out of fashion; but the winds of intellectual fashion blow hither and yon, and we may yet discover that Aristotle was right.[52] Either way,

50. Nagel, *Mind and Cosmos*.

51. Michael Chorost, "Where Thomas Nagel Went Wrong," *Chronicle of Higher Education*, 2013. Chorost argues that Nagel did not "go wrong" in his thesis but in presenting it philosophically without engaging the support from relevant scientific literature.

52. Johnson, *Aristotle on Teleology*.

philosophers of various schools (metaphysicians and ethicists) would do well to dialogue with biologists and cosmologists to come to grips with the possibility that our best evidence suggests that nature is normative.

III. Teleology in nature

What if there are no ends in nature?

One powerful objection to the recovery of telos is that there is no teleology in nature. There are no *ends* (τελοι). Call this position *teleological nihilism.* There are two forms of teleological nihilism: extreme and moderate. Extreme teleological nihilism we may call the view that there are no "purposes" or natural ends anywhere in the world *including* in human actions. Even our practices, behaviors, and lives are purposeless, even to ourselves. Moderate teleological nihilism we may call the view that there are no natural purposes *except* those in human actions, intentions, and societies, etc. On moderate teleological nihilism, human purposes are not instances of a broader category that includes the tendency of an acorn to become an oak and the tendency of deer to survive and reproduce; human purposes are sui generis phenomena that spontaneously emerge out of our brains at a certain level of complexity. Final causation thinking is then projected out onto the world by us; we observe that the beaver gathered wood and that the beaver built a dam and we say "the beaver gathered wood *in order to* build the dam." But really the beaver did no such thing. This is what philosopher of biology Ernst Mayr calls "teleonomic" natural behavior, but not genuinely teleological.[53]

Teleological nihilism claims as its evidence *modern science* as a whole. Natural sciences have dismissed the notion of final causation for three or four centuries now and have gotten along well without it. In fact, natural sciences and the experimental, empirical methods that advance them

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

have progressed far more than anyone could have dreamed. In part, this success is the result of giving up magical thinking.

Teleology

[% out of order]

That nature is normative and some norms are natural is the best explanation of two phenomena: (1) human cognitive and and practical behaviors are inherently end-directed or teleological: John goes to the gym *in order to get fit for his film role*; Jane practices her speech *to win the Iowa primaries*; and (2) animals, plants, and all living things exhibit end-directed or teleonomic behavior: eyes see, hemlock trees offers shade to fish, stomachs digest, deer leap. The first of these phenomena is less controversial: pretty clearly, humans *act on reasons* and in pursuit of ends. The second is more controversial and more interesting – is the appearance of teleology "just" teleonomy or teleology indeed?

Call the view that there are no natural end-directed behaviors *teleological nihilism*.[54] 'Strong nihilism' can refer to the belief (of say determinists) that not even human practices are teleological. 'Weak nihilism' can refer to the belief that *only* human behaviors are end-directed, but nothing else. For example, Kant's explanation of natural purpose denies the biological theory that the form of an organism causes the parts to grow and relate to each other in a particular way, but he admits we *cannot help thinking so*.[55] If the "nature is normative" thesis is true, both forms of teleological nihilism are false.

What if ends are reducible?

Teleoreductionism has taken one of two popular forms: the first reduces 'teleonomic' (that is, apparently teleological) biological functions to causal contributions to a system and the second reduces

54. Arnhart, "Aristotle's Biopolitics."
55. Huneman, "Naturalising Purpose."

teleonomic biological functions to naturally selected effects. A proponent of the first reduction is Donald Davidson; a proponent of the second is Ruth Millikan.

Reducible reply

Neither forms of 'teleoreduction' can account for the normativity of the biological function in question. If it is a fundamental truth not only that hearts cause blood to be pumped but that hearts *are for* pumping blood — that is their natural function — then teleoreduction comes to light as an unnecessary and sadly desperate attempt to preserve a philosophical dogma in the face of scientific fact.

James Barham elaborates:

> I was aware of well-known criticisms of both of the then-current reductionist accounts of function: the "causal-role" theory and the Darwin-inspired "selected-effects" theory. In a nutshell, the problem is that neither theory can explain the normative character of biological processes in a coherent manner. (Biological processes are "normative" in the sense that they may either succeed or fail in fulfilling their functions.) With respect to the "causal-role" theory, there is no way to distinguish between functional and non-functional parts of a biological system without presupposing the normative character of the overall system as a whole – which begs the question at issue. With respect to the "selected-effects" theory, the problem is that selection history is conceptually irrelevant to the identification of function. True, it has a role to play in explaining how present-day functions have come to exist. But selection history cannot possibly explain what it is about a biological process that constitutes it as a function. This is a logical point that Darwinists simply miss. The reason is that our concept of function in no way depends on evolutionary history. If it did, then biologists like Aristotle, Galen, Harvey, and innumerable others who lived long before Darwin would not have had the means to identify the functions of organs, which they of course did. Sometimes, they got it wrong, as when Aristotle placed the seat of perception and thought in the heart, instead of the brain (though some of his predecessors got it right). But Aristotle's mistake was due to his inadequate knowledge of physiology, not to his ignorance of evolution.

Millikan bites the bullet on this objection. She isn't trying to do "conceptual analysis" of the term 'function.' She is willing to admit that her concept of proper function only applies to functional objects with histories and that hypothetical counterexamples involving functional objects without

histories prove that two objects with one and the same "*mark* of purposiveness" can have different functions.[

Biological Teleology

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Ruth Millikan's objection

Millikan argues that an organism's proper function cannot be read off its capacities but must be known via empirical history. Both Barham and Thompson dispute this (influential) definition of

56. Arnhart, "Aristotle's Biopolitics."
57. Zammito, "Teleology Then and Now."

"proper function."

Other writers on natural teleology

Kevin Kelly, wired editor, what technology wants. Robert Right nonzero. Christian de Duve Robert OUsan? Our telos.

> 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."
>
> More recently, Kevin Kelly, founding editor of *Wired*, made the case for teleology as clearly as could be in his book *What Technology Wants:* "Evolution … has an inherent direction, shaped by the nature of matter and energy." That is, there may be laws of nature that push the universe toward the creation of life and mind. Not a supernatural god, but laws as basic and fundamental as those of thermodynamics. Robert Wright said much the same in *Nonzero: The Logic of Human Destiny:* "This book is a full-throated argument for destiny in the sense of direction." Those books prompted discussion among the literati but little backlash from evolutionary biologists. Ruse thinks that's because the authors are science writers, not scientists: "At a certain level, it's their job either to give the science or to put forward provocative hypotheses, and nobody takes it personally."
>
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>
> Stuart Kauffman, of the Santa Fe Institute, who argues that the universe gives us "order for free." Kauffman has spent decades on origin-of-life research, aiming to show that the transition from chemistry to metabolism is as inevitable as a ball rolling down a slope. Molecules on the early earth, he suggests, inevitably began to catalyze

themselves in self-sustaining reactions ("autocatalytic networks"), converting energy and raw materials into increasingly complex structures that eventually crossed the boundary between nonliving and living.

Other biologists are proposing laws that would explain evolutionary ascent in fundamental terms. Daniel McShea and Robert Brandon, a biologist and a philosopher of science, respectively, at Duke University, have argued for what they call a "zero-force evolutionary law," which posits that diversity and complexity will necessarily increase even without environmental change. The chemist Addy Pross, at Ben-Gurion University of the Negev, in Israel, argues that life exhibits "dynamic kinetic stability," in which self-replicating systems become more stable through becoming more complex—and are therefore inherently driven to do so.

Still other scientists have asked how we could measure increases in complexity without being biased by our human-centric perspective. Robert Hazen, working with the Nobel Prize winner Jack Szostak, has proposed a metric he calls "functional information," which measures the number of functions and relationships an organism has relative to its environment. The Harvard astrophysicist Eric Chaisson has proposed measuring a quantity that he calls "energy-rate density": how much energy flows through one gram of a system per second. He argues that when he plots energy-rate density against the emergence of new species, the clear result is an overall increase in complexity over time.

But Nagel's goal was valid: to point out that fundamental questions of origins, evolution, and intelligence remain unanswered, and to question whether current ways of thinking are up to the task. A really good book on this subject would need to be both scientific and philosophical: scientific to show what is known, philosophical to show how to go beyond what is known. (A better term might be "metascientific," that is, talking about the science and about how to make new sciences.)

The pieces of this book are scattered about the landscape, in a thousand scraps of ideas from biologists, physicists, physicians, chemists, mathematicians, journalists, public intellectuals, and philosophers. But no book has yet emerged that is mighty enough to shove aside the current order, persuading scientists and nonscientists alike, sparking new experiments, changing syllabi, rejiggering budget priorities, spawning new departments, and changing human language and ways of thought forever. On the Origin of Species did it in 1859. We await the next Darwin.[58]

58. Michael Chorost is the author of Rebuilt: How Becoming Part Computer Made Me More Human (Houghton Mifflin, 2005) and World Wide Mind: The Coming Integration of Humanity, Machines, and the Internet (Free Press, 2011).