

Re-thinking ‘Flourishing’ as an Organic Concept of the Good: The Interpretation of Development and the Evaluation of Life

Submitted by Jack Griffiths to the University of Exeter
as a thesis for the degree of
Doctor of Philosophy in Politics
June 2018

Word count, excl. table of contents and bibliography: 95,284

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Abstract

This thesis explores the relation between the normative structures brought to bear on the evaluation of life and the way in which the coming-into-being of living organisms is fundamentally understood. It provides a new analysis and critique of the standard concept of ‘flourishing’ in neo-Aristotelian meta-ethics, by uncovering the underlying interpretation of organismic becoming on which it relies, and showing how the turn to a ‘constructivist’ conception of development in contemporary biological theory both disrupts this underlying metaphysics, and provides resources for re-thinking flourishing on a fundamentally different basis. The central claim is that we should turn from a view in which life is given a form to fulfil, and becoming is the process of its fulfilment, to one in which living is the process of creating a way in the world, as life goes along.

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Preface

I'd like to say a little here about the roots of this thesis. As an undergraduate I became fascinated with the idea that traditional philosophical questions are transformed by the evolutionary worldview. In this light, many previously rigid boundaries and dualisms cease to be fixed in heaven and become merely abstractions from the ongoing flow of living change of which we are part. From this I gained a strong sense of the embeddedness of the human in living nature, and of the possibility – even necessity – of ontological continuity between the organic and the supposedly unique human realms of experience, value, purpose, rationality, and so on.¹

At the same time, perhaps in search of solid ground, I became attracted to species-universalist theories of value, such as those of Martha Nussbaum and Philippa Foot, both of whose work features heavily in this thesis. I was attracted by their ability to talk plainly about the human as a thoroughly natural being, and at the same time to assert a set of universal ‘human goods’.² Their work encourages a comfortable sense that certain things – certain capacities, activities, bodily structures, ‘ways of living’ – just *are* essential to a flourishing human life, for any human, given the *fact* of their being this certain kind of living thing. Perhaps this plain-speaking, apparently naturalistic approach is justified? After all, natural history has shaped us in particular ways, just as it has shaped all living beings. Humanity may be part of an ongoing process of change – the descendants of previous forms of life for which different things mattered, and no doubt the ancestors of similarly alien forms of life to come – but we can, surely, stand back and look at our nature as it currently is, as at a ‘still from the moving picture of evolution’, to paraphrase Foot.³ This snapshot would give us an image of the human form of life as it is now, the ‘natural design’ of the species at this stage in

¹ In these connections I have been heavily influenced by the work of Hans Jonas (e.g. 2001 [1966]: Ch 2); John Dewey (e.g. 1910: Ch 1; 1917; 1929 [1925]); and more recent work that expands on ideas of this sort, such as the philosophical school of enactivism (e.g. Evan Thompson 2007; Varela, Thompson & Rosch 1991); and the work of my undergraduate dissertation supervisor, Lenny Moss (e.g. 2009). This work is an important background to my thinking in this thesis, although it does not feature explicitly to a great degree.

² See e.g. Nussbaum 2000a; 2006; 2011; Foot 2001.

³ Foot 2001: 29.

evolutionary history. And this ought to be significant for the normative self-understanding of individual participants in that form of life, whether or not it is, on a grander scale, ultimately transient.

The problem that eventually led me beyond this picture was not that human life is not stable enough at an appropriately limited trans-generational timescale to abstract such a snapshot, but that such a snapshot would not be *a* snapshot at all, but would contain a plurality of variations, perhaps as many as there are individual humans. Although there are contingent limits to the forms of life that can be coherently lived in any particular case, nature does not prescribe a determinate *proper* shape to life within these limits. Simply put, humans (and other organisms) can live in many different ways, and different things can matter for them in different ways. Thus it is perfectly possible to imagine a form of human life in which any purportedly ‘universal’ feature is either not present, not possible, or not important. In the end it was consideration of development, not just evolution, that drove me to this conclusion.⁴ I turned to this topic hoping to attach some concrete significance to the idea of this species-general ‘natural design’ that we could abstract from the process of evolution. Instead it became apparent that the ongoing flow of living change is a reality not just at the trans-generational scale, but at the individual as well. The radical context-sensitivity and plasticity of developmental processes, as well as the active participation of the organism in its own becoming, means that living beings are not *given* a model to follow, but can make themselves in flexible and plural ways.

And who are we to say what life *ought* to make of itself? There is a darker side to the humanist dream of identifying a common core that unites us. Any image of ‘*the* human form of life’, however general, is built on the principle of demarcating ‘us’ from the ‘other’, the properly human from the defective, the malformed, the monstrous – something to be maligned, even eliminated. This logic is crucial to the stigmatisation and ‘dehumanisation’ at the heart of some of the worst episodes of human history.⁵ Thus, I came to see universalist notions of ‘human flourishing’, even the well-intentioned, as not only metaphysically and biologically flawed, but potentially poisonous, ethically and politically. Concerns of both

⁴ In particular the work of Susan Oyama (e.g. 2000a [1985]; 2000b; Oyama, Griffiths & Gray 2001); Richard Lewontin (e.g. 2000a [1998]); Lenny Moss (e.g. 2003); and my secondary PhD supervisor John Dupré (e.g. 2012).

⁵ See e.g. the work of David Livingstone Smith (2011; 2016), and Maria Kronfeldner (2016).

these sorts motivate my endeavour to re-think the notion of ‘flourishing’ in this thesis. The work as a whole is an attempt to hold on to the idea that our existence as *living* beings is crucial to understanding ourselves, and even for structuring the conceptuality of normative thinking, but to do so in a way that embraces the picture emerging from contemporary biology of living as an unscripted, relational, and exploratory process, one that finds its own way in the world, not only across evolutionary time, but also over the course of each individual’s becoming. And it is an attempt to affirm the sense of living nature as a realm of rich possibility and creativity that arises from this picture.

The resulting thesis is an experiment in ‘interdisciplinary philosophy’. It dwells in an in-between space where more neatly defined areas of thought meet each other. The biggest weakness of this work, I am sure, is that in seeking to address a number of different fields at once I end up exploring none of them to an adequate depth, at least not to a depth required to do justice to the weight of some of the claims I want to make. I hope that its superficiality is counter-balanced to some extent by a measure of originality.

Acknowledgments

I owe thanks to many. Firstly, my PhD supervisors, Dr Robin Durie and Prof John Dupré, for providing the conditions to enable this thesis to flourish, without determining its proper form in advance. I also thank the Economic and Social Research Council, whose financial support enabled me to undertake the MRes and PhD degrees that culminated in this thesis.

I owe a great deal to the teaching and guidance of a number of other academics at the University of Exeter since I first arrived here as an undergraduate in 2010. In particular, I thank Dr Edward Skidelsky for always being ready to follow any line of argument generously, and leave nagging questions in my mind. I thank Dr Dario Castiglione, Prof Iain Hampsher-Monk, and Dr Robert Lamb for their encouragement, and their ability to see relations between disparate topics, which periodically buoyed my confidence in writing about things like the ontological status of DNA whilst officially dwelling within the field of political theory. I also owe great intellectual debts to Prof Lenny Moss, Prof Sabina Leonelli, Prof Giovanna Colombetti, and Dr Andrew Schaap for introducing me to ways of thinking that have gripped me ever since, and led me in directions I could not have predicted.

I have also benefited from the friendship and conversation of many others. In particular I thank Dr Jacob Lucas, Dr Lewis Coyne, Dr Richard Graham, Dr Zoe Bulaitis, Dr Frederick Harry Pitts, Ben Rogers, Martin Moorby, Zhangmei Tang, Dr Farhad Kerimov, Dr Felix-Christopher von Nostitz, and the Amory 232 gang. I also thank everyone else with whom I have shared adventures down the philosophical rabbit hole over the last eight years, as well as my college philosophy teacher, Stanley Guffogg, who introduced me to this rabbit hole in the first place. Lastly, and by no means least, I thank Zenna Tagney, whose creativity inspires me, and whose confidence, encouragement, and love have carried me throughout.

Author's declaration

Chapters 0, I, III and VI contain heavily revised elements of my dissertation, 'Capability, Freedom, and Life: Towards a Metaphysics of Capability', submitted in partial fulfilment of an MRes degree at the University of Exeter in 2013-14. This is in accordance with Chapter 11, Section 2.1, of the University of Exeter's Postgraduate Research Handbook.

Minor elements of Chapters V and VI have been published in Griffiths, J. O. (2017) 'The changing space between politics and biology'. *Contemporary Political Theory*, Vol. 16 (No. 4), pp. 541-548. This is in accordance with Chapter 11, Section 2.2, of the University of Exeter's Postgraduate Research Handbook.

Note on internal referencing

I often refer to sections within this thesis using the following notation: e.g. I:2.1 to refer to Chapter I, Section 2.1. If referring to a section within the same chapter I write, e.g. Section 2.1, or simply 2.1. Also, I sometimes refer to the Introduction as Chapter 0, so that, e.g. Section 3.1 of the Introduction can be referred to simply as 0:3.1.

Epigraphs

Human nature is not a machine to be built after a model, and set to do exactly the work prescribed for it, but a tree, which requires to grow and develop itself on all sides, according to the tendency of the inward forces which make it a living thing.

– J. S. Mill, *On Liberty* (1991 [1859]: 66)

But life is action [*praxis*] and not production [*poiesis*].

– Aristotle, *Politics* (2009 [c. 350 BC]: I.2: 6, trans. Jowett, B.)

Darwinism, more than any other doctrine responsible for the now dominant evolutionary vision of all reality, turns out to have been a thoroughly dialectical event. This becomes increasingly visible as its teachings are philosophically assimilated. Whatever their success so far, all contemporary revisions of traditional ontology [must start ...] from the conception of being as *becoming*, and in the phenomenon of cosmic evolution look for the key to a possible stand beyond the old alternatives.

– Hans Jonas, *The Phenomenon of Life* (2001 [1966]: 58)

If it is better to travel than to arrive, it is because travelling is a constant arriving, while arrival that precludes further travelling is most easily attained by going to sleep or dying.

– John Dewey, *Human Nature and Conduct* (1922: 82)

Synopsis

This thesis explores the relation between the normative structures brought to bear on the evaluation of life and the way in which the coming-into-being of living organisms is fundamentally understood. It provides a new analysis and critique of the standard concept of ‘flourishing’ in neo-Aristotelian meta-ethics, by uncovering the underlying interpretation of organismic becoming on which it relies, and showing how the turn to a ‘constructivist’ conception of development in contemporary biological theory both disrupts this underlying metaphysics, and provides resources for re-thinking flourishing on a fundamentally different basis. The central claim is that we should turn from a view in which life is given a form to fulfil, and becoming is the process of its fulfilment, to one in which living is the process of creating a way in the world, as life goes along.

Standard neo-Aristotelian conceptions of flourishing understand the good in terms of fulfilment of a proper form, essence, or nature. Via the work of neo-Aristotelians such as Philippa Foot, Michael Thompson, and Martha Nussbaum a connection with the philosophy of living organisms becomes apparent. These ‘properness’ conceptions of flourishing are naturalised by the assumption of a particular metaphysics of living phenomena as such, one centred on interpreting the process of organismic becoming (ontogeny, development) as a kind of *poiesis* – process that is productive of an end-state, the form of which is prescribed by a pre-given transcendent model. Seen through this lens becoming is the ‘unfolding’ or realisation of the being’s proper or essential form, and life is evaluable in terms of the norms determined by this form.

Understood in this way, the standard neo-Aristotelian ‘properness’ concept of flourishing is an ‘organic concept of the good’ – a way of taking up an image of ‘living’ as conceptual ground for thinking ‘living *well*’. This thesis provides a critique of this nexus of thought, arguing that the *poietic* metaphysics of life is inadequate to the reality of organismic becoming that it attempts to capture, and ought to be rejected. In this way the logical connection assumed by certain neo-Aristotelians, between the phenomena of life as such and the normative logic of the properness concept, is severed.

However, instead of severing the conceptual relation between ‘life’ and ‘flourishing’ altogether, this thesis also articulates a way to positively re-frame this relation. It proposes re-

thinking flourishing as an organic concept of the good by means of an alternative metaphysics of organismic becoming, one instead centred on the logic of *praxis* – process that is performative of that which it creates, the form of which emerges immanently from the process itself. Seen through this lens becoming is the improvisational and creative process of ‘finding a way’ in the world, and life is evaluable in terms of the norms that emerge from within this process, as well as in terms of the performance of this ongoing process itself. On this basis an alternative concept of flourishing – as ‘self-creativity’ – is proposed, and some of its implications outlined.

This double-movement is achieved by means of an interpretive engagement with contemporary biological theory. It is argued that the contemporary turn to a ‘constructivist’ conception of development – in which organismic form and functionality is not inscribed in a pre-given plan such as a ‘genetic programme’, but is contingently and continually constructed within each organism’s unique ontogeny – provides resources both for overcoming the *poietic* and affirming the *praxic* interpretation of organismic becoming, and thereby for re-thinking the structure of the concept of flourishing in the way proposed.

Introduction

1. Locating the subject-matter

1.1. Political thought and the question of human flourishing

The question of flourishing is important not just for how we relate to and evaluate our own lives and those of others, but also how we conceive the aims of social and political action. The majority of political philosophy in recent decades, at least in the Anglo-American world, has revolved around the concept of social justice. Thinkers in this field have attempted to articulate what justice demands of social organisation if it is to treat people equally and fairly, with a particular focus on the distribution of resources, rights, and power between individuals in a society. For John Rawls, who is largely responsible for this focus, justice is “the first virtue of social institutions”,¹ and is thus the first question of political philosophy.

A key assumption of this thesis is that whether or not justice is the *first* virtue of social organisation it is certainly not the *only* such virtue, and that a similarly important end on which a polity might set its sights is the quality of life of its inhabitants. That is, social policy ought to be concerned not only with setting up the relations between individuals ‘fairly’, but also with creating conditions that enable those individuals to live well, to flourish. To put this in a more general way, political action ought to aim not only at ‘the right’, but also ‘the good’.

It may well be that we cannot, in fact, address one issue without addressing the other. It may be, for example, that a decent human life cannot be had outside of conditions of social justice, or at least that there is some positive relation between the two. Or, it may be that we cannot even understand the concept of social justice itself without some conception of the human good; perhaps, say, because a polity can only *be* just if it ensures to all of its inhabitants the conditions for a certain level of quality of life.² Nonetheless, these are distinctions worth making, in part because theorising about social justice has tended to focus on a somewhat

¹ Rawls 1971: 3.

² This is the view of Martha Nussbaum (e.g. 2006; 2011), whose approach to the question of what this quality of life consists in is discussed in this thesis (in particular Chapters I, II, and IV).

abstract notion of social organisation – i.e. the “basic structure of society”, to quote Rawls again³ – that is, one taken largely in abstraction from the actual shape and quality of real people’s lives. Insofar as this is the case, it has paid attention only to how the system is ‘set up’, and not to *how life actually goes* within it. This thesis is motivated by the intuition that the latter is a distinct area of concern for political thinking, whether it is one that resides outside of the question of social justice altogether, or is itself necessary for giving a fully satisfactory answer to that question. Either way, the question of what it is for life to go well or badly, and how social structures might enable or hinder this, ought to be of concern.

In this thesis I do not weigh in on the issue of the relationship between the right and the good, or between social justice and human flourishing. Rather, the issue at stake is the *concept of flourishing itself*. Furthermore, although different ways of understanding this concept lend themselves more easily to certain approaches to social policy and political action than to others, the main purpose of this thesis is not to make any such proposals explicitly. In these senses, although I take its contents to be pertinent to political thinking in a number of ways, the thesis itself is not primarily a work of political philosophy. It is a conceptual exploration of ‘flourishing’, focused on elucidating and analysing the assumptions and forms of thought that can structure this value concept, and inform the way it is taken up in political and social thinking.

1.2. ‘The good’ and/not morality

Before going further, it is also important to distinguish exploration of the concept of flourishing from certain kinds of specifically *moral* enquiry. For a start, in asking what it is to live well, or to live a ‘good life’, I am not asking what it is to ‘be a good person’, in the sense of having morally virtuous or righteous character. The primary sense of ‘the good’ at hand here is, for want of a better term, a *prudential* one: what an individual’s ‘own good’ consists in.⁴ This term is not a perfect one because it can suggest an overly narrow sense of ‘self-interest’, one that excludes, e.g., beneficent action towards others, or moral virtue in general. This is not my intention: it could be that one’s own flourishing itself *involves* cultivating

³ Rawls 1971: 3.

⁴ See Griffin 1988: Ch 4 on the distinction between ‘moral’ and ‘prudential’ perfectionism; and Hurka 1993: 17-18 for a similar distinction.

moral virtue, whatever one means by that. For instance, it could be that there is a constitutive relation between one's own good and particular modes of social relationality, such that the quality of one's being would be intrinsically impoverished or diminished if capacities for righteous action and sound moral judgement were not developed.⁵ I do not mean to preclude any such possibility.

Another way in which this is not a specifically moral enquiry is that it is not my intention to engage in positive moral theorising, in the sense of attempting to prescribe rules for how one should act in particular situations, or to identify specific inter-personal rights and obligations. The good in the 'prudential' sense is no doubt an important consideration *within* most moral reasoning of this sort, but reasoning about the good and the bad is not the *same* as moral reasoning in this sense.⁶ For example, we might judge about some individual – say, a convicted rapist languishing in solitary confinement – that certain changes would improve their quality of life, would enable them to live more richly or fully, etc. But, at the same time, we might judge that in this case it would be wrong of us to afford them that benefit, that, as it were, it would be *wrong* to cause some *good*. The latter judgement incorporates notions of desert, right, justice, and so on, that are distinct from the question of flourishing as I take it here. Although, as I say, it may well be that the latter always enters into the structure of moral reasoning in some way. As with the question of the relation between the right and the good in the political context, certain ways of conceiving flourishing may lend themselves more easily to certain positions over others in this domain as well, and inferences about the shape of moral reasoning may well be drawn from the position I take in this thesis, but such claims are not the primary intention.

1.3. The good as 'flourishing': the neo-Aristotelian context

By raising the question of the good using the *word* 'flourishing', as opposed to, say, 'happiness', or 'utility', I already gesture towards a particular philosophical orientation. This thesis begins from sympathy with a general way of addressing the question of the good that is

⁵ A view of this sort is defended by neo-Aristotelians such as Philippa Foot and Michael Thompson (see e.g. Foot 2001; Thompson 2008), whose thinking on the more general concept of flourishing, but not specifically on that of moral virtue, is discussed in this thesis (in particular Chapters I, II, and IV).

⁶ See Griffin 1988 for similar points (especially Ch 4, 69-70).

found, amongst others places, in contemporary ‘neo-Aristotelian’ approaches to ethics and political thought.⁷ It is best introduced in opposition to the utilitarian doctrine that the intrinsically desirable and undesirable is identifiable with subjective experiential states, in particular that pleasure and satisfaction constitute the good, and pain and dissatisfaction the bad.⁸ In contrast, the basic jumping-off point which I share with neo-Aristotelian meta-ethics is that the good has primarily to do not with the content of one’s feelings but with the *form of one’s life*. It has to do with the *how* of living – how life goes as a whole, the way in which it is lived.⁹

To affirm a view of this sort, construed in such a general way, is not necessarily to spurn pleasure itself. We need not preclude the possibility that feeling satisfied or taking pleasure in experience can be important parts of one’s flourishing, just as acting virtuously may be similarly important. Rather, the idea fundamentally in dispute here is that of identifying the ‘goodness’ of a life with the *quantity of a particular kind of state* aggregated or accumulated over the life. In the neo-Aristotelian view, the good is not identifiable with a kind of state or property, but relates to the form or character of one’s living existence more generally, encompassing the many possible dimensions of activity and experience that constitute *how*

⁷ There is another broad area of research that the term ‘flourishing’ might be taken to suggest – the modern movement of ‘positive psychology’ (see e.g. Seligman & Csikszentmihalyi 2000). Although there are certain over-lapping concerns with research in this area, this thesis is not about the psychology or practical science of ‘how to live well’, but about the conceptual structure of the idea itself, as it is employed in a particular area of philosophy, and how, as I argue, it should be approached differently. I also note that in ‘positive psychology’, the term ‘flourishing’ is often associated primarily with ‘positive subjective experience’. For reasons that will be explained in a moment, this connection has the potential to set us off on the wrong foot here.

⁸ I use the term ‘utilitarianism’ somewhat loosely here, to refer to this theory of the good and the bad. I could instead have used the term ‘hedonism’, or even ‘welfarism’, which has the same meaning in the work of Amartya Sen, to be discussed in a moment (see e.g. Sen 1980 [1979]: 205, 212; 1999: 58-59). In using this term here do not mean to refer specifically to a *moral* theory, e.g. that *right action* is that which maximises pleasure over pain.

⁹ A number of philosophical perspectives in recent decades have done much for the popularity of neo-Aristotelian approaches to questions of the good, either by framing prudential value or moral theory in terms of a conception of human flourishing, or by giving the idea a central place in political philosophy, and even economic theory. For introductions to (various versions of) this approach to issues of prudential and moral value, see e.g. Griffin 1988: Ch 4; Hurka 1993: Ch 1. See also the school of moral philosophy known as ‘virtue ethics’ that has grown out of work such as Anscombe 1958; MacIntyre 2007 [1981]; 2009 [1999]; Foot 2001; Thompson 2008. And for examples of work that brings conceptions of flourishing into the realm of political, social, and economic theory, see also e.g. Nussbaum & Sen 1993; Sen 1999; 2009; Nussbaum 2000a; 2006; 2011; Skidelsky & Skidelsky 2012.

that being *is* in the world.¹⁰ The utilitarian identification of the good-property with pleasure or satisfaction, or ‘positive hedonic states’, is just the most common version of the former idea, and a common foil for those who wish to affirm some version of the latter, more complex, notion. For instance, the contrast with utilitarian thinking is one of the key starting points for what has become known as the ‘capability approach’. This is a contemporary theoretical perspective, derived primarily from the work of Amartya Sen and Martha Nussbaum, for dealing with normative issues in political, social, and economic thought, such as the characterisation of wealth, poverty, social development, and the aims of political action.¹¹ This perspective, in particular Nussbaum’s version of it, is one of the key reference points for ‘neo-Aristotelian’ approaches in this thesis.¹²

There are two main kinds of objection raised by Sen and Nussbaum against a utilitarian concept of the good, and in favour of a broader notion of ‘flourishing’. These are worth looking at briefly. The first trades on intuitions about human beings as objects of ethical concern, and argues that the utilitarian view is too narrow and passive; the second highlights

¹⁰ It is common to point out that Aristotle’s term for the human good, *eudaimonia*, is better translated as ‘flourishing’ or ‘living well’ than ‘happiness’, the latter being misleading given the commonplace use of ‘happiness’ to denote a positive subjective state of some sort (e.g. Cooper 1975: 89-90 (fn 1); Reeve 2014: 30-32; Kraut 2016: §2; Nussbaum 2005a: §§2-3; Sen 1990: 56 (fn 3)). As Aristotle puts it in *Nicomachean Ethics* (*NE*), I.4: 1-3: “[most people] conceive ‘the good life’ [*eu zen*] or ‘doing well’ [*eu prattein*] to be the same thing as [*eudaimonein*]”; also *NE* I.8: 4: “the [*eudaimon*] man [is] one who ‘lives well’ [*eu zen*] or ‘does well’ [*eu prattein*]” (c. 340 BC, trans. Rackham 1934 – Rackham translates *eudaimonia* as ‘happiness’, but notes (in a footnote to I.4: 2) that Aristotle “does not interpret it as a state of feeling but as a kind of activity”). This indicates the Aristotelian heritage in the very general approach to the question of the good outlined here. I would like to stress at this point that although various aspects of this thesis employ *Aristotelian* concepts, nothing in particular of the argument hangs on my expounding a correct exegesis of Aristotle *himself*. That is, the question of whether the particular ideas presented as ‘Aristotelian’ were truly Aristotle’s own is not directly relevant to the validity of the things said about, or the uses made of, these ideas here.

¹¹ See e.g. Nussbaum & Sen 1993; Sen 1999; 2009; Nussbaum 2000a; 2006; 2011; Robeyns 2011; 2013. The capability approach has had a major impact in certain fields of philosophy and many other areas of academia, but has also had an important influence in the political world, notably in relation to the United Nations Development Programme (UNDP), and its annual ‘Human Development Reports’. These have in turn inspired the undertaking of national capability-based studies of quality of life in many countries (see Nussbaum 2011: x-xi, 15-16). For more general information on the capability approach and examples of its academic and political reach, see the website of the Human Development and Capability Association (HDCA) (<https://hd-ca.org/>), and the journal that it publishes, the *Journal of Human Development and Capabilities*.

¹² The other key reference point is some of the thinking of Philippa Foot and Michael Thompson in relation to general concepts of life-evaluation, which I shall introduce in the next sub-section. Foot, for example, similarly rejects the pleasure/contentment view of the good life, in favour of a theory that connects the good with the shape and content of one’s activities and ways of being (e.g. 2001: 85-88).

some intuitive problems with identifying quality of life with satisfaction of subjective preferences.

Regarding the first, the accusation is that the utilitarian view has an impoverished conception of the human subject, one that reduces the living individual, in the words of Nussbaum, to a mere “container of sensations”.¹³ It neglects, or treats as insignificant, the fact that human subjects are not merely pleasure and pain sensors, passive and isolated from the world, but are active and embodied beings, beings that carry on in the world through active engagement with it, that exist through their ways of ‘doing and being’ in the world. As Sen puts it (using a phrase borrowed from Aristotle), the human subject is a form of “life in the sense of activity”.¹⁴ The thought is that this more agential, enactive, view of the human subject ought to frame our approach to the human good, such that we see it as concerned with the quality and scope of the capacities, activities, and ways of being that compose the whole of one’s living existence, rather than (simply) the content of certain subjective states of experience.¹⁵ Quality of life, on this view, relates to what one is *able to do and be*, to one’s ‘capability’ (hence the ‘capability approach’).

The second objection, revolving around examples that highlight the problem of so-called ‘adaptive preferences’,¹⁶ has to do specifically with the tendency of some utilitarian perspectives to identify value with the satisfaction of subjective preferences, or for practical purposes to simply defer to subjective appraisal as authoritative in matters of life-evaluation. The concern with this approach is that, due to the flexibility of subjective appraisal, it has the potential to neglect much else that could be significant to people’s flourishing, e.g. by pushing the *conditions* of their life outside the purview of possible criticism. This is because a person’s preferences and desires tend to reflect their existing horizons of expectation, rather than necessarily what is or could be good in their life. By simply deferring to individual preference we can severely limit the evaluative scope of our analysis. The examples with the

¹³ Nussbaum 2005a: 174.

¹⁴ Sen 1993: 46; 1999: 73; 1990: 43. The phrase is taken from Aristotle *NE* I.7: 13 (trans. Ross 2009).

¹⁵ On the intrinsic significance of activity in a proper account of the good, over and above mere states of pleasure, etc., see e.g. Nussbaum 2000a: 72-73; 2005a: §§2-3; 2011: 55-56; and Sen 1993: 46-47; 1990: 44.

¹⁶ See e.g. Sen 1999: 62-63; 2009: Ch. 7; 1980 [1979]: 214-215; Nussbaum 1988: 154-155; 1992: 230, 235-236; 2011: 54-55.

most intuitive force relate to cases of deprivation or oppression. For instance, a woman trapped in the psychological domination of an abusive relationship may have ‘adapted’ to view her situation as normal or necessary, despite the fact that her husband restricts her activities outside the house, bans social interaction, and prevents her from exploring new ways of living.¹⁷ She may have restricted her desires and aspirations to match the limits imposed on her, and thus – this is the key – may be *no less subjectively satisfied* with her position than a woman on the next street who has a much richer range of possibilities for living her life. Are we then to say that their lives are equally good? The intuition is that, on the contrary, simply looking at their comparable level of subjective satisfaction glosses over much that is relevant to an understanding of their respective quality of life, such as the different conditions, capacities, and opportunities that characterise their lives.¹⁸

It also leaves us with an impoverished understanding of what it is to *improve* quality of life. On this view we can improve a life in two ways: either by making it easier for *existing* desires to be satisfied, through a change in conditions; or by constricting the person’s expectations and aspirations themselves, i.e. changing their desires to ones that are easier to satisfy. For this sort of utilitarian political ethics, the *suppression* of aspirations should in fact be just as worthy an aim for public policy as the better satisfaction of existing desires. It might even be the superior option, insofar as it could achieve a given level of satisfaction more efficiently. And either would be better than trying to enrich the *opportunities* that people have, since there can be no intrinsic value in expanding horizons of possibility *per se*. On the contrary, doing so could even make satisfaction harder to achieve.

The capability approach takes these to be fatal limitations of utilitarian approaches, and therefore argues that we ought to embrace a wider view of the good that takes into account what people are actually able to be and to do, what forms of life are open to them.

So far I have presented the notion of flourishing in an *extremely* general way, where others would no doubt have allowed it to take on a more determinate shape, such as by indicating some particular way of understanding and evaluating the ‘form of one’s living’. This

¹⁷ Examples highlighting the deprivation of women are common in this literature, whether women as a demographic group within particularly patriarchal societies, or individual cases of, as Sen puts it, “hopelessly subdued housewives” (1999: 63). See also Nussbaum 1988: 154-155, 175; 1992: 235-236.

¹⁸ I address the notion of ‘adaptive preferences’ again in III:3.4 and IV:4.

generality is deliberate: the *structure* of the concept of flourishing is precisely what is at stake in this thesis. At the current level of generality, I begin from sympathy with this basic element of the neo-Aristotelian approach. In particular I affirm the intuitions behind the capability approach, that we need to expand our notion of the good beyond the passive utilitarian “container of sensations” picture, and to encompass the notion of “life in the sense of activity” that Sen appeals to; and that the ‘adaptivity’ of subjective preferences means we cannot understand the good simply in terms of satisfaction of subjective preferences. However, when it comes to giving the concept of flourishing more determinate shape, the standard way of doing so in neo-Aristotelian thinking faces some challenges of its own, both ethical/political and biological/metaphysical. I shall now introduce this standard neo-Aristotelian concept of flourishing, which provides the immediate object of critique in this thesis, and in the following section turn to some of these areas in which it faces challenges, and outline the ways in which this thesis responds to them.

1.4. Flourishing as fulfilment of form: ‘properness’ of life in neo-Aristotelianism

The standard tactic of neo-Aristotelianism is to present what it is for an individual to flourish in terms of some idea of the form of life that is *proper* to them, usually what is intrinsic to the ‘nature’ or ‘essence’ of their species. Nussbaum’s version of the capability approach, for example, adopts such a tactic in response to the aforementioned problem of ‘adaptive preferences’. She argues that, in order to gain some evaluative purchase with regard to quality of life, we have to first specify *which* beings and doings (which ‘functionings’, in the terminology of the capability approach) constitute, in themselves, what it is for a human being to live well. The way in which we ought to determine this, she argues, is by asking ourselves a special kind of evaluative question: “Getting the list of functionings that are constitutive of good living is a matter of asking ourselves what is most important, what is an essential part of any life that is going to be rich enough to *count as truly human*.”¹⁹ That is, it is “a question about whether [the functioning in question] is so important that a creature who lacked it *would not be judged to be properly human at all*”.²⁰ In other words, when we ask ourselves what is ‘good’ (for a human), we ought to be asking ourselves what makes a human

¹⁹ Nussbaum 1988: 175 (my italics).

²⁰ Nussbaum 1988: 177 (my italics).

life *properly* human, what makes it a well-formed exemplar of the human type. Since Nussbaum's entrance into this debate in the late 1980s she has published various versions of a list of functionings that, she proposes, outline the basic "shape of the human form of life",²¹ i.e. the functionings that are essential for a human life to count as flourishing, *qua* human life. A recent version of the list comprises the following general categories: (length of) life; bodily health; bodily integrity; use of senses, imagination, and thought; emotions; practical reason; affiliation (with others); (positive relationships with) other species and nature; play; and control over one's environment.²²

What interests me most here is not the particular *content* of any such list, but the *form* of normative thinking that underlies approaches such as this. Characteristic of this thinking is a particular normative logic, evident in the way the list is constructed. It is a logic of better and worse *fulfilment of form*. That is, flourishing is understood as a matter of realising the ways of being and doing that constitute the individual's 'proper' form of existence. 'Good' and 'bad' are concepts of correspondence with proper form, and living well is thus living *properly*, living in accordance with the standards of this form. I call this the 'properness' concept of flourishing (see Chapter I).²³ In *species*-properness versions, the form in question applies to the individual in virtue of their being a token of a species type, and describes proper

²¹ Nussbaum 1995b: 76.

²² Nussbaum 2011: 33-34. Each of these categories is further specified by sub-categories of particular functionings, to varying extents.

²³ I could perhaps have called this the 'perfectionist' or 'essentialist' concept of flourishing, but have opted for a neologism in order to gain more semantic control over the idea. Although I will also use these terms at times, there are a number of ways they can be problematic or misleading. For example, although 'essentialism' is a term that Nussbaum *has* herself used to describe her approach (e.g. 1992; 1995b: 63), she seems to have dropped this label in recent years, usually in favour of 'universalism'. Despite this, the underlying normative logic – the concept of flourishing as fulfilment of essential components of a species form – has remained much the same in her work over the years (for recent examples see e.g. 2006: 346-352, 362-366; 2011: 161-162; on this general continuity see also Clark 2002: 74-75; 2013). Furthermore, 'essentialism' is sometimes associated simply with a way of classifying objects according to their natural kinds, without necessarily implying normative standards (see also II:2 and IV:2). Similarly, Nussbaum avoids the term 'perfectionism', I think, because she does not purport to provide a "fully comprehensive" account of the human good (e.g. 2006: 352), but only a list of necessary aspects for human flourishing – i.e. it is not necessarily a vision of the *completely perfect* human life. However, her approach bears marked similarities to some who do adopt this term (e.g. Hurka 1993, who also does not claim to describe the fully perfect human life). Due to this controversy I also avoid this term as a general title for the idea in question. It is also worth noting that both of these terms are often seen as tied to analysis at a *species* level. This is not the only possible version of what I call 'flourishing as properness'. For example, in I:2.2 I describe how the same logic can also be manifested in a particular kind of *individualist* theory of flourishing.

manifestation of that species type. The idea of a species *form* thus entails (or contains) a species *norm*, a set of normative standards or imperatives to which all individual members, *qua* members, are subject.

‘Living well’, for a human, thus means living properly *as* a human. It means, at the very least, being and doing the things without which the individual in question “would not be judged to be properly human at all”, according to some idea of ‘*the human form of life*’.²⁴ This way of framing *human* flourishing is a particular case of a more general understanding of life-evaluation in relation to all living beings. What it is for any living being to flourish is, at heart, “for that being to persist and flourish *as the kind of thing it is*”,²⁵ for it to live and act *according to that species’ form of life*”, i.e. the “life characteristic of [its] kind”.²⁶

The context for Nussbaum’s use of the species-properness idea is normative political and social theory, and more recently certain environmental and conservational issues.²⁷ But we can grasp hold of the logic of this particular concept of flourishing in abstraction from these contexts, and we can also see it at work in other contexts. For example, very much the same way of giving shape to the notion of flourishing can be found in the philosophy of fellow neo-Aristotelians Philippa Foot and Michael Thompson. The context in this case is a theory of the status of moral virtues and vices.

Their view is that judgement about moral character has the same normative logic as that which I have just identified in Nussbaum’s thinking – it concerns whether the individual in question fulfils, or fails to fulfil, their ‘life-form’ – the way of being that is proper to them *qua* member of a species.²⁸ Judgement about virtue and vice in human character is a *special case* of this more general mode of evaluation, which, they also argue, characterises the good and the bad in relation to living beings as such. And, importantly, this general mode of evaluation has this particular logic *because* of its living subject-matter. The concept of flourishing as fulfilment of proper form is taken to be a logical consequence of the fact that

²⁴ Nussbaum 1988: 177.

²⁵ Nussbaum 2006: 349 (my italics), see also 362-366.

²⁶ Nussbaum 2011: 162.

²⁷ On the latter see e.g. Nussbaum 2017.

²⁸ Foot 2001; Thompson 2008. Nussbaum has addressed moral virtue in a similar way (see 1993).

the objects of evaluation are the phenomena of life as such.²⁹ I am not concerned here with the Foot/Thompson view *as* a theory of moral virtue, but rather with this more basic and general concept of flourishing that they invoke.

My particular interest is in the way that this concept of flourishing is taken to follow from the fact that its subject-matter is *living* beings – evident in all of Foot, Thompson, and Nussbaum (to various degrees implicitly or explicitly) (see Chapter II). I am interested in the fact that, in this sense, the concept of flourishing as properness in these thinkers functions as what I call an ‘organic concept of the good’, a way of structuring normative thinking about life through a particular apprehension of living phenomena as such. The focus of analysis in this thesis is on the assumptions about the living world that underlie and inform this philosophical framing. The particular nexus of thought at work in the ‘properness’ perspective, understood in this way, is the primary object of critique in this thesis, and also provides the foil against which an alternative perspective is developed.

In Section 3 I shall say more about the rationale for this approach, and the philosophical method I adopt, but first I shall address a couple of areas in which neo-Aristotelian theories of flourishing have faced challenges from critics, and outline the ways in which this thesis responds to or expands upon these issues. This will thereby introduce the core arguments of this thesis, as well as indicating more specifically some of the areas of scholarship to which this thesis is a contribution.

2. Challenges for thinking ‘flourishing’, and responses of the thesis

2.1 Ethical/political concerns

Neo-Aristotelian theories of flourishing have faced criticism from many quarters, much from an ethical and political perspective. Concerns have been raised, for example, about whether theories based on a universal species norm can give adequate space to individual and cultural diversity, and whether they can give due recognition to autonomy, freedom, and respect.³⁰ I have sympathy with much of this criticism.

²⁹ See Foot 2001: Introduction, Ch 2; Thompson 2008: Chs 3 and 4; Hacker-Wright 2009.

³⁰ For various examples of the sorts of criticism to be mentioned here, directed specifically at Nussbaum or the Foot/Thompson approach, see e.g. Antony 2000: 31-35; Arneson 2000: 46-52; Clark 2002: 73-76; 2013; Okin

Diversity in ways of living across cultures, and plurality of individual needs, abilities, and values, present a *prima facie* difficulty for philosophies that appeal to species-universal normative standards. The concern is that in attempting to determine values common to all we are in danger of abstracting away from important differences, and undervaluing, or even undermining, individual and cultural autonomy. For more or less any particular functioning, no matter how apparently common in the human species, it is possible that there are some for whom it is either not a possibility, not important in their particular way of living, or even positively disvalued. There are various things that our theory may be taken to *say* about such people, by implication, that might be cause for concern, either for the attractiveness of our philosophy of the good in general, or for its potential political ramifications. For example, it might commit us to saying that these people are incapable of living a worthwhile life, at least in certain respects; that they are a ‘defective’ or lower kind of human being, or indeed ‘not human’ at all; or that they are simply *wrong* about the way of life best for them, no matter how their particular conception of the good arose. At a social/political level, the potential for implications such as these to validate stigmatising and discriminatory attitudes, and even repressive action, has been raised by many commentators.³¹

At a meta-ethical level this approach sets limits on the diversity of ways of being that can be understood as genuine parts of a life lived well, regardless of circumstance and context, and encourages a general insensitivity to individual particularity. Anything that seems to lie

2003: 293-297; Wolf 1995; Glackin 2016; Sugden 2006: 33-41; Begon 2015; 2017; Dela Cruz Bernabe 2006. For related criticisms of appeals to ‘human nature’ etc., not specifically directed at the neo-Aristotelianisms discussed here, see e.g. Hubbard 1990; Kronfeldner 2016.

³¹ Problems of this sort are particularly relevant to an assessment of Nussbaum’s capability approach, because she insists that her ‘proper species functioning’ approach to quality of life is compatible with liberal principles such as neutrality about conceptions of the good, toleration of difference, and respect for individuality and autonomy. In multiple works over recent decades she has attempted to reconcile these two sides of her philosophy (e.g. 1992; 1998, 2000a: 41-59; 2011: Ch 5; 2014). In this thesis I mostly address Nussbaum’s concept of flourishing in isolation from this other side of her work. A previously projected ‘Part 3’ of this thesis was to address explicitly the question of the compatibility between species-essentialist concepts of flourishing and liberal political theory, focusing on Nussbaum’s arguments (and ultimately finding them wanting, despite her best intentions, for reasons similar to those just mentioned). It was also to argue that a version of the capability approach based on my proposed ‘self-creative’ concept of flourishing could do better at overcoming these issues. However, for want of space, ‘Part 3’ has been cut from the final version (although various parts of Chapters I-IV point towards its main claims). This does not affect the overall coherence of the thesis because this final part was to be extrinsic to the arguments developed in Parts 1 and 2.

outside of the norm must either be analysed as a sub-variation of a more general ‘proper’ way of living, or be seen as straightforwardly pathological.

There is therefore little room for the idea that there might just be a *plurality* of ways for humans to live well, some perhaps fundamentally inconsistent others, without some deeper level at which they are *really* all fulfilments of the same species essence. Also, there is little room for the idea that the freedom to figure out one’s ‘own way’ in life, even if this diverges from the norm, could *itself* be a valuable thing. A basic motivation for this thesis is that I *do* think we should make room for these ideas in our philosophy of the good. This is something I do via my proposal for an alternative concept of flourishing, as ‘self-creativity’ (see Chapter III). On this view, in contrast with the properness concept, the norms relevant to evaluation within an individual’s life are contingent on the particularity of that individual’s context and history, and intrinsic value is also attributed to the power to create one’s own way of being through free and open interaction with the world.

This positive proposal provides a way to think flourishing that neutralises many of the concerns just outlined, and in this way the thesis can be seen as a contribution to this area of debate. However, in terms of *criticism* of the standard neo-Aristotelian ‘properness’ perspective, these ethical/political concerns will for the most part remain in the background.³² This is because the majority of the thesis takes up a different theme, focusing on issues that arise from a biological point of view.

2.2. Flourishing and the question of biology: central arguments of the thesis

Neo-Aristotelian approaches to ethics have also faced a number of biologically-oriented criticisms. As I discuss in Chapter IV, these criticisms tend to claim that neo-Aristotelianism either relies on flawed views about biology (e.g. various sorts of species essentialism), or that the way its advocates derive normative claims from ‘natural facts’ ought, when biology is properly understood, to validate views that they themselves would not endorse (e.g. that the

³² A particular exception to this is III:3.3, where I consider some implications relating to issues of disability and identity.

criterion of the good is genetic replication).³³ As a result, discussions of the philosophy of ‘flourishing’ in relation to biology tend to be sceptical. That is, they tend to draw negative conclusions with respect to the prospects for a theory of flourishing informed by biological understanding. Interestingly, defenders of neo-Aristotelianism tend, in a certain way, to agree with this outlook. They commonly respond to these sorts of criticism by *denying* that they derive norms from biological or otherwise empirical facts in the first place. All of Nussbaum, Foot, and Thompson, for instance, deny in various ways that their conceptions of the good are ‘based on biology’ – the *suggestion* being that criticisms from a biological perspective are therefore generally misplaced.³⁴

The primary contributions of this thesis are to this general area of debate, concerning the possible philosophical relations between ‘flourishing’ and biological understanding. There are two main lines of argument in this regard, one negative, one positive.

The negative line of argument is a new addition to the critical side of this debate. It provides a critique of the properness concept of flourishing by means of a critique of its underlying assumptions about living phenomena as such. I argue that, in the neo-Aristotelian thought considered here, the properness concept functions as an ‘organic concept of the good’ by assuming a particular ‘metaphysics’ of the living being.³⁵ This metaphysics apprehends living beings as *given a proper form to fulfil*, given a model or set of standards designating the way they are ‘meant to be’. Living as a process of coming-into-being is thus given the task of *movement towards fulfilment* of that form, towards realisation of essence. I label this metaphysics *poietic* due to its interpretation of organismic becoming (ontogeny, development) as a form of *poiesis*, as a process undergone for the sake of producing or realising a pre-specified end-product. This metaphysics acts to ‘naturalise’ the properness

³³ For bio-oriented criticisms along these and related lines, see e.g. Lenman 2014: §4.1; Kitcher 1999; FitzPatrick 2000; Millum 2006; Andreou 2006; Woodcock 2006; 2015; Lewens 2015: Chs 4 & 10; Odenbaugh 2017; Glackin 2016.

³⁴ Nussbaum 1992; 1995a: 122-123; 2000b: 118-119; Foot 2001: 29, 32 (fn 10), 40 (fn 1); Thompson 2008: 79; 2004. See also various forms of this defence in Hacker-Wright 2009; Lott 2012; Woodford 2016.

³⁵ I use the word ‘metaphysics’ in this context to mean simply a basic conceptual framework that organises experience and understanding of a subject-matter (see also 3.3 below). The metaphysics of living beings as objects of understanding is the conceptual or interpretive lens through which they are apprehended *qua* living things. This can combine a mode of representation and evaluation in the same framework, as do the perspectives I consider in this thesis.

concept of flourishing; it presents its normative structure as simply a reflection of the logic of living phenomena as such. However, as I argue in Chapters V and VI by means of an interpretive engagement with contemporary biological theory, this *poietic* metaphysics of life is inadequate to the reality of organismic becoming that it attempts to capture, and thus ought to be rejected. This engagement with biological theory therefore acts to *sever the implicit logical connection* between the phenomena of life as such and the normative logic of the properness concept, which, as mentioned above, is presupposed as necessary by the neo-Aristotelian views considered here, given the subject-matter of organic life. I therefore argue that this perspective on flourishing cannot, and should not, be naturalised in the way they suppose that it can.

But, surely all this is irrelevant, because, as just mentioned, defenders of this view tend to reject ‘biological’ criticisms as misplaced? Indeed they do, but this does not make my critique irrelevant. In fact, this argument can be made *even if* we allow that the neo-Aristotelian ‘not based on biology’ response, mentioned above, is legitimate. This is because this response (and many of the criticisms that provoke it) primarily concerns the issue of the *content* of their particular conceptions of the good, which they deny is derived straightforwardly from biological/empirical facts. As far as the argument of this thesis is concerned, I *grant* that this response is valid, and thus also that many of the common biologically-oriented criticisms neo-Aristotelians face are, as they tend to say, talking past it in certain ways (see Chapter IV). However, there is a more fundamental level at which this perspective *is*, in a certain sense, ‘based on biology’. That is, as just explained, the way in which, not any particular *content*, but the *form* of the basic concept of flourishing that they employ is naturalised by assuming a particular way of apprehending the phenomena of life as such (more on this in 3.1 below). Given this, the question of how we *ought* to understand organic phenomena, and whether the particular metaphysics assumed here is necessary, or even conceptually adequate to its object (life), is indeed pertinent to an assessment of the coherence of the properness concept of flourishing. And this *is* a question in which biological theory has a legitimate role to play (see also 3.3 below).

The second main line of argument in relation to this area of debate is more positive. It is that, whilst the properness concept of flourishing is undermined by biological considerations, this needn’t mean that the philosophy of flourishing in general has nothing to gain from an engagement with biological theory, or rather that such an engagement need be entirely negative. I argue that, as well as de-naturalising the properness concept, this strategy of

bringing to the surface the conceptual interplay between the metaphysics of life and the normativity of ‘living well’ can also provide a way to accomplish a positive *re-thinking* of flourishing as an ‘organic concept’. I develop an alternative perspective from *within* this conceptual space, one which organises it in a different way, informed by a different view of organismic becoming. And, as with the negative argument, this conceptual re-organisation is achieved by harnessing intellectual resources provided by an engagement with contemporary biological theory.

In contrast to the *poietic* metaphysics assumed by the standard neo-Aristotelian view, this alternative perspective begins from an apprehension of organismic becoming as a form of *praxis* – improvisational and creative process, the ‘product’ of which is constituted by its performance. Seen through this lens becoming is the immanent process of ‘finding a way’ in the world through interaction with contingent circumstances, not movement towards fulfilment of a transcendent form or essence. From this shift in our interpretive perspective on living phenomena as such, a different framing of the normative structures brought to bear on the evaluation of life is proposed, which I label flourishing as ‘self-creativity’, mentioned above. On this view, life is evaluable not in terms of its better or worse realisation of an essence, but in terms of the norms that emerge as relevant to it from *within* the organism’s particular process of becoming, contingent on its contextual relations and unique ontogenetic history. It also entails the intrinsic evaluability of the performance of this ongoing process itself, in relation to which I propose a concept called ‘self-creative freedom’: the extent of the openness and richness of one’s power to explore the possibilities for doing and being in the world, and to shape one’s life through responsive interaction with this space of possibility. This is a parameter of flourishing constituted by the capacities of the individual and the conditions within which they live.

This double-movement – away from one way of drawing the relation between ‘life’ and ‘flourishing’, and towards another – is presented in Part 1 simply as a proposal based on the contrast between the *poietic* and the *praxic* metaphysics of becoming.³⁶ In Part 2, this interpretive shift is motivated more fundamentally, through an internal critique of modern biology. It is argued that the contemporary turn to a ‘constructivist’ conception of development – in which organismic form and functionality is not inscribed in a pre-given

³⁶ The distinction between *poiesis* and *praxis* employed in this thesis is derived from Aristotle’s original distinction, but also extends the meaning of the two terms in certain ways (see II:3).

plan such as a ‘genetic programme’, but is contingently and continually constructed within each organism’s unique process of ontogeny – provides resources both for overcoming the *poietic*, and affirming the *praxic*, interpretation of organismic becoming, and thereby for re-thinking flourishing as an organic concept of the good in the way proposed.³⁷

3. Rationale and method

3.1. ‘Life’ and the good: exploring the significance of organic facticity

Why remain within this space? Why seek to *re*-think flourishing in relation to the biological? Why, for the sake of a theory of the good, ask anew the question of our understanding of the living world, as opposed to simply not asking it at all? A number of basic assumptions motivate this approach.

With regard to the question of the human good in general, I start from an apparently trivial assumption. This is that human beings are living organisms. Whatever qualities and capacities we might associate with the human, they exist as part of the human as a living entity, as a phenomenon of life, and we ought to apprehend them *as* part of this context. An assumption of this sort is, I take it, accepted at some level by most (except perhaps the most ardent idealists or dualists), and it strikes a particular note of common sense within modern self-understanding, for which the evolutionary worldview has, as Hans Jonas put it, “abolished the special position of man” as the unique site of transcendence of the domain of organic nature.³⁸ Humanity is embedded within the world of living nature; it is one realm of being within an inter-related and constantly changing web of life, rather than, for example, a separate rung on the eternal ‘chain of being’, between animals and angels.³⁹ I call this assumption – the fact of our being living beings – the assumption of human ‘organic facticity’. In light of this assumption, our understanding of what it is to be human, and what it is to be a particular individual, are rightly intertwined with how we understand what it *means*

³⁷ My main point of reference for developmental constructivism is the work of Susan Oyama (e.g. 2000a [1985]; 2000b; Oyama, Griffiths & Gray 2001). The proposal to use the contrast between *poiesis* and *praxis* to interpret the turn from the neo-preformationist ‘genetic programme’ perspective to developmental constructivism has also been made by Christophe Rehmann-Sutter (2006), from whom I borrow some elements of my analysis.

³⁸ Jonas 2001 [1966]: 57. See also Moss 2009: 103-104.

³⁹ On the latter idea see Lovejoy 1960 [1936]: 189-195.

to say that the human being is an organism, and that human becoming is organismic becoming. This thesis is specifically and deliberately an exploration of the possibilities for evaluative understanding of ourselves *given* the assumption of this intertwining. It is an exploration of the possible *significance* of our organic facticity for the normative structures we bring to bear on evaluation of our lives. Just because one way of articulating this significance fails, does not mean that there are not other more promising ways of doing so.

Another basic assumption that I begin from has to do with the relation between living phenomena and value in general. The assumption is that ‘organisms have norms’.⁴⁰ That is, there is something it is to benefit or harm a living being; things can be good or bad *for* an organism; there is something it is for a living existence to go well or badly, and improve or deteriorate. This is not the case for inanimate objects. One can scratch, chip, or break a rock, or one can protect it from such damage, but neither action can be bad or good *for* the rock itself: it has no norms of its own. The rock may be valuable *for* us, or another living being, in which case we might say that it can be evaluated derivatively. E.g. we might appreciate its shape or colours, and wish for these to remain untarnished, or value it instrumentally, as a means to some extrinsic end. But ‘intrinsic’ evaluation of the sort relevant to living beings simply doesn’t make sense for this kind of object.⁴¹ This claim about intrinsic norms attaching to living beings as such need not assume conscious appraisal of value by the organism. If a tomato plant is deprived of sunlight and water, then providing it with these will more than likely benefit it as a particular living being, whether or not the plant is in any sense consciously aware, or appraises this benefit *as* a benefit. The organism’s world, and its own states and activities, have ‘parameters of significance’ for the organism *qua* living being, they can *matter* in relation to its being in the world. Conscious appraisal introduces a particular, and more complex, level of *mediation* between the organism and the significances of its world, but is not the foundation of significance itself, it is not what *makes* something good or bad *per se*.

One way of looking at the strategy of this thesis – of considering the conceptual relations between the interpretation of organismic becoming and ‘living well’ – is as a way of

⁴⁰ For related views, and various ways of interpreting the *meaning* of this claim, see e.g. Jonas 2001 [1966]; Moss & Nicholson 2012; McLaughlin 2001: Ch 9; Nussbaum 2006: Ch 6.

⁴¹ On the distinction between intrinsic or categorical, and instrumental or hypothetical, value, see Foot 2001: 26-27; Thompson 2008: 75.

answering the question of where these ‘norms’ or ‘parameters of significance’ *come from*. What is the *genesis* of norms in relation to an organism’s being? In particular – at least, this is how I address the question – what is the relation between the process by which an organism comes into the world, and the particular norms that are relevant to it? Are they in some sense *given to* the organism, prior to development, *as ends to be fulfilled and standards to be met* via this process (part of the ‘properness’ concept); or are they constructed within this process, and contingent upon it (part of the ‘self-creative’ concept)? I compare these ways of understanding the genesis of norms in Chapter III.

To return to the general assumption of human organic facticity, one of the most general attractions of the notion of ‘flourishing’ itself is that it seems to embrace this orientation as significant from the start. In a certain sense it always already contains a reference to our being as living beings, insofar as it sees the good as having to do with the form of one’s *life*, with the character of one’s *living*. It presents ‘the good’ not as a concept of *feeling* happy, or *having* certain things, but as one of *living* well. The category of the living as such is, then, in a basic sense implicated in the concept of flourishing. This makes it an appropriate way to articulate an understanding of the human good, given the assumption of human organic facticity.

We can see this very basic ‘intimation of the living’ reflected in the particular neo-Aristotelian theories I have introduced here. For example, in their rebuke of the utilitarian subject as passive pleasure-sensor, Nussbaum and Sen affirm the active or agential over the passive, the animate over the inanimate, and in this sense the living over the inert.⁴² The human subject, they stress, is a subject of “life in the sense of activity”: our approach to questions of human value ought to embrace human existence as a kind of living activity. This is part of the reason why the capability approach emphasises an evaluative space constituted by capacities for ‘doing and being’ in the world. Susan Wolf has also noted the reference to organic facticity in this orientation, calling it a “partly biological” picture of the human subject, one which contains “a complex, organic ideal, in which the ability to exercise

⁴² For more indications of Nussbaum’s thinking in this context see e.g. Nussbaum 2000a: 72-73; 2005a: §§2-3; 2006: 159-160, 356-366; 2011: 127, 157-163; 2017; and Bendik-Keymer 2014; 2017.

physical powers and realize physical capabilities is not artificially separated from or denigrated in comparison with intellectual and spiritual ideals”.⁴³

We can also see, even more emphatically, this orientation towards the human-as-organism in the thinking of Thompson and Foot. Thompson also emphasises that which is implicit in the Nussbaum/Sen critique of utilitarianism. He presents the neo-Aristotelian conception of the human subject as a concrete form of life, as opposed to, for example, the Kantian idea of an abstract rational ego.⁴⁴ And, for Thompson, the agency of the human subject is derivative of its existence as a living being, meaning that a proper comprehension of human action, will, reason, as well as other capacities, requires that they be seen *as* specific forms of living activity and process.⁴⁵ He even speculates that “an appeal to notions of life and organism and life-form would seem to be implicit in *all* departments of ethical thought”.⁴⁶

Furthermore, as mentioned above, Thompson and Foot are explicit that their stance on moral virtue and vice is informed by the assumption that the relevant objects of evaluation are *living beings*. As Foot says, “moral judgement of human actions and dispositions is one example of a genre of evaluation itself actually characterized by the fact that its objects are living things”.⁴⁷ The basic orientation towards life as such is therefore taken to have implications for the forms of thought brought to bear on questions of flourishing more generally.

As explained above, the primary object of critique in this thesis relates precisely to one of these (apparent) implications, evident in Foot/Thompson and Nussbaum in various ways: that the ‘organic facticity’ of the subject-matter carries with it the *presupposition of a certain kind of normative logic* – properness according to a life-form – which is taken as *the* appropriate mode of evaluation for living phenomena as such, and thus as the natural way to structure the concept of flourishing. Footian philosopher John Hacker-Wright summarises this presupposition well:

⁴³ Wolf (1995: 106).

⁴⁴ Thompson 2008: 7-8.

⁴⁵ Thompson 2008: 27-30.

⁴⁶ Thompson 2008: 27 (my italics).

⁴⁷ Foot 2001: 4.

[G]rasping something *as an organism* requires us to situate the organism against its species or life-form. [...] The existence of a life-form *is presupposed whenever we identify anything as an organism*. [...] [T]o identify something as an organism is *ipso facto* to look at it from [this] normative standpoint; and this is (logically) *before* developing any empirical theories of the organism.⁴⁸

The last part of this statement alludes to the common denial, mentioned above (2.2), that empirical/biological claims are the basis for the particular *content* of a conception of species life-form. Neo-Aristotelians deny that understanding of what is proper to a species is simply a matter of statistical generalisations about a population, or is derived from theories about evolutionary history, for example. And, as mentioned, I grant the validity of this response here. However, regardless of how this content *is* actually derived, what this statement also highlights is the way in which the *form* of what I call the ‘properness’ concept, the particular normative logic of this concept, is nonetheless *presupposed by apprehending the organic as such in a particular way, as something that inherently demands the logic of judgement-according-to-a-proper-form*. Simply “grasping something *as an organism*” requires that we “situate [that] organism against” what we understand to be its *proper* way of living *qua* member of its kind.

Flourishing as properness, as seen in the neo-Aristotelian cases discussed here, is in this sense what I have called an ‘organic’ concept of the good: a way of providing structure to normative thinking by *taking up the living* as a basic conceptual resource. I postulate that the particular metaphysical lens through which life is taken up in this approach – centred on the interpretation of becoming as *poiesis*, as I argue – lies at the root of much of what is problematic, both ethically and metaphysically, in standard neo-Aristotelian theories of flourishing. And, as mentioned above (2.2), it is inadequate to the reality of organismic becoming, as I argue through engagement with contemporary biological theory.

However, I do not think that rejecting this particular way of framing the relation between ‘life’ and ‘flourishing’ requires that we expunge from meta-ethical thinking the appeal to the organic *tout court*. I think that to reject altogether the idea of taking up human organic facticity as a way to shape the normative structures we bring to bear on life-evaluation would be to throw out the baby with the bathwater. What I *share* with the neo-Aristotelian thinkers

⁴⁸ Hacker-Wright 2009: 310-311 (my italics, apart from “*ipso facto*” and “*before*”). See also Lott 2012.

discussed in this thesis is the underlying embrace of life as such as a ground for thinking flourishing – the attempt to think flourishing as an organic concept of the good. What I reject is the particular way in which they go about it. I argue that we ought to go beyond the limitations of the properness concept not by denying the sense of life at the heart of the notion of flourishing, but by thinking again about the role that it plays in our normative conceptuality. We ought to explore the possibility of taking up the living as conceptual ground for life-evaluation in a different way. That is, we ought to re-think flourishing as an organic concept of the good. In Section 4 below I outline the argument that follows in the chapters of this thesis. But first I shall make some comments about philosophical method.

3.2. Interpretation and understanding

As I have suggested, I attempt to think across a number of traditional disciplinary divides in this thesis. In doing so I employ an ‘interpretive’ method, the basic assumptions of which derive from the traditions of phenomenology and hermeneutics, as well as some related traditions such as philosophical pragmatism. The fundamental starting point is that experience of the world, insofar as it is integrated into understanding, is always shaped by *interpretation*, it is always mediated by the particular concepts and perspectives through which the subject attempts to *make sense*. In other words, there is no such thing as ‘direct’ experience or ‘unmediated’ knowledge of the world.

These statements require some qualification, since they could be misleading. One might take them to imply that the interpretive facticity of human experience erects a kind of fundamental *barrier*. In other words, to achieve *true* knowledge, *genuine* understanding, or *direct* perception, one would have to transcend this facticity – break out of one’s station as a particular, concrete being whose engagement with the world is always from a particular perspective and structured by the particularities and significances of its existence and experience.⁴⁹ To truly know the world would be to have access to it from what Thomas Nagel called a ‘view from nowhere’.⁵⁰ This feat, unfortunately, is impossible for limited beings like

⁴⁹ On *this* sense of ‘facticity’ (parallel with but not the same as what I called ‘organic facticity’ above), see Heidegger’s 1923 lectures, *Ontology - The Hermeneutics of Facticity* (1999 [1923]), many of the core ideas of which were later subsumed into *Being and Time* (2010 [1927]). See also Grondin 1994: 93-95.

⁵⁰ Nagel 1986.

us, at least in this life. All that we can ever achieve, alas, is a series of ‘views from somewhere’. Thus we are resigned to the kind of scepticism that led from Locke and Hume to Kant: we have access only to appearances of the thing, appearances shaped by our concepts, never to ‘the thing in itself’.

The meta-philosophical method of this thesis emerges precisely from a critique of this sceptical ‘barrier’ analysis. The hermeneutical solution to this sceptical *aporia* is in fact a dissolution of it, achieved via rejection of the false dichotomy that lies at its heart: the contrast between having experience or understanding of something merely *from a particular perspective*, and having access to it *absolutely* – free of perspective, and free of the action of conceptualisation. Against the background of the ideal of absolute knowledge, to admit the interpretive nature of human experience is to *restrict* it to a fundamentally limited form. The contrast is a mistake because the notion of the absolute at play here is a paradoxical one, an empty or self-defeating ideal. What would it *be to make sense* of something without integrating it into some framework of conceptualisation? What would it *be to experience* something from a ‘nowhere’? This phrase of Nagel’s perfectly embodies the contradiction of the absolute: to be a ‘view’ at all is to be a view from *somewhere*. Or, alternatively, to be ‘from nowhere’ is to thereby *cease to be a view*. ‘Nowhere’ does not signify some special place, from which an absolute point of view, over and above all of our merely particular ones, can be taken up. It signifies a *lack* of place: the view from nowhere is no view at all. The sceptical conclusion of the ‘barrier’ analysis of our interpretive facticity only makes sense by assuming the ideal of the absolute point of view to be meaningful in the first place, which it is not.

This argument, so far, entails negation of the ‘absolute’ side of the absolute/particular dichotomy, but it also suggests the method for overcoming it, and its sceptical implication, altogether. This task is completed by recognising that far from being a contingent *barrier* to experience of the world, the particularity and facticity of the subject is rather the very *condition of its possibility*. To have a ‘perspective’ is not to have a fundamentally inferior kind of view; it is necessary to having any kind of view at all. Making sense of something by conceiving of it in some particular way is not a level of understanding that we are regrettably limited to by virtue of being unable to grasp the world ‘directly’; it is part of what it is to do any ‘grasping’ at all.

The recognition that the interpretive constitution of understanding is precisely that which *enables* any understanding at all is central to Heidegger's taming of the 'hermeneutic circle', and to the philosophical hermeneutics to which it gave rise, primarily through the work of Hans-Georg Gadamer.⁵¹ A form of this move can also be traced back to Hegel's overcoming of Kant's epistemology. For Hegel, in the words of Stephen Houlgate, "our categories do not keep us at one remove from the structure of things; rather, they are the very preconditions which give us access to the structure of things. Our categories do not confine us within the alleged limits of human experience; they equip us to see and understand what *is*".⁵²

3.3. Science, metaphysics, and normative thinking

This is relevant for how this thesis approaches the understanding of science, and attempts to bring it into relation with ostensibly disparate fields. From this point of view, questions to do with knowledge about the empirical evidence of science and questions to do with how it is to be *interpreted* are not separate issues. There is no *simple* apprehension of 'the facts', *on top of which* a layer of interpretation might be added, say for poetic effect. The facts do not *give* to us a single way of being understood. Understanding as such involves an *activity* of grasping, embedding in wider conceptual relations, and making sense of the facts in some *particular* way.⁵³ And, as just explained, this is not to collapse into scepticism; it is, on the contrary, to acknowledge the interpretive constitution of understanding *per se*. Therefore, the metaphors and conceptual frameworks through which science is both expressed and absorbed are directly relevant to a discussion of the science itself, as well as to consideration of the ways in which it can help us think through wider issues.⁵⁴

⁵¹ See Heidegger 2010 [1927]: §32; Gadamer 1993 [1960]: 293, 262, 375-376; Grondin 2002: 46-47; 1994: 111-112.

⁵² Houlgate 2005 [1991]: 5-6.

⁵³ My view here is also influenced in part by epistemological traditions in the philosophy of science such as those stemming from Kuhn's notion of the embeddedness of science in theoretical 'paradigms' (Kuhn 2012 [1962]) and Hanson's notion of the 'theory-ladenness' of empirical observation (Hanson 1965 [1958]).

⁵⁴ For related work on the integral role of metaphor in concept formation, that structures both everyday experience and scientific understanding, see e.g. Lakoff & Johnson 1980; Keller 2002: Pt 2; Konopka 2002; Nicholson 2014b: 162-163.

In discussing different possible ‘metaphysics’ of living phenomena in this thesis – such as those derived from the central contrast between *poiesis* and *praxis* – I refer to different possible basic conceptual frameworks, or ‘interpretive lenses’, through which experience and understanding of this subject-matter can be organised and integrated in different ways. These different perspectives shape particular ways of making sense of and responding to the living world, such as by bringing certain structures of evaluative judgement to bear on it (more in this in a moment).⁵⁵

Frameworks of this sort can organise understanding about a subject-matter across ostensibly separate fields of inquiry and thought, and highlighting these connections can help us draw implications across such (apparent) boundaries. For example, as I argue here, a *poietic* metaphysics of life underlies both the standard neo-Aristotelian concept of flourishing and (see Chapter V) the ‘neo-preformationist’ conception of development implied by a number of concepts dominant in modern biology, such as the ‘genetic programme’. By uncovering the way in which the contemporary turn away from this view, to a ‘constructivist’ conception of development, involves a shift in framing from the logic of *poiesis* to that of *praxis*, we can show how the background metaphysics of the neo-Aristotelian properness perspective is not simply *given* by the phenomena of life as such, and moreover, as the argument for constructivism shows, neither is it conceptually adequate to this subject-matter (see Chapter VI).

This alludes to an important point: that the choice between metaphysical frameworks is not simply arbitrary. I have already explained why affirming the fundamentality of interpretation does not commit one to scepticism. Neither does it imply that all interpretations are ‘equally valid’ with respect to some particular phenomenon. Interpretations can be more or less *adequate* to the subject-matter they help us make sense of, they can accommodate its various aspects more or less coherently, and bring phenomena into relation with each other in more or less integrated and unified ways. The ‘adequacy’ of a metaphysics to its object of understanding is something we can only make judgements about from within the ongoing process of making sense of the world, in the sense that there is, as above, no presuppositionless point of view from which we could assess correspondence absolutely. But this does not mean that we are completely at sea when it comes to affirming the validity of

⁵⁵ See also Rehmann-Sutter 2006; 2008; 2010.

one way of understanding over another. There is a dialectic between observation and interpretation through which one set of concepts and metaphors can show up as insufficient to accommodate the reality as we encounter it, and can give way to other ways of making sense of that reality.

This dialectic is precisely that which I see as driving the debate between neo-preformationism and developmental constructivism in contemporary biology. As I argue in Chapter VI, the primary argument for the constructivist position is one of conceptual adequacy to the subject-matter, organismic becoming. The neo-preformationist concept of the genetic programme can frame development with a certain degree of coherence, and it has provided a productive model for empirical enquiry in many areas. But it has a limited capacity to accommodate the growing recognition of the importance of plasticity and context-sensitivity in ontogenetic processes. For example, observations revealing the indeterminacy of relations between genetic structure and phenotypic ‘product’, and the multiple levels on which processes of developmental construction occur, put pressure on the neo-preformationist view by shifting what I call the ‘burden of conceptual justification’ onto it.

Engagement with biological theory is crucial, I believe, for gaining a proper view of the possibilities for thinking ‘flourishing as an organic concept’. This is not because I think science can *by itself* provide answers to philosophical questions, not least to ethical ones. It is rather because, firstly, whether we like it or not, the understanding of science helps to structure the conceptual milieu within which we think about such questions, by shaping our understanding of ourselves and the world around us.⁵⁶ And secondly, as long as our philosophical thinking engages scientific theory with a *critical awareness* of the different interpretive possibilities that emerge from it, we can *make use* of this mutual interaction between science and self-understanding without our thinking being over-determined by some particular empirical or theoretical doctrine.

Similarly, in making critical use of scientific theory in this thesis I do *not* purport to be deducing ‘normative implications’ from straightforwardly ‘brute fact’ empirical claims. Rather, I address the empirical realm of biology from the perspective of metaphysical frameworks in which *certain kinds of normative structuring are already entailed*. Just as

⁵⁶ On the role of biological science in shaping self-understanding and ethical/political reasoning (and vice versa), see e.g. Barker 2015; Meloni 2016; Barnes & Dupré 2008: Chs 5, 7 & 8; Lewontin 1991; Rehmann-Sutter 2008, 2010.

“grasping something *as* an organism” in one particular way (in terms of a proper life-form, becoming as *poiesis*) requires us to presuppose a certain kind of normative standpoint as appropriate,⁵⁷ grasping the organic in a different way (in terms of *praxic* process, for example) can lay down a different kind of structuring for the activity of life-evaluation (see Chapters II, III and VI). What is at stake in the engagement with biological theory here is the relative adequacy of these different points of view for our attempts to *make sense* of the reality of organismic becoming itself, as just discussed. This in turn has implications for the philosophical coherence of the corresponding ways of framing ‘organic’ concepts of flourishing. But there is no simple line of deduction from ‘fact’ to ‘value’. Conceptual relations are drawn here in a way that is always already mediated by modes of interpretation in which the appropriateness of different *ways of evaluating* is also implicated. Through the interpretive dialogue that I develop here between the philosophy of flourishing, the metaphysics of becoming, and biological theory, I hope to provide an example of how to have this kind of dialogue in a sensitive, sophisticated, and constructive way.

Another way to see the status of the relations drawn in this thesis between biological theory and the structuring of meta-ethical categories is in terms of a distinction between explanation and understanding. Scientific reasoning is typically concerned with *explaining* a target phenomenon. It wants to know *why* something exists, or *how* something happens. On the other hand, what I am primarily concerned with in this thesis, with respect to the phenomena studied by biology, is the significance of different ways of *understanding* these phenomena. By this I mean something broader and more fundamental than explanation; the alternative metaphysics of life discussed are different ways of ‘looking at’ the phenomena of life and the becoming of living beings, different ways of grasping *what kind of things* these phenomena *are*, not specifically ways of explaining why or how they exist, or occur in the way they do.

This sort of distinction might, in fact, be drawn in order to undermine the attempt to involve biological theory in a discussion of concepts of flourishing at all. A defender of the neo-Aristotelian approach of thinkers such as Foot and Thompson might oppose my very project by arguing that, a) their concept of the species ‘life-form’ is *not* intended as an explanation of why individuals of a species live the way they do, but rather a way of understanding, e.g., what it means to be a human or a giraffe, and what it is to live well or badly as one; and b),

⁵⁷ Hacker-Wright 2009: 310-311 (my italics).

biological theories about organismic form and development, on the other hand, are constructed primarily for the purpose of explaining these things. Therefore, looking at the latter cannot help us to assess the former, nor to advocate a different kind of approach.

I do not deny either of premises a) and b) here, but I do deny the conclusion. Whilst scientific theories might be *intended* primarily as tools for explanation, they are not *independent* of the wider frames of understanding through which we apprehend the phenomena being explained. The concepts employed in some explanatory theory can validate and enforce, or disrupt and undermine, different such frames. For example, the neo-preformationist concept of the genetic programme, even if intended as simply part of an explanation of development (and heredity, evolution, etc.) also brings with it a particular way of understanding what kind of things organisms are, and what kind of process their coming-into-being is. As mentioned, I argue that it validates a *poietic* conception of living phenomena, which contains a particular normative logic. The neo-Aristotelian ‘properness’ concept does not specifically rely on a particular *explanation* of organic forms, not least in terms of genetic programmes (see V:2.5, 5), but it does depend on this more fundamental metaphysics, and if there are independent reasons from within biological theory for rejecting this perspective, and taking up another, then this has implications for the coherence of the standard neo-Aristotelian approach, as an ‘organic’ approach to meta-ethics.

Indeed, I argue that there are such reasons (Chapter VI). They are best expressed by what I call the ‘constructivist turn’ in contemporary biological theory. Much like the neo-preformationism it replaces, the constructivist perspective is primarily intended as an approach to explanation in biology, yet it, too, is more than this. Through the various concepts it employs it also constitutes a more or less unified way of looking at, making sense of, understanding what kind of things organismic being and becoming are. Specifically, I argue, it is best understood as involving a fundamental re-framing in terms of the logic of *praxis*. As mentioned just now, the main argument *for* taking up this perspective, at least in the context of biological theory, is conceptual adequacy to the phenomenon, and part of this is the ability of the theory to *explain* phenomena more fully and coherently. But taking up this conceptual aspect shift *has significance* beyond just the way we go about explaining, and I am primarily interested in it here for this reason, and not specifically *as* a way of explaining.

4. Chapter summary

In Part 1 (Chapters I-III) I describe the two concepts of flourishing at stake in this thesis – ‘properness’ and ‘self-creativity’ – and show how they represent two opposing ways of constructing an ‘organic’ concept of the good. I do this by connecting them with alternative ways of apprehending living phenomena as such, centred on alternative ‘metaphysics’ of the coming-into-being of living organisms – as *poiesis* and as *praxis*.

In the first chapter I outline in more detail the properness concept of flourishing, firstly in an abstract way, and then illustrate it through discussion of Nussbaum’s ‘proper species functioning’ framework, and the parallel concept of species ‘life-forms’ in Foot and Thompson, arguing that the normative logic contained in both is fundamentally the same. I also show how the basic idea of living well as fulfilling one’s proper form, or realising one’s essence, is not necessarily tied to the species level, but can also be expressed in various other ways, including as a kind of individualism, in which flourishing involves living in accordance with one’s ‘true self’ *qua* individual.

In Chapter II I make explicit how the properness concept, as seen in the neo-Aristotelian approaches of Foot/Thompson and Nussbaum, functions as an ‘organic’ concept of the good, and introduce the analysis of organismic becoming in terms of the distinction between *poiesis* and *praxis*. Each of these thinkers – to various degrees implicitly and explicitly – presents the properness concept as a logical consequence of the fact that the objects of evaluation are *living* beings. Life as such is taken to entail the logic of properness as *the* appropriate mode of its evaluation. This presupposition, I argue, relies on the assumption of a particular metaphysics of living beings. I connect this metaphysics with certain meanings of ‘essentialism’ and ‘teleology’, and then introduce the *poiesis/praxis* distinction as a further way of understanding it, characterising the view of life underlying the properness concept as *poietic*, due to the conception of becoming as *poiesis* that it implies. The chapter closes with a discussion of some further aspects of Nussbaum’s philosophy of flourishing in which we can see the underlying *poietic* metaphysics of life coming to the surface more explicitly.

Chapter III begins from a proposal, to take up an interpretation of becoming as *praxis*, and construct an alternative ‘organic’ concept of flourishing on this basis, in contrast with the nexus of thought outlined in the first two chapters. I firstly elaborate a *praxic* conception of organismic becoming, and then outline the corresponding perspective on flourishing that I label ‘self-creativity’. I illustrate this alternative approach by means of an interpretation of J.

S. Mill's ethics of 'self-development' and an outline for a version of the contemporary 'capability approach' based on this perspective. I then draw out some implications of taking this perspective in relation to certain issues to do with disability, individual identity, and the problem of so-called 'adaptive preferences'.

Part 2 (Chapters IV-VI) addresses the question of the philosophical relations between 'flourishing' and biological understanding, using the conceptual framework set out in Part 1. By means of an interpretive engagement with contemporary biological theory I argue that the most coherent picture we have of the becoming of living beings is one that rejects the *poietic* and affirms the *praxic* metaphysics of life. Therefore, the interpretive lens assumed by the properness concept of flourishing is not a necessary part of a proper apprehension of living phenomena as such. On the contrary, it is inadequate to the reality of organismic becoming, and, furthermore, a conception of life that reflects the logic of *praxis* emerges as superior. The shift in metaphysical perspective on organic phenomena proposed in Chapter III is thereby validated, and the particular re-thinking of flourishing constructed from this basis attains a more fundamental grounding and motivation.

The main purpose of Chapter IV is to acknowledge some existing 'biological' critiques of neo-Aristotelian meta-ethics, and show how the argument of this thesis approaches this critical task in a different way. Neo-Aristotelians of the sort discussed here tend to respond to bio-oriented criticisms by denying that their theories are 'based on biology' in the first place, suggesting that such criticisms are generally misplaced. I grant to them the general validity of this response, but argue that my line of attack survives this concession. This is because this response (and many of the criticisms that provoke it) primarily concerns the issue of how the *content* of particular conceptions of the good is derived, with regard to which neo-Aristotelians are justified in their various 'not based on biology' rebuttals. However, as argued in Chapter II, the *form* of the basic concept of flourishing in this approach is, in a certain sense, 'based on biology', in that it relies on the assumption of a particular metaphysics of life (that I characterise as *poietic*). Biological considerations are relevant to the question of the validity of this underlying metaphysics, and therefore to the philosophical coherence of this particular 'organic' approach to flourishing. It is at this level of analysis that the subsequent engagement with biological theory takes place.

The final two chapters of this thesis reveal how the conflict between *poietic* and *praxic* metaphysics is currently playing out within the arena of contemporary life science,

particularly in relation to the understanding of ontogeny. In Chapter V I show that the dominant conception of ontogeny in modern ‘neo-Darwinian’ biology, revolving around the neo-preformationist concept of the ‘genetic programme’, expresses a *poietic* metaphysics of life. It represents ontogeny as a process aimed at realisation of a pre-given plan, in a way that parallels the assumptions about living being and becoming underlying the properness concept, and naturalises the same basic normative logic. The neo-Aristotelians considered in this thesis do not specifically rely on any particular theory about genetics in order to bolster their theories, but they do share with this perspective in modern biology an underlying *poietic* metaphysics. Therefore, the specific kinds of biological theory analysed in this chapter are not necessary for *understanding* the neo-Aristotelian properness concept *per se*, but are necessary background to the story to be told in the final chapter, about how we can harness resources from *within* contemporary biological theory for grounding a fundamentally different way of thinking ‘flourishing’.

In Chapter VI I argue for the ‘constructivist turn’ in developmental biology, and show how embracing this, in opposition to the neo-preformationist conception of ontogeny, involves a fundamental shift in perspective from the *poietic* to the *praxic* conception of organismic becoming. Developmental constructivism, which is motivated as a way of accommodating the importance of plasticity and context-sensitivity in developmental processes, sees organic form and functionality as the unique product of each life course, as emergent from the contingent history of interactivity that is the organism’s particular ontogeny. On this view, living being is continually constructed and re-constructed through the ongoing process of organismic becoming, a process which reflects the immanent creativity and reflexivity of *praxis*. Although it emerges from critique of a particular understanding of *genetics*, the constructivist turn involves more than just a change in how we understand the ontological status of the genome; it undermines the notion of becoming as a *poietic* process of essence-realisation altogether, and thereby disrupts the metaphysical ground for the normative logic of properness, when conceived as an ‘organic’ concept of the good. I show how, as well as doing this negative work, embracing the constructivist framing of life in terms of *praxis* provides specific intellectual resources for re-thinking flourishing in the way proposed in Chapter III.

Part One

Two Concepts of Flourishing

Introduction

In this first part I describe the two concepts of flourishing at stake in this thesis – ‘properness’ and ‘self-creativity’ – and show how they represent two opposing ways of constructing an ‘organic’ concept of the good. I do this by connecting them with alternative ways of apprehending living phenomena as such, centred on alternative ‘metaphysics’ of the coming-into-being of living organisms – as *poiesis* and as *praxis*. See the table in III:4 for direct comparison of the two perspectives contrasted in Part 1.

Chapter I

Flourishing as Properness

Introduction

In this chapter I outline the concept I call ‘flourishing as properness’, and give some illustrations of the idea. This concept is characterised by a particular normative logic, based on the notion of better and worse *fulfilment of form*. That is, flourishing is understood as a matter of realising the ways of being and doing that constitute the individual’s ‘proper’ form of existence. Good and bad are primarily concepts of correspondence with proper form, and living well is thus living properly, living in accordance with the standards of this form. On this view there is a *transcendent* relation between ‘the good’ and individual existence – the good stands outside of and gives normative imperatives to concrete becoming. And in this sense the individual is seen as normatively *heteronomous* with respect to its good. This structure of normative thinking is present in an aspect of Nussbaum’s version of the capability approach, and in Foot and Thompson’s analysis of flourishing in terms of species ‘life-forms’. Other versions are also possible, such as a particular kind of individualist approach to the good.

1. The logic of properness

Before elaborating, a little ground-clearing is needed. It is helpful to divide our topic into two components, two target areas for conceptualisation that can help categorise a philosophical perspective on flourishing. These are what I call, firstly, a notion of *being-well*¹ and, secondly, a notion of *becoming-well*. The main purpose of this distinction is to distinguish a synchronic and structural concept of the good from a diachronic and processual concept of the good. That is, to distinguish evaluation of the current structure of a being’s existence, relating to notions of attained form and functioning, from evaluation of living conceived as a

¹ I use ‘being-well’ rather than ‘well-being’ deliberately, in order to distance this discussion from the common use of the latter term to refer to subjective or psychological happiness. As outlined in 0:1.3, the concept of ‘flourishing’ in the neo-Aristotelian context has to do with the form of one’s life, with the way that life goes as a whole, not simply with the way it is subjectively felt or appraised.

process rather than an end-product; or to distinguish what it is for a life to *be* good or bad at any particular point from what it is to *become* well or badly. We will see that these two components relate to each other in different ways depending on the perspective taken up.

I shall now give an abstract description of the properness concept in relation to these two components. Firstly, being-well. The structure of this concept is, on this view, one of realisation or fulfilment of a form, essence, or 'nature' that is given to the individual being. This pre-given essential form prescribes certain ends and norms to the being's existence. A life is 'good' or 'bad' in proportion to the attained properness of the life in question, i.e. the extent to which it realises proper form and proper functioning. Being-well as properness can be seen as a particular concept of 'harmony', that is, harmony as *correspondence* between concrete life and proper form. The opposite of being-well, what we might call being-badly, is a concept of disharmony in this regard, 'defectiveness', or deviation from the way one is meant to be.

The particular good of an individual, the content of their being-well, is understood as determined transcendentally. By this I mean that the being's essence is logically prior to their becoming in the world, and is independent of that becoming; it is *given to* the individual, and is unaffected in its content by the being's concrete existence. An implication of this is that, since the *source* of the norms by which one's flourishing is defined is transcendent in this sense, the individual is understood as fundamentally normatively *heteronomous* – the ultimate ground or authority regarding the determination of intrinsic value stands outside of the perspective of their particular existence.

Secondly, becoming-well – the good in relation to living as process rather than attained structure. In the concept of properness, this notion is straightforwardly derived from, and is subordinate to, that of being-well. Since flourishing is essentially fulfilment of proper form, becoming registers as an object of evaluation merely as movement towards or away from this fulfilment – it is evaluated simply in terms of its ends and outcomes. Thus becoming-*well* is successful movement of this sort; it is change or process through which the features of one's proper form and functioning are developed and expressed. Becoming-badly, as we might call the opposite of this, is living which moves away from or fails to achieve properness of form or functioning.

Take any particular element of a life – a bodily form, capacity, activity, social relation, environmental condition, etc. We might ask: Is this a 'good thing' or a 'bad thing'? Would its

introduction be an ‘improvement’ or ‘worsening’ of quality of life? These sorts of evaluative questions can be addressed in a couple of key ways within this schema. The issue can be divided, broadly-speaking, into either: a) a matter of being-well – of whether the object of evaluation constitutes part of that individual’s proper way of being, or is on the contrary a defect with respect to this; or b) a matter of becoming-well – of whether it constitutes a movement towards, or better enables, the achievement of properness, or rather leads towards defectiveness in some way. From a social or political perspective, the conditions of human life that we ought to promote, insofar as the human good is an end in view, are those which enable people to live properly, to live according to their proper form.

This gives a rough outline of the normative logic and general value concepts that compose what I call flourishing as properness. (See III:2 for a corresponding outline of the proposed ‘self-creative’ concept, and III:4 for direct comparison in the form of a table.) Clearly, any particular version of this perspective could give much more detail regarding the relationships between these components. For example, it seems possible for some state or activity to be a genuine part of an individual’s good in terms of its being-well, and yet also for it to lead to defectiveness in other areas. Or, vice versa, it might constitute a defect in one area, yet enable greater properness in some other respect. A more detailed elaboration would need to have some answer to the question of relative weighting between these aspects (even if that answer is that no such weighting can be determined in general). Furthermore, I have so far said nothing about *content* with regard to particular conceptions of the good, only about the *form* of normative thinking that this perspective employs. Particular uses of the properness perspective will likely involve claims about what exactly constitutes the essential features of, e.g., a human life *per se*, or even some particular human life. But the general logic itself need not be tied to any specific such elaboration.

2. Illustrations

2.1. Species-properness in Nussbaum, Foot, and Thompson

We can, however, give examples of this logic at work. Perhaps its most common manifestation is that found in various contemporary neo-Aristotelian approaches which define flourishing in terms of the essence or nature that belongs to the individual *qua* member

of a particular *species* of living being.² The content and philosophical role of the ‘species essence’ can be conceived in various ways, some more and some less expansive. It might refer specifically to some characteristic capacity that is deemed *unique* to the species in question, such as the notion of the human as the specifically *rational* being, for example.³ This might then be taken to define the ‘highest’ mode of existence for that species, or its ‘ultimate end’. Or we might appeal to a more inclusive notion of the overall shape and content of the life that is good for any particular token of a species type – not restricted to features unique to that species, but including everything deemed ‘essential’ to living well as a specimen of that species – e.g. what constitutes its proper bodily form, health and physiological good functioning, kinds of experiential and cognitive capacity, modes of interaction with other beings, and so on. I focus on the latter kind of idea here, since it is more general, although the two share a similar structure. In either case the idea of a species *form*, variously defined, entails a species *norm*, some normative standards or imperatives to which all members, *qua* members, are subject. And in either case this perspective involves the idea that the process of living is given the task of growing into, moving towards fulfilment of, its proper form. In the human case, living has the task of realising the essentially human form, of becoming properly human.⁴

The first key example I shall draw on is an aspect of the foundations of Nussbaum’s version of the ‘capability approach’. Nussbaum’s thinking on this topic is complex, and I stress at the outset that I am deliberately isolating just one particular aspect of it here, as a way to illustrate the idea I am calling flourishing as ‘species-properness’. Her thinking has also changed in various ways over the three decades she has been writing about the capability approach, yet this theme, in its general outline, has remained central.⁵ As briefly outlined in 0:1.4, Nussbaum argues that in order to adequately address certain social and political questions we have to ground our thinking in a conception of human flourishing, one which

² Aside from the thinkers to be discussed here (Nussbaum, Foot, and Thompson), variations on this approach can be found in the work of neo-Aristotelians such as Thomas Hurka (e.g. 1993: Ch 1, Pt 1), and Rosalind Hursthouse (e.g. 1999: Pt 3).

³ As in Aristotle’s famous ‘function argument’ for the idea that human flourishing consists in rational activity performed well (*NE* I.7: 9-16).

⁴ This normative idea of the ‘species essence’ is quite different to another use of the term, relating simply to classification. I discuss this difference more in II:2 and IV:2.

⁵ See also Clark 2002: 74-75; 2013.

stands above subjective desires and preferences. Over several decades she has developed a list of the kinds of being and doing – or ‘functionings’ – deemed to be essential to human living well. The various functionings that comprise this list include, to pick some at random, ‘being able to move freely from place to place’, ‘being able to use the senses’, ‘being able to have attachments to things and people outside ourselves’, ‘being able to laugh, to play, to enjoy recreational activities’.⁶ She has used this conception of the good as the basis for a theory of social justice, arguing that the justice of a polity requires it to, as best as possible, provide its citizens with the ‘capability for’ the proper human functionings up to a certain basic level. And she has used it for a perspective on social assessment and development, in which the categories of human functioning provide indicators for measurement of quality of life in a society.⁷

Of particular interest here is the basic *concept* of flourishing that lies behind these approaches to political/social theory, specifically the normative logic that frames how Nussbaum presents the list of human functionings. That is, the *sense* in which these functionings are deemed to be part of human flourishing; the way she expresses what it *means* for a functioning to be ‘good for’ a human. She presents it as a conception of what is essential to living a ‘properly’, ‘truly’, or ‘fully’ *human* kind of life. The goods of living well, for the human species, thus refer back to an idea of what is essential to or characteristic of ‘the human form of life’ as such.

⁶ Taken from Nussbaum 2011: 33-34. Strictly speaking we should get rid of the ‘being able to’ locutions for these to be examples of the functionings on the list. Nussbaum’s list is often *presented* as a list of capabilities-to-function, rather than functionings (as exemplified by the wording of these examples). This is usually due to the context – a theory of social justice in terms of minimal citizen entitlements, and a corresponding approach to social policy aims. For various reasons the ends in sight for these specifically *political* purposes are capabilities, not actual functionings. I.e. social policy should aim to make people *capable* of the essential functionings, but stop short of *forcing* them to function properly. However, strictly speaking, human flourishing in Nussbaum’s philosophy does not simply consist in being *able* to fulfil the functionings in question, but in actually doing so. Although she occasionally slips into describing the good human life specifically in terms of capabilities (e.g. 2000a: 74, 82; 2006: 161-162), or is plainly ambiguous on the matter (e.g. 1998: 317), she confirms this interpretation elsewhere (e.g. 2000a: 71-72, 76, 87; 1998: 321). It is also the most coherent interpretation, because the fact that these *particular* functionings are deemed to constitute the human good explains the specific content of the list of capabilities employed in a political context, the list of things it is the proper aim of social policy to enable. See also III:3.2.

⁷ Regarding this list and some of its social/political applications see e.g. Nussbaum 2000a: Introduction, Ch 1; 2006: Ch 1; 2011: Chs 2 and 3. She also presents the list as embodying a list of fundamental entitlements for all humans, and in this way as a kind of human rights theory (see e.g. 2006: 78).

To illustrate the reasoning involved: the way in which we are to determine the content of this list, she argues, is by asking ourselves a special kind of evaluative question: “Getting the list of functionings that are constitutive of good living is a matter of asking ourselves what is most important, what is an essential part of any life that is going to be rich enough to *count as truly human*.”⁸ That is, it is “a question about whether [the functioning in question] is so important that a creature who lacked it *would not be judged to be properly human at all*”.⁹ Or, as she tends to put it in more recent work, an existence which lacked something on this list would be judged “not a life worthy of human dignity”.¹⁰ We would deem such a life to be, as it were, ‘beneath’, or ‘other’ than, the kind of life appropriate for a human being, a deviation from proper form. The list thus aims to both describe the basic “shape of the human form of life”,¹¹ and thereby to provide universal criteria for evaluating the intrinsic quality of individual human lives.¹²

Nussbaum contends that, beyond all the individually, culturally, and historically particular diversity, there exists, at a greater level of generality, some “way the human being essentially is”, meaning that we can therefore construct a “more or less determinate account of the human being [which] divides its *essential* from its *accidental* properties”.¹³ This is clearly

⁸ Nussbaum 1988: 175 (my italics).

⁹ Nussbaum 1988: 177 (my italics).

¹⁰ E.g. Nussbaum 2006: 78.

¹¹ Nussbaum 1995b: 76.

¹² Nussbaum has developed this conception in numerous books and articles over the last three decades. See in particular 1988; 1992; 1993; 1995a; 1995b; 1998; 2000a; 2006; 2011. A number of details should be noted. Firstly, that she doesn’t see this as a fully comprehensive, or necessarily *complete*, account of the human form of life, but an account of some necessary conditions for a human’s life to be a ‘properly human’ one at all, and, by extension, to be a good human life: “A life that is not even human at all is, *a fortiori*, not a good human life” (Nussbaum 1995a: 118). Secondly, she stresses that the content of the list is “open-ended” and revisable (e.g. 2006: 76), a claim designed to preclude objections that she sees the human good as something fixed or eternal. My critique does not rely on such objections. Any particular list of essentials can be given, and we can even allow that what *is* essential can change over historical time. What is of interest here is the implied relationship between the *individual* and whatever content is posited for the species form at any time, due to the transcendent-normative status of the form itself in relation to particular individuals, as tokens of their type. (This point is reflected in Part 2 with regard to the implicit understanding of biological phenomena in neo-Aristotelianism: its fundamental role is in grounding a *concept* of flourishing as form-fulfilment, rather than in giving that form any particular *content*. See in particular IV:5.)

¹³ Nussbaum 1992: 206, 207 (my italics).

intended as an appeal to some matter of ‘objective fact’ – at least in the sense that it refers to a reality that stands outside of individual particularity and subjective preference. Indeed, she talks in places of the possibility of being more or less *correct* in our general description of the human essence.¹⁴

However, it is a ‘fact’ of an unusual sort. Nussbaum denies that the notion of ‘human nature’ or ‘humanness’ at play is one that can be discovered from a purely ‘external’, value-free, empirical standpoint. Rather, it is ‘internal’ to the self-understanding of human beings, and is also explicitly *normative*.¹⁵ The species ‘form’ is something that entails (or contains) an ought-to-be, that says what is *good*, rather than simply a set of empirical facts about human existence as it is.¹⁶ As she puts it in 2006’s *Frontiers of Justice*, “the notion of human nature in my theory is explicitly and from the start *evaluative*, and, in particular, *ethically evaluative*: among the many actual features of a characteristic human form of life, we select some that seem so normatively fundamental that a life without any possibility at all of exercising one of them, at any level, *is not a fully human life*, a life *worthy of human dignity*, even if the others are present”.¹⁷ Note that the notion of ‘essence’ or ‘nature’ here is not that of a set of properties that define kind-membership *per se*; rather the human essence defines what is essential to being a human *well*, given that one is *already* understood as a member of the human kind.¹⁸

¹⁴ See Nussbaum 2005b: 179 in which she says it is important to endorse “unequivocally a definite list of capabilities” that relate to the good of all humans generally, even though any particular list we might give “might be wrong in detail” – thus implying that a *correct* list *is* possible, even a detailed one. See also 1993: 159-160, in relation specifically to the specification of the moral virtues, where a similar position is espoused. Here she even goes as far as to draw an analogy between progress in scientific knowledge (of the nature of thunder) and “progress towards greater correctness” in understanding of ethical concepts, an analogy that seems to rely on a commitment to the truth conditions of ethical claims being at least to some extent *independent* of our judgement, an ontological position even more extreme than she takes at the start of her 1992 paper on human essentialism. It should be pointed out, however, that in both 1993 and 1992 she seems by the *end* of the articles to have somewhat weakened the philosophical positions she sets out to defend, largely in response to certain objections, without, it seems to me, making these manoeuvres properly explicit.

¹⁵ On this internal/external distinction, see in particular Nussbaum 1992; 1995a.

¹⁶ See Nussbaum 1988: 174-175; 1992: 206-208; 1995a: 94-95; 2000a: 83; 2006: 181-182, 347.

¹⁷ Nussbaum 2006: 181 (my italics, apart from “evaluative” and “ethically evaluative”).

¹⁸ I return to this point, and the different meanings of ‘essentialism’, in II:2 and IV:2.

Let's try to make the status of these ideas clearer. The normative criteria of 'proper human functioning' apply to all human individuals in virtue of their being members of the human kind. What exactly it is that renders one a 'member of the species' in the first place is not entirely clear in Nussbaum, but the most consistent interpretation seems to be: one counts as a member of the human kind if one is born of human parents and has the innate potential for "at least some of the most important" human functionings.¹⁹ One's life counts as *properly* human, and thus as flourishing to at least a minimal extent, in virtue of achieving the functionings on the list up to a certain threshold level. In other words, insofar as one is a member of a particular kind of living being one is thereby subject to a set of standards, which constitute what it is to be a token of that type *well*, and this constitutes at a basic level what it *is* for one to live a flourishing life.²⁰ So, for example, *not* 'being able to move freely from place to place', or *not* 'being able to use the senses' in some way, will be necessarily and intrinsically bad things for any human being, and – this is the key to the logic of properness – the *sense* in which they will be 'bad' is that they will make that existence less *human*, they will make it a less-than-fully-realised *example* of humanness.

¹⁹ Nussbaum 2006: 187-188, see also 38, 181, and 432 (fn 18). To clarify: simply being born of human parents is not sufficient to count as a member of the species. Individuals with very extreme mental impairments, such as anencephalic infants, or those in permanent vegetative states, are not human at all, "but a different form of life" (2006: 187). Someone who enters a permanent vegetative state, or develops extreme senile dementia, at some point in their life is "a (former) human being" (2006: 181; see also 2000a: 73). Such cases involve the absence or "death of anything like a characteristic human form of life" (2006: 181). The exact borderline here is not entirely clear. Note also that she sometimes seems to define "existence as a human being" in terms of "the very birth of a person into the human community" (2006: 285). It's not entirely clear what this means, e.g. whether it means the same as being born of human parents or not. Note also that at 2006: 285 there seems to be a suggestion that this (whatever it means) is seen as a *sufficient* condition of being a member of the species, whereas, as I have just said, elsewhere the innate properties/potentials of the individual also play a role in distinguishing the human from the non-human (e.g. 2006: 181 and 187, where simply being born of human parents is clearly not sufficient to make one a member of the human species). Beyond these details, what *is* clear is that the 'species form' that one falls under as token, and which provides normative imperatives to one's way of living, is not simply determined by the species one belongs to on straightforwardly 'biological' definitions of the term 'species', e.g. in terms of reproductive, phylogenetic, or genealogical relations in a population. In short, being *Homo sapiens* is not sufficient for being a member of the human kind (see also IV:2). Note also that if one needs to have innate potential for some of the "most *important*" human functionings, then even bare kind membership involves some normative judgement for Nussbaum (see also IV:2). For more on the status of these 'innate potentials', see II:4.

²⁰ Variations on this way of defining flourishing, in relation both to humans and to other species, can be found in Nussbaum 1988: 147-155, 170, 175-177; 1992: 207-208, 214-215, 220; 1993: 243-248, 266-267; 1995a: 90-95, 122; 1995b: 72-76, 80-85; 1998: 317; 2000a: 71-76; 2006: 69-81, 180-181, 346-352, 362-366; 2011: 161-162.

Thus we can see the elements of what I've called the 'properness' concept in this aspect of Nussbaum's philosophy. What makes some way of living 'good' for a particular human is that it is part of what makes one's life "count as truly human". Being-well for a human is, at base, a matter of 'being a human properly', of realising the human form or essence through one's concrete existence. By implication, becoming-well is a matter of developing towards fulfilment of the standards of proper human functioning. For any particular individual, the content of their good – what it is for them to live well – is therefore determined transcendently, in the sense defined above. That is, it is something they are *subject to* as token of a type; it is something *given to* them rather than something determined from *within* their own living existence. With respect to the essential elements of the good, at least, the individual is fundamentally heteronomous.

The properness concept of flourishing is also central to a view developed by fellow neo-Aristotelians Foot and Thompson. Whereas Nussbaum primarily employs this idea to conceptualise the aims of political action and the standards of social justice, Foot and Thompson use it to theorise about the status of judgements of moral character in humans.²¹ Their view sees moral virtue and vice as types of 'natural goodness' and 'natural defect'. They argue that human action and character are aspects of living existence, just as physiological processes and bodily structure are, and that their evaluation ought to be understood accordingly. That is, judgement about moral character ought to be seen as having the *same logic* as the form of thinking that is appropriate to evaluation of living phenomena in general. The normative logic assumed in relation to this subject-matter has the same basic shape as that we've just seen in Nussbaum – it concerns whether the individual in question fulfils, or fails to fulfil, the way of being that is proper to them *qua* member of a species, what they call the species 'life-form'.²² It is, again, this underlying concept of the good, and the way in which it is understood and presupposed, that is of interest here.

As with Nussbaum, the imagining of an essential 'form' plays the role of determining a 'norm' – imperatives, standards, criteria of success – to which individuals of a type are seen as subject. Thompson's work can help us understand in more detail the perceived relation between 'form' and 'norm' in this thinking, and the logic of 'proper' and 'defective' it

²¹ Foot 2001; Thompson 2008.

²² See Foot 2001: Chs 2, 3, 6; Thompson 2008: Ch 4; 2004.

entails. This logic, he points out, is contained in a certain kind of proposition, which he calls ‘natural-historical judgement’.²³ Natural-historical judgements have the structure of the generalised statements often found in field guides or nature documentaries, such as ‘The horse is a four-legged animal’ or ‘The mayfly breeds shortly before dying’, or put slightly differently, ‘Horses are four-legged animals’, ‘Mayflies breed shortly before dying’. They appear to have a straightforwardly descriptive sense, composed of subject and descriptive predicate. And Thompson does in some sense understand them to be matters of fact, statements which can be true or false.²⁴

However, they are not *simply* descriptive; they also contain a normative standard.²⁵ This is because the *subject* of such propositions is not an empirical individual or collection of empirical individuals.²⁶ It would be a conceptual mistake, for instance, to enquire in response to such propositions, ‘Which horse is *‘the horse’*?’ or ‘Which mayflies do you mean by *‘mayflies’*?’ The propositions themselves are not claims about any *particular* horses or mayflies, nor about *all*, or even *most*, horses or mayflies (not all horses have four legs, and most mayflies do not breed at all). The subject of natural-historical judgements is instead what Thompson calls a ‘life-form’. This is a special kind of subject. A species’ life-form is “how creatures of this kind live”.²⁷ The horse life-form, for instance, is realised in an individual horse’s life *when that life goes properly*, as it is *supposed* to, for that kind. *True* natural-historical judgements are statements of fact *about* a species’ life-form, supposedly. These facts can be understood, Thompson says, by taking up what he calls “the standpoint of ‘inner design’” in relation to a living being.²⁸

²³ See in particular Thompson 2008: Ch 4.

²⁴ See e.g. Thompson 2008: 68-69, 72-73.

²⁵ At least, they do in the sense that Thompson understands them (as ‘natural-historical judgements’). It is debatable whether this is in fact the best way to understand the generalised statements found in field guides, for example. It is also perfectly plausible to see these simply as devices for identifying biological species, which give descriptions, usually *statistically normal* descriptions, in order to aid this task (see Lewens 2015: 44-46, 54-55; Sterelny & Griffiths 1999: 7-8).

²⁶ Thompson 2008: 68-73.

²⁷ Foot 2001: 28.

²⁸ Thompson (2008: 13), citing Hegel.

Exactly what kind of thing, or kind of reality, is the “inner design” that corresponds to the word ‘life-form’ is not entirely clear. For our purposes this doesn’t matter too much. Whatever ‘reality’ is meant to constitute the life-form, the important point is that assuming this interpretive perspective to be a necessary part of understanding living beings as such brings with it a certain kind of normative logic (see also II:1). The way the horse life-form *is* determines how individual horses *ought* to be; true natural-historical judgments about the horse life-form imply imperatives and standards of evaluation for particular horses. The kind of evaluation in question is that of a horse’s intrinsic or categorical ‘goodness’ (as opposed to its instrumental or hypothetical value). That is, the implied imperatives relate to horses, not *qua* tools of human action, or dependent in some other way on the ends of others, but *qua* horses.²⁹

The normative implications for any *particular* horse of the statement ‘Horses are four-legged animals’ can be expressed in a number of ways. As Thompson puts it: “for example, “[That horse] ought, *as far as its merely being a horse goes*, to be four-legged,” or “It is supposed, *by its mere horse-nature*, to be four-legged,” or “It ought, *considering just what it is*, to be four-legged”.³⁰ In the words of Foot, “it is the particular life form of a species of plant or animal that determines how an individual plant or animal *should be*”.³¹ By comparing the actual lives of individuals to their species forms, we are able to judge the individual “to be *as it should be* or, by contrast, to a lesser or greater degree *defective* in a certain respect”.³² In this way of thinking, no particular individual need ever have actually manifested *all* aspects of the life-form successfully in order for these claims to be true – as Thompson puts it, “nobody’s perfect”.³³

For these thinkers it is this ‘organic’ structure of evaluation that frames the general question of flourishing, quality of life, etc.³⁴ Foot again: “To flourish is here to instantiate the life form

²⁹ See e.g. Foot 2001: 26-27.

³⁰ Thompson 2008: 75 (italics in original).

³¹ Foot 2001: 32 (my italics).

³² Foot 2001: 34 (my italics). See also Thompson 2008: 80-81.

³³ Thompson 2008: 72.

³⁴ As with Nussbaum, I must stress here that I am deliberately isolating just one aspect of the much more complex and nuanced thinking of Foot and Thompson, in order to illustrate the way of approaching issues of

of [one's] species"; the intrinsic value of a being's particular capacities and faculties has to do with what "fits a living thing for the instantiation of the life form of its species"; this fitting-to-form and instantiation-of-form is what "counts as the good of a living thing".³⁵ Clearly, again, we see here what I have called the concept of flourishing as properness: being-well is, at root, a matter of fulfilling one's proper form, of living according to the transcendent imperatives it entails. Any particular living being, upon coming into existence, is given a set of ends towards which they ought to develop; their becoming is to be evaluated in terms of success or failure with respect to these ends.

I put it that Nussbaum's claims regarding the "way the human being essentially is",³⁶ or the "shape of the human form of life",³⁷ are best understood as a variety of natural-historical judgement, as defined by Thompson.³⁸ This helps us understand how these apparently descriptive claims about human life in general can at the same time be taken to imply normative imperatives and standards for individuals. It is because they are not intended as facts about the human species *qua* collection of empirical individuals, but rather descriptions of an idea of the human 'life-form', in the Thompsonian sense (equivalent to words such as 'essence' and 'species nature' in Nussbaum).

As mentioned above, the life-form is an 'essence' *not* in the sense of a set of properties that define kind-membership *per se*, but rather that constitute what it is to be a *proper* or *good exemplar* of a kind. It is an 'essence' in the sense of defining how the individual is *meant to be*, given what they *really* are.³⁹ They are also, therefore, not claims about what is universal, unique, or even statistically normal, among a biological species such as *Homo sapiens*, but

life-evaluation that I've called the logic of properness. This, as I have shown, is indeed a basic theme that runs through these thinkers, but it by no means provides a comprehensive outline of their philosophies.

³⁵ Foot 2001: 91-92.

³⁶ Nussbaum 1992: 206.

³⁷ Nussbaum 1995b: 76.

³⁸ Bendik-Keymer has also interpreted Nussbaum's thinking in precisely this way (Bendik-Keymer 2017: 342). Nussbaum has assented in general to his treatment of her work in this paper (Nussbaum 2017: 319), although she has not specifically responded to the alignment with Thompson and Foot, to my knowledge.

³⁹ See also Oyama 2010: 411 for this definition of essence.

are, from the start, claims about how a human life goes *when it goes as it is supposed to*, when it realises what is essential to *proper* humanness.⁴⁰

2.2. Individual-properness

In the cases discussed so far, the individual's 'proper form' is something given to them in virtue of their *species*, like a set of expectations prescribed to members of a club, that define what it is to be an exemplary member of that club. However, the properness concept of flourishing can be expressed in other ways. It is also possible, for example, to express it in an *individualist* fashion.⁴¹ This view would understand living well with reference to a 'true self', an essential nature or proper form that attaches to the being *qua* particular individual. This would be, like the species life-form, something that logically precedes the individual's actual becoming in the world, and prescribes ends transcendentally. On this *individual*-properness view, in contrast with that of *species*-properness, being-well is fulfilling one's true individuality, and becoming-well the process of developing towards this self-realisation. This development could possibly involve some form of self-discovery, some process of revealing one's innate and true self, in order that it can be properly realised. Jean-Jacques Rousseau expressed such a view, saying that

[a]side from the nature common to the species, each individual brings with him at birth a distinctive temperament, which determines his spirit and character. There is no question of changing or putting a restraint on this temperament, only of training it and *bringing it to perfection*.⁴²

A view of this sort is also to be found – at least according to one interpretation – in some of the ethical and political thinking of John Stuart Mill. In the third chapter of *On Liberty*, Mill argues for a vision of the good life in terms of "self-development", or "the free development of individuality".⁴³ As John Gray reads him, Mill rejects human *species* perfectionism of the

⁴⁰ These points will be important again in II:2 and IV:2.

⁴¹ Hurka also notes this possibility, as a version of what he calls 'perfectionism', although himself rejects an ethics based on this idea, in favour of a species-level perspective (1993: 14-15).

⁴² Quoted in Hurka 1993: 14 (my italics). See also Hinchman 1990: 764-765.

⁴³ Mill 1991 [1859]: 69; 63.

sort I have just described, but he maintains a form of individual perfectionism: the idea that each individual “has a quiddity or essence which *awaits his discovery*”, in Gray’s words.⁴⁴ Mill uses this idea as part of his argument for political expansion of individual liberties, and social openness to diversity, eccentricity, and “experiments of living”.⁴⁵ The idea is that through greater diversity in possible ways of living, people are better able to flourish – meaning, in this case, better able to uncover and live in accordance with their particular individual essences. Richard Arneson also seems to expound this interpretation of Mill’s self-development ethics: “One might hold with Mill that what is good for a particular individual depends on her nature, and individual natures differ. [...] Mill adds that our individual natures are not transparent to ourselves, so we have to go through a *process of discovery* involving experiments in living, self-observation and self-culture, and general knowledge acquisition to *learn about our nature and our good*. Hence we need wide individual freedom”.⁴⁶ A different interpretation of Mill, for which I think there is good ground, instead reads him in terms of the concept of flourishing that I call ‘self-creativity’. I present this alternative interpretation of Mill’s ethics of self-development in III:3.1.

We can imagine yet other ways that the properness concept could be employed, besides either the species or individualist varieties. For instance, to pitch the location of the relevant ‘nature’ or ‘essence’ below the level of species, one might attempt to invoke an idea of the individual’s gender, family, nationality, or ethnicity, or, to go above the level of species, their genus (such as *Homo*), class (such as mammal), etc. It is uncommon for philosophers to theorise the good in terms of any of these categories, although there is nothing in the very idea of properness-according-to-an-essence, to prevent one from doing so.⁴⁷ We could even understand the individual as having essences on multiple levels, and their flourishing as defined in terms of all these aspects of their ‘nature’. For example, I might think that my own good lies in fulfilling the life-form ‘mammal’, the life-form ‘human’, the life-form

⁴⁴ Gray 1996 [1983]: 73 (my italics), see also 79-86.

⁴⁵ Mill 1991 [1859]: 63.

⁴⁶ Arneson 2000: 42-43 (my italics).

⁴⁷ This observation is, in fact, the basis for some criticism of species-properness views. The objection is that theorists who appeal to this idea cannot explain what is especially significant about the *species* such that it uniquely constitutes the level at which essential functioning is to be identified. See for example Copp & Sobel 2004: 536; Lewens 2015: 54.

‘Caucasian’, the life-form ‘male’, and realising my own particular ‘true self’ as well. The purpose of stressing this multiplicity of possibilities is to clarify that the target idea here is not just ‘species essentialism’, but rather a particular mode of evaluative thinking about life that, whilst indeed evident in many philosophies that appeal to species-level norms, is itself expressible in multiple ways.

Chapter II

Properness and the Metaphysics of Becoming

Introduction

In this chapter I firstly make explicit how the logic of properness, as seen in the neo-Aristotelianisms presented in the previous chapter, functions as an ‘organic’ concept of the good – a way of structuring normative thinking through an understanding of the category of living phenomena as such. In the thinking of Foot/Thompson and Nussbaum the assumption that the subject of evaluation, in speaking of flourishing, is a *living* being is taken to entail the logic of properness as the appropriate mode of evaluation. This presupposition, I argue, relies on the assumption of a particular ‘metaphysics’ of living beings, in order for it to be ‘naturalised’. After considering some other ways of characterising this metaphysics (Section 2), I introduce a different language for this task, the distinction between *poiesis* and *praxis* (Section 3). I label the metaphysics in question *poietic*, because of the interpretation of organismic becoming as *poiesis* that it contains. In the final section I illustrate this through discussion of Nussbaum’s notions of ‘basic capabilities’ and ‘human development’. This chapter sets out the interpretive framework within which an alternative way of thinking flourishing will be proposed (Chapter III), and within which the discussion of biological theory in Part 2 will be brought into relation with the analysis of concepts of flourishing in Part 1.

1. Life and the presupposition of the logic of properness

Whenever we evaluate some object we implicitly commit ourselves to the claim that the particular form of thought structuring our evaluation is *appropriate* to the object in question, that it brings the object into view in a way that represents it adequately. So, for example, when I judge that my toaster is broken, in that it fails to do what it is designed to do (i.e. toast bread), I commit myself to the claim that evaluation in terms of success and failure with respect to design is an appropriate form of thought to bring to bear on that object. In particular, I commit myself to an understanding of the object in question, such that it is in fact a product of design, and indeed that it is designed to toast bread. It would be relevant to the

validity of my judgement about *that object in front of me* were someone to point out that it was not in fact a toaster at all, but rather a pile of stones, or a dead badger. My observation that it doesn't toast bread would still be true, but my judgement that it is therefore a bad or defective toaster would be invalid.

Similarly, when we make claims about the intrinsic quality of a living existence in terms of properness-according-to-an-essence (which, as it happens, has some structural similarities with the artefact/design case, because they are linked by the notion of *poiesis* – see Section 3 below), we implicitly commit ourselves to the view that this mode of thought is appropriate to this kind of object, that the logic of properness grasps living as an object of evaluation in the right kind of way. We therefore assume the validity of some particular way of understanding 'living itself', an understanding that makes this logic appropriate. In the case of Foot and Thompson this implicit commitment is made explicit. It is one of the basic premises of their argument that moral virtue also be understood in terms of life-forms. The argument can be reconstructed as follows:

P1. Living phenomena as such demand a mode of evaluation in terms of properness according to a life-form;¹

P2. Human action and character, the subjects of moral judgement, are aspects of the human as a phenomenon of life;²

C1. Therefore evaluations of moral character “share a conceptual structure” with evaluation of living in general: “moral judgement of human actions and dispositions is one example of a genre of evaluation [...] characterized by the fact that its objects are living things”;³

C2. Therefore the conceptual structure appropriate to evaluation of moral character is also the logic of properness.⁴

It is the first premise of this argument, and the particular understanding of living being and becoming that it relies on, that interests me here. The orientation towards the human-as-

¹ See Foot 2001: Introduction, Chs 2 and 3; Thompson 2008: Chs 3 and 4; also Hacker-Wright 2009; Lott 2012.

² See e.g. Thompson 2008: 27-30; Foot 2001: 3-4, 5.

³ Foot 2001: 5, 4, see also 27.

⁴ See e.g. Foot 2001: 38-40, 43-44.

organism – what I call the assumption of human ‘organic facticity’ (see 0:3.1) – is clearly taken to involve the *presupposition* of the normative logic of properness. Living existence as such is seen as *requiring* that it be grasped within this conceptual structuring. As Footian philosopher Hacker-Wright puts it: “[G]rasping something *as an organism* requires us to situate the organism against its species or life-form. [...] The existence of a life-form *is presupposed whenever we identify anything as an organism*”; and, taking this perspective on an organism “is *ipso facto* to look at it from a normative standpoint” – the particular normative standpoint I have called the concept of flourishing as properness.⁵ Thompson, at points, even seems to *define* the living as that which is subject to a life-form. A living organism, he says, “is whatever falls under a species or ‘bears’ a life-form”.⁶ And, he claims, if one were to lose the ability to interpret individual organisms in terms of life-forms, then one would “lose [...] the capacity to experience things *as alive*” at all; “every thought of an individual organism *as alive* is mediated by thought of the life-form it bears”.⁷ The properness logic is therefore presupposed as *the* appropriate mode of evaluation insofar as the subject-matter, life, is apprehended in a particular way, as subject to a given ‘life-form’ that it ‘bears’. (For elaboration on Thompson’s argument for this ‘presupposition’ – Premise 1 above – see Appendix at the end of this chapter.)

The assumption that the logic of properness is made necessary by the nature of living phenomena as such is also evident in Nussbaum’s thinking, although it is not quite as explicit.⁸ We can see it most clearly via some recent work in which she has extended the capability approach beyond the human domain as a way of framing ethical issues to do with non-human life.⁹ She argues that the basic motivations behind the capability approach to human flourishing are not specific to the human case – they are not unique to a special concern for the human good – but begin in an understanding of living beings as such. She advocates the view, which she attributes to Aristotle, that “all of nature is a continuum, and

⁵ Hacker-Wright 2009: 310-311 (my italics). See also Lott 2012.

⁶ Thompson 2008: 76-77.

⁷ Thompson 2008: 77 (my italics) and 81 (my italics). See also Lott 2012: 353, 374.

⁸ It is also apparent in Hurka’s perfectionist theory (see 1993: 14-18).

⁹ See Nussbaum 2006: Ch 6; 2011: 157-163; 2017. See also Bendik-Keymer 2014; 2017 for discussion.

that all living creatures are worthy of respect and even wonder”;¹⁰ that “there is something wonderful and worthy of awe in any complex natural organism”.¹¹ To have ‘wonder’ at the living is to see that there is something it is for every living being to flourish or thrive, or to be damaged or inhibited in their activity of living. This, for Nussbaum, is to recognise a sense in which living beings have ‘dignity’, a dignity which can be upheld through respectful treatment or violated through domination.¹² “Wonder at living beings”, Nussbaum asserts, thus contains “a wish for their flourishing” – “an ethical concern that the functions of life not be impeded [and] that the dignity of living organisms not be violated”.¹³

Nussbaum’s ‘biocentrism’, as Jeremy Bendik-Keymer labels this orientation,¹⁴ seems to have two central motivational elements. Firstly, ‘wonder’, ‘awe’, and ‘respect’ towards the living arise from a recognition that, as with the human subject (see 0:1.3, 0:3.1), living beings in general are not merely passive streams of sensation, but are first and foremost loci of “life in the sense of activity”, to borrow a favourite phrase of Sen’s.¹⁵ They are loci of capacities for doing and being in the world; and their good lies in the cultivation and expression of life in this sense. For Nussbaum, the dignity of living agency is due to its “active striving”,¹⁶ its “striving toward flourishing”.¹⁷ This ‘striving’ is an expression of power or vitality which manifests itself to degrees and in diverse ways throughout organic nature.¹⁸ Secondly,

¹⁰ Nussbaum 2006: 328, see also 348.

¹¹ Nussbaum 2006: 94.

¹² Nussbaum 2006: Ch 6; Bendik-Keymer 2014: 175-180.

¹³ Nussbaum 2006: 349, 348.

¹⁴ Bendik-Keymer 2014.

¹⁵ Sen 1993: 46; 1999: 73; 1990: 43. The phrase is taken from Aristotle *NE* I.7: 13 (trans. Ross 2009). As an aside, it is interesting to note that in affirming “life in the sense of activity”, Sen probably did not *intend* to appeal to something about organic life in general (but rather only human life). However, I suggest that we can see Nussbaum’s thoughts on non-human life as drawing out something that has been implicit in the capability approach at least since Sen first used this phrase. The capability approach is in this sense based on a positive affirmation of life as such, understood in a particular sense: as something which acts and ‘strives’, which exists through doing, and has a ‘good’ in relation to this.

¹⁶ Nussbaum 2011: 31.

¹⁷ Nussbaum 2017: 317.

¹⁸ See e.g. Nussbaum 2006: 94, 337-352; 2011: 157-163; 2017. See also Bendik-Keymer 2014: 176-180, 189-190; 2017. It should be noted that Nussbaum tends to focus specifically on *animal* life in her discussions, life which is sentient and mobile. This is usually because the context is the question of *justice* in relation to non-

alongside this general appeal to living as an active process – and this is the important point for the current discussion – Nussbaum *also* consistently frames the notion of flourishing within the concept of proper fulfilment of a species form. For example, it seems that the ethical concern arising from wonder at a living being is not merely a desire that the being’s activity “not be impeded”, but also involves “the idea that it is good for that being to persist and flourish *as the kind of thing it is*”.¹⁹ More specifically, in order to flourish each creature needs “the opportunity to live and act *according to that species’ form of life*”, i.e. the “life characteristic of their kind”.²⁰ Thus the kind of life towards which any living being *ought* to strive, because it constitutes what it *is* for them to live well, is given by a life-form idea under which the individual falls as token. For Nussbaum, as for Thompson’s theory of ‘natural-historical judgements’ (see I:2.1), an idea of “the species plays a role in giving us a sense of a characteristic *form of life that ought to be promoted*”.²¹ The motivations behind Nussbaum’s ‘biocentric’ ethics thus seem to arise from two ways of apprehending phenomena of living nature as objects of evaluation. On the one hand, there is a sense of wonder at a living being as a fount of activity and power. On the other, this vitality is apprehended *as* structured according to a pre-given form that *prescribes a proper shape to its expression*.²² The latter

human life, and she deems these capacities necessary conditions of considering an organism to be an object of justice or injustice. Bendik-Keymer (2014; 2017) has convincingly argued that, although she has been ambiguous at times, Nussbaum’s notion of living dignity, derived from ‘wonder’ at living ‘striving’, is deeper than this, and extends to all of life, with the question of justice relating to the demands of specific *kinds* of dignity that come from sentience and self-movement. Nussbaum now seems to assent to this interpretation (2017: 319). She notes, for example, that “when we think about what it is for humans to strive and flourish, it is stunted and obtuse not to think about animals *and biological striving more generally*” (2017: 320 (my italics)).

¹⁹ Nussbaum 2006: 349 (my italics), see also 362-366.

²⁰ Nussbaum 2011: 162.

²¹ Nussbaum 2011: 161 (my italics).

²² I believe, in fact, that there is a fundamental tension between these two aspects of Nussbaum’s biocentrism. The former motivates a basic respect for the power of life to immanently determine its particular way of being through its own active becoming, an idea also affirmed in the foundations of my ‘self-creative’ concept of flourishing (see Chapter III). The latter, on the other hand, seems to subordinate this particularised power to a transcendent normative structure that determines its ‘proper’ and ‘defective’ expression. I will not discuss these internal issues of Nussbaum’s philosophy any further here. The previously projected Part 3 of this thesis, now cut for want of space, was to discuss this tension further and relate it to a similar tension that arises from her attempt to reconcile the notion of proper human functioning with certain liberal political principles. These matters are extrinsic to the point here, which is that the logic of properness is seen to be a logical corollary of taking living phenomena as such as objects of evaluation.

element is what grounds the presupposition, explicit in Foot/Thompson, that the domain of the living carries with it the logic of properness as its appropriate mode of evaluation.

The presupposition of the properness logic in relation to living phenomena therefore relies on a particular way of apprehending the category of *living* itself, one in which this logic is taken to be simply a reflection of the nature of this category as such. The ground of this presupposition is the following ‘metaphysics’ of life: living beings are *given a proper form to fulfil*, a form which provides a model or set of standards which the life in question is to follow, designating the way it is ‘meant to be’. Living as a process of coming-into-being, as *becoming*, is thus given the task of *movement towards fulfilment* of that form, towards realisation of essence. (Or, as I shall put it in Section 3, becoming is understood as *poiesis*.) We can see how this metaphysics entails the logic of properness: since ‘being’ is given a proper form, therefore being-*well* is fulfilment of that form; and since ‘becoming’ is given the task of movement towards that fulfilment, becoming-*well* is thus the successful carrying out of this task, it is developmental movement towards properness of being. In this way this metaphysics of the living ‘naturalises’ the properness concept of flourishing; it renders it a necessary part of the evaluative apprehension of living phenomena in general. In this way, flourishing as properness, as seen in the neo-Aristotelian cases discussed here, functions as an ‘organic’ concept of the good: it is a way of *taking up the living* as a conceptual resource for structuring normative thinking about life.

A characteristic of this ‘metaphysics’ of life is that it packages together both a mode of *representation* and a mode of *evaluation*. It is an integrated way of looking at, apprehending, and interpreting the living as something that determines the structure of normative judgement that is appropriate to it. I do not question the validity of thinking through such a metaphysics *per se*, in fact I allow the possibility that something of the sort might even be a necessary part of the way we make sense of the world in general. What I do question is the necessity of the *particular* way of interpreting the living that underlies ‘flourishing as properness’, as seems to be assumed by the thinkers discussed so far. Furthermore, as part of my argument for an alternative perspective on flourishing, I shall propose a different way of framing apprehension of the living as such. This alternative will similarly package together a general representation and a structure for evaluation, and can thus be seen as an alternative ‘metaphysics’ to counter the one just outlined. The next two sections discuss some different ways of talking about the metaphysics behind the properness concept, and lay some groundwork for the shift in interpretive perspective that I propose.

2. Biological essentialism(s), teleology of proper form

We can call this metaphysics of life by a number of names. We might, for example, call it ‘biological essentialism’. It certainly seems closely related to the ‘essentialism’ that many psychologists and ethnographers have identified as a common feature of ‘folk biology’ about species membership and organismic development.²³ Experimental evidence in these fields suggests that people tend, as Tim Lewens puts it, to be “intuitive essentialists” about biology; that is, they tend to

regard each living kind as having some sort of underlying internal nature, which is itself causally responsible for the appearance of typical features of the kind in question. These essences are hidden: they can fail to manifest themselves properly even when they are present. They are teleological, in the sense that they are oriented to some end state that may not in fact appear. [...] These essences also have normative implications, in the sense that they specify proper and improper developmental outcomes in virtue of their teleological orientation.²⁴

Insofar as the metaphysics I have identified sees organisms as having essences or life-forms given to them, which define their being-what-they-are-properly, it can be aligned with biological essentialism of this sort. It can also be called ‘teleological’ in the above (transcendent) sense – the life-form prescribes *teloi* to development, end-goals *given to* the organism towards which it is to aim, but which it can fail to realise. And, certainly, both of these terms capture the implicit *normative* structure that emerges from this separation of concrete existence and underlying essence: life-forms “specify proper and improper developmental outcomes”, ways that development *ought* to go if it is to go properly. We can therefore call this ‘teleological essentialism’.

However, I would like to introduce another language with which to characterise this metaphysics, because there are certain connotations of ‘essentialism’ in biology that could over-determine the metaphysics of life I refer to, or mislead us in certain ways. For example,

²³ See Gelman & Hirschfeld 1999; Gelman 2003; Linnquist *et al* 2011; Medin & Ortony 1989: 183-186; Lewens 2015: 52; Smith 2016: 422-423.

²⁴ Lewens 2015: 52. Lewens also points out that Foot and Thompson use the language of ‘folk’ biological essentialism to strengthen the intuitive appeal of their view (52-53).

we have said nothing so far about the extent to which the life-form/essence is “causally responsible”, as Lewens puts it, for developmental outcomes (assuming that this means efficient and material causation; in talking of teleology we have, of course, implied formal and final ‘causation’)²⁵. It is worth noting in relation to this that the essentialism we are interested in here is *not* the same thing as biological *determinism*.²⁶ The essence gives ends to development but, as Lewens notes, these “may not in fact appear” – i.e. the essence is not causally sufficient for its own successful realisation. This possibility of disparity between essence and appearance is, in fact, a crucial condition of the *normative* logic at work here – if something happens deterministically or inevitably then it makes no sense to say either that it should or should not happen. In general, since biological ‘essentialism’ is often understood in a causal, or otherwise explanatory, way,²⁷ the term could be taken to say more than we need to at the moment.

We have also said very little so far about whether the life-form might be ‘internal’ or ‘external’ (or even about what these might mean – In what sense? In relation to what?). A number of different views on this matter could be compatible with the general metaphysics of life that I have identified so far (see Section 4 below for one way of viewing the life-form as ‘internal’ to the living being).

Furthermore, I have stressed that the essences to which organisms might be seen as subject need not be related only to species membership.²⁸ Since biological essentialism is often associated with ideas of species-level form, the term could also unnecessarily restrict our characterisation of the metaphysics in question. Furthermore, there is another kind of ‘species essentialism’ which it is worth distinguishing from the metaphysics I have outlined here (I alluded to this distinction in relation to Nussbaum, in I:2.1). This ‘essentialism’ is a way of *classifying* objects into kinds according to ideas of the defining properties that all members of

²⁵ In keeping with modern convention, I avoid using the *language* of causation in relation to teleology and goal-oriented phenomena.

²⁶ I return to this point in V:2.6, in relation to the interpretation of genetics.

²⁷ See also Gelman & Hirschfeld 1999; Medin & Ortony 1989: 184.

²⁸ This is, in fact, reflected in the literature on ‘folk essentialism’. Whilst the essentialist way of thinking seems to be particularly prominent in relation to species membership (see Atran *et al* 1997), it is also notably present in relation to other categories, such as personality, gender, and race (Gelman & Hirschfeld 1999).

a kind necessarily manifest.²⁹ The species-properness view of life is primarily concerned with the normative question of what it is to live *well*, *given* that one is member of living kind, not with what it is that constitutes kind-membership in the first place (see also IV:2).

The language I want to introduce helps to avoid over-determining the subject in these ways. Moreover, it allows us to focus in particular on the way in which we understand organismic *becoming*, the process of development, growth, and change that an organism undergoes across time. This is important. One of the reasons that the classificatory form of species essentialism doesn't capture the normative thinking in question here is that it suggests a too-static view of organisms, one that treats them simply as objects with (or without) certain essential properties, and classifies them into kinds on this basis. The normative dimension of teleological essentialism derives, as I just mentioned, from an ontological separation between essence and appearance, proper form and concrete existence. And this, I believe, is made intuitively plausible in the case of living beings by the essentially *processual* character of the subject-matter. Imagine a molecule (in the way it is often presented, as a static 3D model composed of balls and rods). If a molecule with two hydrogen atoms and one oxygen atom loses a hydrogen atom, it goes from *being water* to *being hydroxide*. Its concrete structure determines what it (essentially) *is*; the two cannot come apart. It would be eccentric at best to claim that the subsequent molecule was *really* still a molecule of water, but one that was failing to exhibit its proper features, one that had *become* in the wrong sort of way. But living beings do not simply pop into existence, remain in some static form for some time, and then pop out of existence again. Life becomes; it is constituted by a process of growing-into and carrying-on in the world. Because living beings are processes of growth and change the essentialist mode of understanding is better able to posit a separation between imagined static essence and the organism's concrete structure as it becomes through time. My goat Billy has not developed eyes. Nonetheless, I can still look at him and imagine that he *is*, *in essence*, something that *does* have eyes (because 'Goats have eyes', as a Thompsonian natural-historical judgment might put it). It's just that his outer appearance has not properly manifested what he, *qua* goat, is *really* or *essentially* like. I can take up "the standpoint of

²⁹ See e.g. the 'natural kind essentialism' that follows Kripke (e.g. 1980 [1972]) and Putnam (e.g. 1975: Chs 8, 11, and 12). The application of this kind of thinking to biological taxa is the subject of much criticism in modern biological theory (see e.g. Sober 1980; Dupré 1981; 1986; 1998; 2012: 73-74; Hull 1986; Lewens 2012; 2015: Ch 4). I elaborate on this, and on the reasons why it can be misleading to identify neo-Aristotelian species-properness views with it, in IV:2.

‘inner design’” in relation to him,³⁰ and imagine what he would look like if he had turned out the way he is *meant to be*, as I understand it. From this point of view, organismic becoming is understood as aimed towards actualisation or fulfilment of proper form. In the case of Billy, it has failed.

3. *Poiesis* and *praxis*: a different language for the metaphysics of organismic becoming

In order to focus on the significance of the way in which living as a process of becoming is understood I shall discuss the metaphysics of life using a language that distinguishes kinds of activity or process: the distinction between *poiesis* and *praxis*. This section lays out the meaning I attach to these terms.

Aristotle used these terms to refer to two different kinds of human activity.³¹ In his usage, *poiesis*, often translated as ‘making’ or ‘production’, is activity which is done for the sake of an end beyond the activity itself. *Praxis*, often translated as ‘doing’ or ‘action’, is activity which is done for its own sake, the end or fulfilment of which is the performance of the act itself. The archetypal case of *poiesis* for Aristotle was the fabrication of artefacts. Building a house, for example, is aimed at the production of something outside the process of building – i.e. the finished house – and its value is derivative of the value of this end; it is to be evaluated in terms of its finished product. In contrast, musical performance, an example of *praxis* for Aristotle, is not done for the sake of some end-product that the performance brings about, but rather the performance constitutes its own ‘end’; it is done for its own sake, and it is to be evaluated in terms of the qualities of the performance itself.³²

The language of *poiesis* and *praxis* has been interpreted and put to use in multiple ways.³³ My use of it will relate to Aristotle’s, as just described, but will have a wider application, in that I

³⁰ As Thompson (2008: 13) puts it, citing Hegel.

³¹ See Aristotle *NE* I.1: 2-3, VI.2: 5, VI.4, VI.5: 1-4; *Magna Moralia (MM)* II.12: 3 (trans. Rackham 1935).

³² Aristotle uses house-building and flute-playing as examples of *poiesis* and *praxis* respectively (*MM* II.12: 3).

³³ For various interpretations of its meaning in Aristotle’s thinking, see e.g. Broadie 1991: 202-212; Kraut 1989: 200-203, 213-217; Sherman 1989: 113-117; Charles 1984: 64-67; 1986. See also the use of this distinction in modern phenomenology, starting with Heidegger’s early reading of Aristotle (e.g. 2009 [1924]: §17cy), its development into political theory by Arendt (1998 [1958]; see also Bernasconi 1986; Villa 1996), and in a

shall use it as a way to interpret living process more generally (not specifically human activities). Furthermore, as I shall explain in a moment, the meaning I attach to it will in a certain way go beyond Aristotle's own use of the terms, and incorporate a conceptual aspect drawn out in the work of Martin Heidegger and Hannah Arendt. Given this specification, I shall use the distinction to label alternative interpretive lenses through which to understand phenomena of organismic life, based on the way in which becoming is understood within them. The essentialist metaphysics just identified behind the properness concept of flourishing I shall call *poietic*, after the interpretation of becoming as *poiesis* that it contains. In Chapter III I outline a *praxic* conception of organismic becoming, an idea to be motivated more fundamentally later, via discussion of biological theory (Chapter VI).

The way that I go somewhat beyond Aristotle in my use of this language is best explained first of all through the notion of *poiesis*. In Aristotle's particular use of the terms, it seems that *poiesis* is defined simply in terms of the separation of process and end; *poiesis* is activity done for the sake of bringing about some product or state of affairs beyond itself. Aristotle says, "he who makes something always has some further end in view: the act of making [*poiesis*] is not an end in itself, it is only a means, and belongs to something else".³⁴ And: "while production [*poiesis*] has another end than itself, this is not so with action [*praxis*], since good action or well doing [*eupraxia*] is itself the end".³⁵

However, whether intended by Aristotle or not, the separation between process and end in *poiesis* implies another dimension, which is not quite explicit in Aristotle's description. It implies that, as well as the process being completed in some end beyond itself, the *form* of that end is in some way given *to* the process, *as* the end towards which it is to aim. One cannot act towards some end without already having an idea of the particular end towards which one acts; the form of the end must in some sense be pre-conceived. This is brought out most clearly in the experience of artefact production, Aristotle's archetype of *poiesis*. In making my new wardrobe, for example, I do not just act in order to bring about some end-product, but in order to bring about a particular kind of end-product, with a particular

slightly different way by Habermas (as cited in Canovan 1983; see Canovan 1983 on the influence on Habermas of Arendt's use of *poiesis/praxis*).

³⁴ *NE* VI.2: 5 (trans. Rackham 1934).

³⁵ *NE* VI.5: 3-4 (trans. Peters 1906).

structure that fulfils particular roles, and so on. At least, I do so when I go about making the wardrobe *properly*, *qua* process of wardrobe-making. The pre-conception, or *design*, that prescribes ends to the making can be more or less detailed and explicit: I might have only a rough idea of end structure, or I might have a detailed blueprint or even a set of instructions written down (literally *pre-scribed*)³⁶ giving plan to the process as well as form to the end. Insofar as the process is aimed at realisation of an end, some pre-conception or pre-*designation*³⁷ of that end also exists, logically prior to the process of its realisation.

Thus *poiesis* is not simply, as Aristotle seems to present it, instrumental *to* something beyond itself, but is also, as it were, the instrument *of* something given in advance of itself. It is the middle term between design and product, the process of translating the former into the latter. I stipulate that I intend to invoke both dimensions of this picture in using the term.

The conceptual structure of *poiesis* is easily taken up and projected beyond its source in the experience of intentional human making. This is something highlighted by Arendt in her analysis of *poiesis* in *The Human Condition*.³⁸ She focuses on the pre-designational aspect just outlined, and uses this to argue, following Heidegger, that the phenomenological roots of Platonic idealism lie in the experience of artefact production – the experience of *homo faber*, man-as-maker.³⁹ Because the idea of the thing to be made, which guides its production and determines its proper form, logically precedes and is independent of the reality of the product itself, it has a “quality of permanence” in relation to the changeable and perishable material things made from it.⁴⁰ This, Arendt argues, was the inspiration for Plato’s theory of eternal

³⁶ It is interesting to note the etymology of our normative word ‘prescription’ from the notion of something being ‘written before’. The verb ‘to prescribe’ comes from the Latin *prae*, ‘before’, and *scribere*, ‘to write’, making *praescribere*: “write before, prefix in writing; ordain, determine in advance” (<https://www.etymonline.com/word/prescribe>).

³⁷ Another interesting etymological connection exists between ‘design’ and ‘designate’. Both derive from the Latin verb *designare*, “to mark out, devise, choose, designate, appoint” (<https://www.etymonline.com/word/design>).

³⁸ Arendt 1998 [1958].

³⁹ Arendt 1998 [1958]: 141-143. For Heidegger, it is our phenomenological relation to production of things, and to the things made, that has provided the dominant conceptual structures of Western metaphysics at least since Plato. For an analysis of the place of this reading of *poiesis* in Heidegger, and its influence on Arendt, see Bernasconi 1986: 111-114, 117-118, 120.

⁴⁰ Arendt 1998 [1958]: 142.

eidoi, which stand outside the changeable material world and in-form the objects within it (living things included), the ultimate source of which is the transcendent craftsman of the cosmos, or *demiurge*.⁴¹ In her words: “The one eternal idea presiding over a multitude of perishable things derives its plausibility in Plato’s teachings from the permanence and oneness of the model according to which many and perishable objects can be made”.⁴² In other words, on this interpretation Plato generalised a conceptual framework that derives from the human experience of *poiesis* into a fundamental theory of reality. Arendt notes that “although Plato used his theory to express quite different and perhaps much more “philosophical” experiences, he never failed to draw his examples from the field of making when he wanted to demonstrate the plausibility of what he was saying”.⁴³

Whether or not Arendt and Heidegger’s thesis on the origins of Platonic idealism is exegetically accurate, what this analysis reveals is the close correspondence in conceptual structure between the notion of *poiesis* and metaphysical perspectives that separate pre-designated form or essential being from worldly becoming.⁴⁴ For this reason the concept provides a helpful tool for understanding the structure of thought involved in these kinds of perspectives, including, I argue, the basic assumptions about living beings that underlie the properness concept of flourishing (to which I return in the next section).

As it happens, the notion of *poiesis* that we find reflected in essentialist thinking is itself a somewhat idealised vision of the concrete activity of making things. Making as it is actually gone about is rarely *simply* the translation of idea into product. Rather it interacts with the contingencies of material context, and proceeds to various degrees improvisationally, through experimental interventions within and sensitive response to the ongoing flow and friction of material reality. Out of this activity *eidoi* are derived as abstractions, and abstractions which can change *with* the making as much as they can give ends *to* it, as in the way a sculptor has

⁴¹ Plato’s famous ‘theory of Forms’ is found in several places, including *Republic* Bks V-VII (c. 380 BC, trans. Jowett 1973) and *Parmenides* (c. 360 BC, trans. Jowett 1973). On the concept of the *demiurge*, see *Timaeus* (c. 360 BC, trans. Bury 1929).

⁴² Arendt 1998 [1958]: 143.

⁴³ Arendt 1998 [1958]: 142. For example, in Bk X of *Republic*, “Plato himself explains his doctrine by taking “the common instance” of a craftsman who makes beds and tables “in accordance with [their] idea”, and then adds, “that is our way of speaking in this and similar instances”” (Arendt 1998 [1958]: 142 (fn 7)).

⁴⁴ I make critical use of this correspondence in Chapter V, in discussing the ‘Platonic’ character of certain dominant metaphors in modern biological theory.

to adapt their fore-sight of the finished sculpture in response to the particularities of the block of stone or wood they are interacting with.⁴⁵

However, this merely helps clarify what it is that I intend to refer to by using the language of *poiesis*: not all of the complex realities of concrete acts of making, but the stripped-back, idealised picture just described – *poiesis* as transition from model to product, *eidōs* to *telos*. And, I define *praxis* in contrast with this picture.

Now to summarise the *poiesis/praxis* distinction as it is meant here. As mentioned, the *poietic* is aligned with both conceptual aspects of the idealised picture of making just described. A process is *poietic* to the extent that it takes place *for the production of an end beyond itself*, and to the extent that it takes place *according to a pre-given determination* of the form of that end. A fully *poietic* interpretation of a process combines both aspects, and will conceive it as normatively subordinate in a double sense, in relation to both poles of this *eidōs-telos* metric. It conceives of it as merely for the sake of its outcomes, and sees the norms by which these outcomes are to be evaluated – and therefore also by which the process is itself to be evaluated – as given to it, transcendent of the process itself.

The meanings I attach to the term *praxis* are not quite as tightly linked as the two aspects of *poiesis*, but are nonetheless derived by contrast with these aspects. Firstly, following Aristotle's meaning mentioned above, one way a process can be *praxic* is if it is, in some sense, done 'for the sake of' the process itself, rather than for some separable end-product; e.g. if, like a musical performance, it constitutes that which it creates. Regarding this sense of the term, a *praxic* process will be evaluated in terms of the qualities of the activity itself, not derivatively in terms of the state of a further product. Secondly, there is a sense derived by contrast with the pre-designational aspect of *poiesis*. A process is *praxic* in this sense to the extent that it does *not* have a transcendent plan to follow, but instead *creates its path immanently*, within the process itself; like, e.g. improvisational activity. Insofar as the process generates some 'product' (whether constituted by or separable from the process), the process is *praxic* in this

⁴⁵ The fact that concrete acts of making do not for the most part reflect the idealised vision of *poiesis* as transition from fixed idea to finished product is a recurring theme in the work of anthropologist Tim Ingold (e.g. Ingold 2011: 4-6; 2015a: Ch 23; 2013; Ingold & Hallam 2014: 1-3). See also a similar remark in Oyama 2000a [1985]: 37.

second sense insofar as the form and identity of that which is created is emergent from the creative process itself. Similarly, instead of the norms for the product's evaluation being pre-given by a transcendent determination of proper form, they will be contingent on the process of its creation. Regarding this dimension of the distinction we might say that a *poietic* process is the slave of the *eidos*, employed to realise that *eidos* in the world, whereas, conversely, in *praxis* the product is the child of the process, and neither are normatively beholden to a pre-scribed model. A fully *praxic* interpretation of a process will combine both aspects. Firstly, it will see the process as immanently creative of its product, as determining its form and identity as it goes along, and will see the norms relevant to an intrinsic evaluation of that product as contingent on its particular process of creation. Secondly, it will also see the process as in some way constitutive of the 'end' for which it takes place, as constitutive of its own fulfilment, and thus as evaluable in terms of the performance itself, rather than (just) in terms of that which it creates.

The table below summarises the ways in which this distinction is being drawn here.

	<i>Poiesis</i>	<i>Praxis</i>
Dimension 1: Relation between the process and its 'end', its 'for the sake of which' (the original Aristotelian dimension):	Separate: the end is achieved in a state/product beyond the process itself.	Reflexive: the process constitutes that which it creates / is 'for its own sake'.
Dimension 2: Relation between the process and the form/identity of that which it creates:	Transcendent: a proper form for the product is prescribed by a prior and independent model/plan (<i>eidos</i>).	Immanent: the form of that which is created emerges from the process of its creation.

To summarise, the process is...	<i>Productive and planned</i>	<i>Performative and improvisational</i>
Normative structure implied:	Product and process evaluable in terms of the <i>eidos</i> .	Norms relevant to the ‘product’ contingent on its process of creation; process itself evaluable ‘for its own sake’.

As I shall explain in a moment, the different aspects of either of these concepts need not always be found together in particular cases. For the rest of the thesis, however, these subtleties will not be so important. I use this distinction to identify two general metaphysical lenses through which organismic becoming can be interpreted, and the various perspectives and ideas I analyse through this framework will be treated as either ‘fully *poietic*’ or ‘fully *praxic*’, i.e. as invoking both aspects of their respective concepts of process.

The different aspects of the *poietic* and the *praxic*, as I define them, pick out different possible characteristics or aspects of activity, and need not always to be found together exclusively. Some illustrations will help to explain this. Firstly, it is clear that some activities can have both *poietic* and *praxic* aspects with respect to Dimension 1 – they can be both aimed at a further end and done for their own sake.⁴⁶ For instance, many crafts, such as pottery or Japanese cuisine, although completed in the production of a separate end, are often done as much for the sake of the activities themselves, which can embody a beauty or joy of their own, as they are for the sake of the items they produce.⁴⁷ On the other hand, take activities such as musical or dance performance, the ends of which are for the most part reflexive, constituted by the performance itself. Particular performances can nonetheless also take place in order to produce a separate product, such as an audio recording of the performance.

⁴⁶ See also Kraut 1989: 213-217; Broadie 1991: 205.

⁴⁷ See also Rehmann-Sutter 2006: 316.

Secondly, some processes can have both *poietic* and *praxic* aspects with respect to Dimension 2, regarding the distinction between transcendent designation of form and immanent creativity. For example, as noted above, most making is not purely *poietic* in this sense. The sculptor rarely simply copies a pre-given model into material reality. Rather the making is to various degrees a process of figuring out the form being made *as the making goes along*. ‘What are you making?’, we might ask of a sculptor scraping away at a lump of wood. ‘I’m not sure yet’, they might respond, ‘but it’s beginning to look like a bird. Maybe that’s what it will be’. Or, less extremely, they might have set out to make a bird, but without a pre-conception about how exactly it ought to look – whether it ought to have a long or short beak, talons or webbed feet, and so on.

Furthermore, some processes can be *praxic* in one sense and *poietic* in the other. Musical or dance performances, even if performed entirely for their own sake, are often also directed by a score or choreography, which they are to follow if they are to be good examples of the particular piece. They thus contain a *poietic* element, in virtue of the prior determination of a proper shape for the performance. They are *praxic* in Dimension 1 but, at least partly, *poietic* in Dimension 2. The improvised sculpture in the previous paragraph provides a converse example.

Cases might also be described in which these ambiguities are expunged, cases which can act as archetypes of pure *poiesis* or pure *praxis*, in the senses specified. Regarding the former, take automated fabrication of artefacts. The production line of the mechanised factory and the modern technology of 3D printing provide vivid illustrations. These productive processes are merely transitions between design and end-product. The proper forms of the products to be made are conceived in advance, through the preparatory work of the product designer and factory architect, or the programmer of the printing machinery; and the processes of production are merely necessary phases in the realisation of the intended forms.

A converse archetype is provided by live improvisational music and dance. The performance of an improvised jazz solo, for example, is not scripted. It is something that gains shape through the interplay between the soloist’s experimental expressions and the activity of the rest of the band (and even the audience). The performance is constructed through a process of continuous exploration of, and responsive negotiation with, the changing musical situation. As well as being performed for its own sake,

exactly *what* it is that is performed emerges from the activity of performance itself. As Miles Davis is purported to have said, “I’ll play it first, and tell you what it is later”. The performance is creative of that which it expresses, rather than merely a re-presentation of something pre-conceived; it gains a particular form and identity in virtue of the unique process by which it comes into being. What it is for *that* particular solo to ‘go well’, *qua that* unique expression, is not something that can be subordinated to a set of criteria describing ‘how solos of that sort are meant to go’. Whether some particular note or phrase ‘works’ or not, whether some overall line of play creates a coherent response to the situation, and so on, can only be grasped from within the particular process of creative expression.

It might be objected that, even in these cases, my descriptions simplify realities that are in fact more complex. This may be so, but, again, I am trying to highlight opposing sets of conceptual structures through which processes can be interpreted, and for this purpose, these simplified descriptions suffice as helpful archetypes.

4. Becoming as *poiesis*: innate potentials and ‘human development’ in Nussbaum

I shall refer to *poietic* and *praxic* metaphysics of life as different ways of conceiving the ontology of living beings as such, in virtue of the general interpretation of organismic *becoming* that is privileged within them.⁴⁸ The metaphysics of life underlying the properness concept of flourishing, what I earlier called ‘teleological essentialism’ about biological entities, can now also be characterised as *poietic* in this sense. It is based on the idea that living beings as such are given a proper form (they ‘bear’ a life-form, in Thompson’s language), and therefore that living as a process of becoming is *movement towards fulfilment* of that form, or is its progressive realisation. The general idea of developmental process assumed is one of transition between pre-given model and concrete realisation, and in this sense becoming is seen as undergone for the sake of this realisation. As I explained above (Section 1), this interpretation of becoming, which I now call *poietic*, is implicit in the ‘life-form’ theory of Foot and Thompson and the ‘proper species functioning’ theory of Nussbaum

⁴⁸ The idea of *poiesis* and *praxis* as two ways of interpreting ontogeny has been outlined explicitly by Rehmann-Sutter (2006), whose work in this connection I shall draw on again in Chapters V and VI.

(which I take to be fundamentally the same in the relevant respects – see I:2.1). I shall now highlight a particular way that Nussbaum explains this idea of flourishing, in which we can see the underlying *poietic* metaphysics of life coming to the surface more explicitly.

Nussbaum doesn't see her list of 'human functionings' as merely an aspiration, simply an abstract ideal that human lives 'should' aim at. The list is also described in another way, one which gives it some organic flesh, as it were. She also presents the content of the list as corresponding with a set of innate potentials – what she calls 'basic capabilities' – that in some sense *exist within* the human individual as a concrete living entity.⁴⁹ 'Basic capabilities' have a double significance for Nussbaum. First of all they are part of what defines species membership *per se*; i.e. part of what determines the life-form one is subject to.⁵⁰ As I mentioned in I:2.1, one counts as a member of the human species, for Nussbaum, if one is born of human parents and has the potential (basic capability) for "at least some of the most important" human functionings.⁵¹ Secondly, and most importantly for the present discussion, having the innate 'basic capability' for some essential functioning is *part of what makes it a good thing* to realise that particular functioning. The sense in which this is the case reveals the *poietic* interpretation of development particularly vividly. We can see this by looking more closely at the way she describes basic capabilities.⁵²

Firstly, basic capabilities are not fully serviceable abilities. For example, no human infants are born actually able to use language. Rather they are "innate powers", "innate equipment", or "innate faculties" *for* the development of such abilities.⁵³ Secondly, as this language itself

⁴⁹ On 'basic capabilities' in general, see Nussbaum 1988: 166-170; 1992: 228-229; 1995b: 88-89; 2000a: 83- 84, 100; 2006: 278, 285, 346-347, 361; 2011: 23-24. In the literature on the capability approach, this can be something of a confusing term, since it does *not* mean the same thing in Sen's writing. Sen uses 'basic capabilities' to refer to the capabilities to satisfy certain elementary, or 'basic', needs such as the need for food, water, and shelter. See also Robeyns 2013: 417 on these two different uses of the term.

⁵⁰ For more on this meaning of 'species membership' see IV:2.

⁵¹ Nussbaum 2006: 187, see also 38, 181, 187-188, 432 (fn 18).

⁵² In this section I present the notion of basic capabilities as Nussbaum did from at least 1988 until the early 2000s. In some more recent work she has downplayed this idea, largely, it seems, because she has chosen to change the role it plays in her theory of political entitlements (see Nussbaum 2006: 7, 186-195, 347). This change doesn't matter for our purposes – I am again isolating a particular aspect of her work for the sake of illustrating an idea.

⁵³ Nussbaum 2011: 23-24.

suggests, Nussbaum is not talking merely about the necessary conditions for particular developmental outcomes. Of course, any ability – physical, intellectual, artistic, or whatever – will require certain physiological resources or structures to be present at the start of life, from which these abilities may develop, in interaction with appropriate context, etc. But basic capabilities are something more than this: they are also teleological states, in that they have *as ends* the achievement of particular functionings through the being’s development. Following her interpretation of Aristotle, Nussbaum says that basic capabilities are states whose “very being makes forward reference to functioning”.⁵⁴ They are “*needs* for functioning: [...] they are there and in a state of incomplete realization. They are conditions that reach towards, demand fulfilment in, a certain mode of activity”.⁵⁵ These conditions are unaffected by the particularities of the individual’s actual life-history, and they don’t need to be subjectively felt *as* needs in order to prescribe proper ends to life: even if “a person [...] has been taught, in circumstances of deprivation, not to *want* the functionings in question [...] there is [nonetheless] in that person right now a condition that demands that functioning as its fulfilment”.⁵⁶ Having a basic capability and *not* actualising it is a bad thing; it means one’s life fails to achieve something essential to it. Basic capabilities that are not realised in their appropriate activity will be “cut off, fruitless, incomplete [...] only in a shadowy way even themselves”.⁵⁷ They, and presumably the individual that has them, will be “like actors who never get to go on the stage, or a musical score that is never performed”.⁵⁸ “If functioning never arrives on the scene, they [will be] hardly even what they are”.⁵⁹

We saw in I:2.1 that Nussbaum’s list of human functionings is presented as a list of things essential for living a ‘fully human’ kind of life, a list of the ways of being that constitute a normative idea of humanness. In this abstract sense, an individual’s becoming is seen as given a set of ends that they ‘should’ develop towards, that are not determined *by* their

⁵⁴ Nussbaum 1995b: 88.

⁵⁵ Nussbaum 1988: 169.

⁵⁶ Nussbaum 1988: 169.

⁵⁷ Nussbaum 1988: 169.

⁵⁸ Nussbaum 1992: 228; 1995b: 88.

⁵⁹ Nussbaum 1992: 228-229; 1995b: 88.

development, but independently constitute the “form of life that ought to be promoted”.⁶⁰ That is, the content of the good is determined transcendently, prior to and independently of that to which it applies. In the notion of basic capabilities, the givenness of proper form takes on a more concrete and organic character. What it *means* to ‘have’ this essence has something to do with one’s ‘innate’ constitution. The proper species functionings are “innate”, prior to development – given “by nature”,⁶¹ as she has put it at times – and thus exist (or rather ‘subsist’ – in potentiality rather than actuality)⁶² *within* the individual as a concrete living entity from the start of life. That is, the content of the species life-form is seen as embodied in the innate constitution of individual tokens of the species, in the form of innate teleological states. Note that the fact that these states are seen as ‘internal’ to the concrete living individual – literally ‘within’ them as living bodies – does not affect their ‘transcendent’ status: they are still *given to* the process of becoming *as* meant-to-be-realised states that define the *proper* form of the fully-developed individual, and are unaffected by the individual’s particular history. This is a vision of the transcendent embodied in the concrete, rather than merely an abstract ought-to-be. This is certainly one way of fleshing out Thompson’s suggestion that we think about an organism’s life-form by taking up “the standpoint of ‘inner design’” in relation to it.⁶³

Thus, for Nussbaum at least, part of what makes ‘proper human functioning’ *good* is that it is the fulfilment of teleological states within oneself. It is not good to fulfil the human form just because that is ‘what humans should be like’, but as a token of the human kind you have these ends within yourself, which create a kind of internal *need* for their fulfilment: “there is in [you] right now a condition that demands that functioning as its fulfilment”.⁶⁴ She argues that these two senses in which certain functionings are good are connected: “Capability-needs

⁶⁰ Nussbaum 2011: 161.

⁶¹ E.g. Nussbaum 1988: 166.

⁶² On the distinction between existence and subsistence, see Yagisawa 2014: §3.1. I am using the term ‘potentiality’ in this instance in Bergson’s sense of ‘positive possibility’: as “something ideally pre-existent” or “pre-existence under the form of an idea”, like a “phantom awaiting its hour” that is “realised by an acquisition of existence”. This is as opposed to ‘possibility’ in the ‘negative’ sense, as mere “absence of hindrance”. See Bergson 1992 [1930]: 101-102.

⁶³ Thompson 2008: 13.

⁶⁴ Nussbaum 1988: 169.

are important because of the value of the functionings in which they naturally terminate; functionings are valuable, in part, for the way in which they realize [basic] capabilities. We cannot and should not prise the two apart”.⁶⁵

Nussbaum’s concept of human development is thus a vivid illustration of the *poietic* interpretation of organismic becoming.⁶⁶ Development, when it goes well, is the concrete unfolding and realisation of these inner meant-to-be states, and is itself undergone for the sake of this achievement. Illustrative of both of these aspects is Nussbaum’s description of child development. Children are seen “as beings who exist in a state of incomplete fulfilment of their natures”;⁶⁷ and the aim of their growth into adults is *to become* properly human.⁶⁸ She argues that the especially tragic nature of a child’s death, before reaching maturity, lies in the fact that “her activities of growth and preparation for adult activity now have lost their *point*”, they have not achieved their end-goal.⁶⁹ The deceased child will be like an artefact half-made, or as she suggests, “like [an actor] who never get[s] to go on the stage, or a musical score that is never performed”.⁷⁰ Nussbaum also invokes this general idea of becoming in an interesting play on words that draws a connection between two senses of ‘human development’ – meaning either the goal of a certain field of international political/social action or the

⁶⁵ Nussbaum 1988: 169.

⁶⁶ Foot and Thompson do not talk explicitly of organismic development in terms of ‘innate potentials’ aimed at a specific realisation, but the *poietic* metaphysics of becoming, aside from being implicit in the life-form idea itself, is also suggested in some of their language. To take one example, when explaining how natural-historical judgements are not statistical generalisations (see I:2.1), Thompson says that “although ‘the mayfly’ breeds shortly before dying, *most* may-flies die long before breeding” (2008: 68). It is noteworthy that he says “die long *before* breeding”, rather than simply “never breed”, or “die without breeding”. In what sense do they die *before* breeding? There is no breeding that comes afterwards! This suggests the assumption that ‘breeding’ is in some sense already *fore-seen* in the individual, subsisting as a meant-to-be waiting to be realised. The individual’s development is aimed towards this end, although in most cases the process ceases *before* it reaches its projected fulfilment. For some related examples, see the end of the Appendix below.

⁶⁷ Nussbaum 1988: 166.

⁶⁸ See also Ingold’s description of the idea of ‘humanization’, in which “there’s some notion of what being human *is*, and an idea that, perhaps small children, when they come into the world, are not quite human – yet. And so they have to be *humanized*, they have to be given this essence of humanity that turns them into human beings. [...] It eventually will become human, and that is the process of humanization” (2015b; see also 2015a: Chs 22-23).

⁶⁹ Nussbaum 1995b: 88 (my italics).

⁷⁰ Nussbaum 1992: 228; 1995b: 88.

ontogeny of a human individual: “The idea of innate equipment [basic capabilities] does [...] play a role in the Human Development Approach. After all, the term “human development” suggests the *unfolding of powers that human beings bring into the world*”.⁷¹

Bendik-Keymer has also identified this sense of development as ‘unfolding of form’ in Nussbaum’s ‘biocentric’ ethics. As mentioned above (Section 1), this is an ethical attitude that begins in ‘wonder’ at living nature, and centres on the notion of dignity in the ‘striving’ of living beings. He attempts to describe the character of this ‘striving’ from which dignity emerges. As we might expect, given Nussbaum’s consistent framing of flourishing within the logic of proper species form, his descriptions also often return to the idea just outlined, of a movement towards realisation of innate essence: “the dignity seen in [...] being alive comes from [...] having a special order that “unfolds” toward an end”.⁷² The dignity of a living being, he suggests, comes from its development being *teleological*, in the sense of the term described in Section 2 – as having ends designated to its process of becoming transcendentally (even if embodied or represented ‘internally’). And this grounds the normativity of the logic of properness: as Bendik-Keymer puts it, for a living being to have a teleology is for it to “have a way that their life is *supposed* to go when it is healthy”, determined by its species form; and this teleology “explains what is good for them”.⁷³

Nussbaum does not offer an opinion on the physical or physiological constitution of the internal and innate states she calls ‘basic capabilities’. She does not, for example, appeal to genetics as the basis for them. However, this would seem an obvious avenue down which someone might think to go regarding this issue. I argue in Part 2 that a popular conception of genetics (as ‘programme’) does indeed invoke the *poietic* view of organismic becoming. I also argue that the ‘constructivist’ turn in developmental biology undermines this view and motivates a radical change in perspective on organismic becoming (to one that invokes a logic of *praxis*), with implications for neo-Aristotelian ‘properness’ conceptions of flourishing, whether or not they explicitly appeal to claims about genetics.

⁷¹ Nussbaum 2011: 23 (my italics). The ‘Human Development Approach’ is another name for the capability approach, as applied to issues of social development (2011: x).

⁷² Bendik-Keymer 2014: 179 (‘dignity’ italicised in original). In a parenthesis at the end of the cited sentence he seems to *identify* the notion of ‘unfolding towards an end’ with that of ‘active striving’.

⁷³ Bendik-Keymer 2017: 342 (my italics). He cites Thompson and Foot in this connection.

Appendix: Thompson on apprehending the organic as such, and the ground for presupposing the logic of properness

What do Thompson *et al* mean when they say that apprehension of an organism, *qua* organism, requires implicit reference to its ‘life-form’? And, why do they take this to necessitate the transcendent logic of properness for intrinsic evaluation of an individual’s existence? In an attempt to answer these questions in more detail I shall now discuss further some of the exposition Thompson gives of his ‘normative naturalism’.⁷⁴ I shall offer some critical responses as we go along, responses which are separate from, but complement, the main line of criticism outlined in later parts of the thesis. This will also help to highlight the metaphysics of life (which I have labelled *poietic*) underlying the properness concept of flourishing.

Let’s start with what Thompson calls ‘vital description’.⁷⁵ A vital description is a claim about a particular living individual of the sort ‘This organism has wings’, ‘This organism is currently digesting food’, or even simply about a particular region of space-time, of the sort ‘There is digestion going on here’, ‘What we see here is an example of reproduction’, etc. Vital descriptions, which apply uniquely to living phenomena, are a sub-set of the form of judgement that predicates of particular subjects instances of generic kinds of property, process, or activity. We might also, for example, make a claim about *This lump of iron* that ‘Oxidation is occurring on its surface’. Thompson argues – rightly, I believe – that vital descriptions are different to this sort of purely physical description. What distinguishes vital descriptions is that in order to make these kinds of judgements it is not enough just to look at the physical constitution of the phenomena or events in front of us; we need also have an understanding of how these phenomena ‘fit together’ with other aspects of the life of the organism in question, an understanding of the functional relations that constitute its ‘way of living’ as a whole.

To elaborate: If we know, of any physical object, that it is losing electrons to its surrounding medium, then we can describe it as undergoing the process of oxidation – this process is

⁷⁴ This is the label he gives to his position in the 2004 paper ‘Apprehending Human Form’.

⁷⁵ See Thompson 2004: 51-54; 2008: Ch 3: §§2-3.

defined simply by its physical constitution. However, in living beings, physically identical structures or processes can amount to different vital phenomena, and the same kind of vital phenomenon in different organisms can be constituted by physically diverse structures or processes.⁷⁶ For example, mitosis, the process of cell division in which two genetically-cloned daughter cells are produced, may, as Thompson puts it, “be happening here, under the microscope, in an amoeba; and there in a human being. In the first case, an event of this type will of course be a phase in a process of reproduction – one of the forms of generation available to that kind of thing. But in the case of the human it will rather be a part of growth or self-maintenance; reproduction is another matter, and has another matter, among humans”.⁷⁷ I.e. one physically-defined process, mitosis, falls under two different vital descriptions, reproduction and self-maintenance, in different organismic contexts. Simply looking at the physical details of the phenomenon in question will not tell us what roles it plays in the wider patterns of living activity of which it is part, and will therefore leave us none the wiser regarding what it *is, qua* vital phenomenon. For a converse example take respiration. In dolphins it usually involves inhaling oxygen in the form of gaseous air through a hole in the top of their heads, but in sharks it usually involves the absorption of oxygen dissolved in liquid water passed through gills – two physically diverse processes that nonetheless count as part of the same kind of vital phenomenon.

To expand on the previous example: If, whilst exploring an area of ocean, we were to come across an organism that, say, looked much like a dolphin, was living in the water, and had what looked like a blow hole on top through which air was periodically being sucked in, we might well assume that we were looking at a process of respiration, similar to the usual dolphin variety. However, suppose that, on closer inspection, we discover that this air is not being exploited for oxygen, but actually being funnelled to a cavity in the rear of the body, out of which it can be fired in powerful bursts, propelling the animal forwards, perhaps giving it the extra speed needed to catch a particular kind of prey. (Suppose also, if you like, that oxygen is instead absorbed from the water via filaments on the outer surface of the animal’s body.) Taking into account these relations between the phenomenon in question and

⁷⁶ Paraphrased from Thompson 2004: 64.

⁷⁷ Thompson 2008: 55.

the organism's activities, we would likely change our description such that the air-sucking we observe is understood as part of a process of propulsion, rather than one of respiration.

In short, in describing a living organism – *qua* organism (nexus of vital phenomena) as opposed to *qua* collection of merely physical properties and processes – we thereby make implicit reference to a certain kind of 'wider context'.⁷⁸ This 'wider context' is (what we understand to be) the functional inter-relations constituting the way in which the organism in question goes about existing and acting in the world, the *how* of its life. This is one sense that we can give – and Thompson does give – to the term 'life-form'. In this thesis I have no quarrel with this notion, as I have expressed it here so far. Indeed, I appeal to broadly the same idea, for example, in Chapter III when discussing the development of an internally-coherent 'way of being in the world', and also in IV:3 when discussing the meaning of 'function' in neo-Aristotelian naturalism as a concept of 'organisational functionality'.

However, there is another level of meaning attached to the term 'life-form' in Thompson/Foot *et al*, a meaning for which I reserve use of this specific term throughout the rest of this thesis, and which is one of the primary objects of its critique. In this usage, the word 'life-form' is always, explicitly or implicitly, prefixed by the word 'proper'. A particular individual's life-form, in this sense, is not that concrete nexus of relations which we find out about when investigating the particular functional knitting-together of activities and structures in that organism's life. Rather, it is (what is understood to be) the *proper shape* of this functional knitting-together, the way in which that organism's activities and structures are *supposed* to relate to each other (independently of how they actually do so, or how that organism actually lives). This is conceived as something given to the developing organism *qua* ideal model for its life, in virtue of the 'kind' of being that it is, providing normative standards for all members of that kind alike. The perspective on life-evaluation that I have called 'flourishing as properness' – characterised by a mode of evaluation that measures concrete existence against an idea of proper form independent/transcendent of it – is based on this idea, this sense of 'life-form'. Thompson takes this properness logic to be a necessary part of the apprehension of life as such – to be contained within, for example, the exercise of vital description just outlined.⁷⁹ I disagree; this shift to a higher conceptual gear is certainly a

⁷⁸ Thompson uses this phrase 'wider context', which is borrowed from G. E. M. Anscombe (1981: 85-87).

⁷⁹ See e.g. Thompson 2004: 52.

tempting and apparently ‘natural’ movement, but is a leap without sufficient justification. It is the perceived necessity of this conceptual link that I attempt to disrupt through discussion of the ontology of organismic becoming later in the thesis (Chapters III and VI in particular), but I’ll take a different run at it here.

How does Thompson make this turn, from the first sense of ‘life-form’ to the second? And does it have sufficient grounds? Let’s return to our jet-propelled quasi-dolphin – call him (this particular being) ‘Skipper’. After discovering this remarkable creature, and learning about his particular way of being (his form of life in the first, concrete sense), we will likely look around for more creatures of similar description. Let’s suppose, first, that this search is successful; we find many more creatures that look very much like dolphins, except that they too engage in the unusual modes of propulsion and respiration mentioned above.⁸⁰ We have thus discovered a number of similar individuals that, at least in certain relevant respects, ‘share in’ the same way of living as our original specimen Skipper (this is tautological – we identify them as ‘similar’ on this very basis).

We decide to declare the discovery of a new species, and name it ‘the jet dolphin’. When writing the encyclopaedia entry for this new species we will provide certain general descriptions. We might well put them in the following sort of way: jet dolphins have ‘air-intake holes’ of a certain size, in a certain place on the back of their heads; high-pressure expulsion nozzles at a certain location on their lower back; oxygen-filtering filaments on various parts of their surface; they are able to propel themselves and respire in particular ways by means of these features; they eat a particular kind of fast-moving fish, and so on. These statements have the same grammatical form as what Thompson calls ‘natural-historical judgements’ – the form ‘Species S has/is/does X, Y, Z, etc.’ (see I:2.1). A complete set is the ‘natural history’ of a particular kind.⁸¹ Thompson is right that these are statements of a peculiar sort: They are, in some sense, based on our empirical experience of concrete individuals, yet they are not, strictly speaking, descriptions of any particular individuals, nor

⁸⁰ For a parallel thought experiment, about the discovery of a new species of jellyfish, see Thompson 2004. In my own version of this story here I roughly follow Thompson’s narrative, but at the same time try to distinguish the different possible interpretations of the processes of discovery and description in question: Thompson’s, in which the leap to the normative logic of properness is carried through; and mine, in which this is put in question.

⁸¹ A somewhat confusing term, since, it seems, the *history* of our object of study has little to do with our description of it, at least directly. Thompson is appealing to the older sense of ‘natural history’ as an exercise in atemporal *classification*.

are they necessarily statistical averages (it could be that, as a statistical fact, *most* jet dolphins die as infants, without having developed the rear expulsion nozzle at all). They are pitched at a certain level of abstraction from the actual individuals we are grouping together under this label, such that what we are actually describing is an *idea* of ‘the jet dolphin’ as a coherent holistic form of life – an archetype pieced together from experience of various individuals, to which those individuals may correspond to greater or lesser degrees.⁸²

What really matters is how we *interpret* this exercise in ‘natural history description’, and what other kinds of intellectual operation we take it to justify or imply. In particular – and this is where I part ways with Thompson – do we see the general archetype we have described as *merely* the product of our own creative abstraction; or do we understand our statements as (to various degrees of accuracy) corresponding with some essential reality shared by all ‘members of the jet dolphin kind’? For Thompson it is the latter: For any living individual there is a “system of *true* natural-historical judgements” which describes the (proper) life-form of that individual’s ‘kind’.⁸³ Furthermore, do we then take this general description as merely a helpful guide – constructed perhaps for the sake of aiding identification in the field; or, *qua* description of essential reality, do we see it as providing us with normative standards against which the quality of life of particular individuals is to be judged? For Thompson, again, it is the latter: The ‘natural history’ that we have described “[articulates] the ideal, standard or perfect operation of a bearer of this kind of life”.⁸⁴

Here we get to the crux of the issue, as I see it. It is one thing to bring together experience of a number of similar individuals, and to abstract from their overlapping patterns of activity and structure a general idea of ‘the’ form of life that they share, which we can accept is only to degrees accurate of any particular individual. This exercise of abstraction, outwards from particular to general, is very useful, probably necessary, for communication and learning

⁸² I leave it ambiguous exactly how this process of abstraction and piecing-together of a ‘general idea’ actually works, because, in Thompson, it *is* ambiguous. He tells us only things like, “At some point in the gathering of this storm of experience [of a set of similar individuals], condensation will occur. You will find yourself with a new object of explicit and independent thought: [the life-form of a kind of living being]. [...] But your increasingly abundant experience as you study these [organisms] will put you in a position to frame certain distinctive *general judgments* as well. These judgments will not be about individual[s] taken singly or *en masse*, but, we might say, directly about the newly conceived life form itself” (Thompson 2004: 48).

⁸³ Thompson 2008: 72 (my italics).

⁸⁴ Thompson 2004: 55.

about the living world. But it is quite another thing, and not implied by the first, to take these general descriptions as constituting (perhaps because we think them to have identified the content of an essential reality of some sort) an *ideal model* for those individuals, and any others we take to be members of the kind in question – a standard that describes how their lives are *supposed* to go.

This exercise of idealisation and transcendent evaluation, in which the general description is reified as an ideal and turned back towards the particular as a means of its judgement, is an interpretive leap that must be made independently, and is not implied by the exercise of vital description itself. As discussed earlier, to engage in vital description we must indeed look to the ‘wider context’ of the *how* of existence of the organism in question. However, we need not understand *this* in relation to an idealised model against which it is itself to be judged. For example, we can establish that the phenomenon in front of us is one of reproduction, without implying judgement as to whether this particular instance of reproduction is a ‘proper’ or ‘defective’ one given the kind to which this organism belongs.⁸⁵ Note that, above, when we first discovered that Skipper’s air-sucking activity is not in fact part of a process of respiration but actually one of propulsion, we did so without making any claim as to whether this is the way that Skipper is *supposed* to propel himself, or to use that hole in his head, etc. That is, we made no (transcendent-normative) judgement as to whether this individual is a properly-formed or defective example of some general kind (in fact, we made no judgement about his ‘kind’ at all, except if we take this to mean simply that we described the form of life that he, in fact, inhabits). This shows that, for vital description, what it is crucial to have in mind is not, in fact, an idea of the proper species form of the individual in question, but rather a generic understanding of terms like ‘respiration’, ‘propulsion’, ‘digestion’, and so on, such that we can identify these as certain kinds of functional relationality across physically diverse organismic contexts.⁸⁶

To emphasise the contingency of the intellectual transition from description/abstraction to idealisation, let’s return to the moment when we set out to look for other examples of the strange jet-propelled creature we had discovered. After having observed this one individual,

⁸⁵ Thompson, on the contrary, claims that these two kinds of description/judgement are *mutually* dependent (2004: 52).

⁸⁶ Thompson doesn’t seem to consider the importance of these sorts of generic understanding to vital description.

Skipper, we were able, as we have seen, to describe the internal functionality that constitutes his form of life, his way of doing things like moving himself, respiring, hunting food.⁸⁷

According to Thompson's argument, we should also (at least in theory) be able to move into that higher conceptual gear and say whether Skipper is a more or less perfectly formed token of a newly discovered kind of animal, or is in fact a defective or deformed example of some other kind, say the bottlenose dolphin. For Thompson, although answering this question may be difficult in practice – at least until we have seen other examples of the new kind, if it be such, and abstracted an idea of its proper form – it is nonetheless a meaningful question.⁸⁸

Now, our search for other specimens can go one of two ways. The first we have described already: we discover a number of creatures with similar forms of life to Skipper, and bring them together under a new kind-name. Our original specimen can then – if we buy Thompson's turn to the logic of ideal form – be judged a more or less perfectly realised token of its kind.⁸⁹ Let's suppose that, in this scenario, we come to judge Skipper to be a mightily well-formed – flourishing – jet dolphin. Lucky Skipper. On the other hand, it might be that our search fails to find any other similar organisms. Perhaps, let's say, we also learn that Skipper is the offspring of some 'normal' bottlenose dolphins, and the only such case to develop in the way he has. Now, assuming that this fact of genealogy renders Skipper a

⁸⁷ We might also, I would argue, generate some normative understanding of 'better' and 'worse' in this context. Rather than comparison between concrete existence and an idea of perfect form, our evaluative judgement would gain traction primarily by focusing on change over time and its impact on the internal coherence of Skipper's life. If we come back later and find that a pollutant has inflamed our new friend's air-intake hole, frustrating its efforts to catch its favourite kind of fish, we could judge this a bad thing, on the basis of our understanding of the ends and needs particular to this individual being. Our judgement would primarily be framed by concepts of enhancement or disruption of internal harmony, rather than correspondence-or-not with independent form. I attempt to further articulate this (immanent) evaluative logic in the next chapter, so will not elaborate here (the purpose of this appendix being to gain a deeper critical understanding of Thompson's thinking).

⁸⁸ For example, during his story about the discovery of a new kind of jellyfish ('the umbrella jelly'), Thompson notes: "When you thought, of the first specimen you sighted, that it was a cross jelly, you thought it was woefully deformed. And if it had been a cross jelly, it would have been woefully deformed. But now, with further observation, you can see that that original specimen was quite sound, except perhaps for a few broken tentacles. It is just that it belonged to a *different kind*, and was thus subject to a different standard" (Thompson 2004: 55, see also 48).

⁸⁹ I would argue that, if we wanted to, we could make that leap even having only observed one specimen: we can look at it and *imagine* that, say, its fins are not the length they are supposed to be, according not to the standards of a kind we are familiar with, but one for which this is so far the only token.

‘member of the bottlenose kind’,⁹⁰ on Thompson’s logic we must therefore conclude that, as it turns out, he is actually “woefully deformed”.⁹¹ Woe to be Skipper.

Note the radical opposition of these two evaluative conclusions. What is it that brings us to such different judgements? Is the life of Skipper *itself* actually any different in the second case than it is in the first? No. Rather, on Thompson’s logic, the evaluative conclusion we draw depends entirely on how we interpret the situation vis-à-vis Skipper’s membership of a ‘kind’. The relation between our vital description of the internal functionality of his life and our judgement about his level of flourishing (as properness) is in this sense entirely indeterminate. This, I think, gives the lie to the supposed logical link that Thompson draws between the former and the latter.

The flip-side of this, as I see it, is that the difference between these two judgements has nothing at all to do with the actual quality of life of Skipper himself – concerning, e.g., his ability to satisfy needs, to pursue goals, the richness of his experiential interaction with the world, etc. In the transition from seeing Skipper as a well-formed jet dolphin to seeing him as an unfortunate, mal-formed freak of a bottlenose, nothing has changed with Skipper himself, only with his metaphysical relation to a supposed ideal form. At this point, even if we still think the conceptuality of ideal form is unavoidable in our cognitive dealings with life, we nonetheless seem to reach something of a normative brick wall, in the face of which I can only protest: perhaps *that* just doesn’t matter, and it *shouldn’t* be part of our concept of flourishing.

To summarise: Thompson maintains that the mode of evaluation in which the two above judgements take place – which I call the logic of properness – is a necessary part of the apprehension of life as such, and the fundamental basis of any evaluative understanding of living beings. On the contrary, I argue that there neither seems to be a necessary logical connection between vital description and the logic of ideal form, nor does it seem that the

⁹⁰ The question of what exactly it *is* that renders one a ‘member of a kind’, for Thompson, is really key to these issues. Unfortunately, he does not give us an answer, apart from the tautological one that to be member of a kind is to bear a (proper) life-form, to which one’s life may correspond to greater or lesser degrees. As I explain more in a moment, he seems to assume that this ‘bearing’ of life-form is simply *given* to individuals – in some sense inherently, or innately – and that this notion of ‘being born into a kind’ is intuitive enough not to require explication.

⁹¹ Again, see Thompson on the possibilities for interpreting the unusual jellyfish specimen (2004: 55, 48).

latter, in itself, gives us any real normative traction in the task of life-evaluation. Although the logic of properness is, no doubt, a common way of thinking, and often eminently difficult to extricate oneself from, I maintain that it is not contained within the apprehension of living beings as such, and nor is it essential to taking an evaluative perspective on living existence.

So, aside from what has already been discussed in this appendix, what *is* it that underlies Thompson's (and similar thinker's) presupposition that a life just *is* something that has an ideal model given to it, which it is its intrinsic aim to realise? I do not have a full answer to this question, but as a partial answer I return to the following theme. As I have argued at various points in this chapter (and do so again in Chapters V and VI), I think that we can identify, as an essential component of this way of interpreting the organic realm, a particular way of understanding life-across-time as a process of growth and development. This interpretation sees development as what I call a *poietic* process – progressive movement towards, and for the sake of, realisation of a pre-given model.

This is implicit in the fact that – however Thompson understands the conditions determining the 'kind' one belongs to, and therefore one's proper form of life – this kind-determination is clearly something 'given' to the individual independently (transcendently, as I would put it) of their actual concrete existence, as opposed to something created within the process of becoming itself.⁹² What this pre-giveness might actually demand of organic reality is unclear. We have seen above (II:4) how Nussbaum provides one way of making this notion more determinate, by combining it with an idea of 'innate potentials' that provide *teloi* to development. Thompson doesn't appeal to this notion explicitly, but he does make some remarks about developmental process that suggest a similar picture. For example, he notes that "[T]he idea of a life form, as something atemporally describable [as an 'ideal'], and as something at least potentially borne by many individuals, seems to be *contained in the idea of life as a process that unfolds in time*".⁹³ We get a clearer sense of the *poietic* character of this

⁹² For example: "A species or life-form of course *determines* a class of individuals, its bearers" (2008: 60) – that is, rather than the individuals themselves having anything to do with determining their form of life. The analogy Thompson draws between 'bearing' a proper life-form and being a speaker of a particular *language* (e.g. 2004: 52-54) might, in fact, be taken to suggest the contrary – that one's form of life is actually (as I argue in this thesis) something *developed* in relation to the contingencies of one's concrete context, analogous to the learning of a language. However, I get the feeling that this is actually one place where, for Thompson, the language/life-form analogy breaks down, precisely because of this.

⁹³ Thompson 2004: 64-65 (my italics). This specific notion of development as 'unfolding' will be addressed again in various places in Chapters III, V, and VI.

‘unfolding’ elsewhere, when he claims that among our natural-historical judgements about a kind will be descriptions of “the characteristic developmental ‘story’ of the egg or seed, saying, for each stage, ‘what happens next’, until we come to the mature form” – that is, when applied to individual cases, saying ‘what *is supposed to* happen next’, if this instance of organic becoming is to ‘go well’ *qua* token of what it essentially is – an ideal story that “might, of course, only be “realized” in a tiny fraction of the individuals of that kind”.⁹⁴ We can read these statements either as identifying the *poietic* conception of development as the *reason* for the notion of ideal life-form and the associated properness logic, or just as identifying the mutual implication between these ideas. Either way, the question of the ontology of becoming provides a window onto the metaphysics of life at stake in this view, as an essential part of it. It is through this window that I attempt to climb by means of the central arguments of this thesis.

⁹⁴ Thompson 2008: 72, see also 80, 41-42, 43.

Chapter III

Flourishing as Self-Creativity

Introduction

In this chapter I propose an alternative way to think flourishing as an organic concept of the good, in contrast with the nexus of thought developed over the previous two chapters. That is, as with the properness concept, the concept of ‘flourishing as self-creativity’ proposed here can be understood as a way of taking up an image of the living as ground for normative thinking. However, it is one that emerges from interpreting organismic becoming as a form of *praxis*, in opposition to the *poietic* metaphysics identified in the previous chapter. I firstly introduce this alternative way of interpreting becoming, in order to ground the concept of flourishing as self-creativity (Section 1). I then outline the elements of the proposed concept (Section 2). In Section 3 I illustrate this alternative approach by means of an interpretation of J. S. Mill’s ethics of ‘self-development’ and an outline for a version of the contemporary ‘capability approach’ based on this perspective. I then draw out some implications of taking this perspective in relation to certain issues to do with disability, individual identity, and the problem of so-called ‘adaptive preferences’.

1. Becoming as *praxis*: finding a way in the world

The properness concept finds its naturalisation in a *poietic* interpretation of the living being: *to live is to be given a proper form*, a design for life which the organism is supposed to reflect. Living as a process of coming-into-being thus has the task of *movement towards fulfilment* of that form, towards concrete realisation of essence, and is for the sake of this realisation. At this point I invite us to consider a change of perspective.¹ What would it be to apprehend life through the interpretive lens of *praxis*, instead? I suggest the following (taking the two dimensions of *praxis* outlined in II:3 in reverse order).

¹ At this point, this change of perspective is simply a proposal that emerges from exploring the contrast between *poiesis* and *praxis* as two ways of interpreting organismic becoming. The rhetorical purpose of Chapters V and VI is to *motivate* this shift more deeply, via an engagement with biological theory regarding the nature of ontogeny.

Firstly, like a creative improvisation, we will see the process of coming-into-being as immanently creative of its ‘product’, the individual life in question. The individual’s particular way of being, its identity, form and functionality, norms and needs, and so on, are not prescribed to it by a transcendent ‘nature’ or ‘life-form’ that it bears (there is no such thing), but are emergent from within the process of its becoming. In this sense we will see organismic becoming as a ‘self-creative’ process; as the process of *finding a way in the world*, of *figuring out* a particular way to live, as life goes along, in interaction with the world in which one becomes.²

This means that *how* the particular life fits together and ‘works’ as a whole (to the extent that it does) is contingent on the particularities of the life in question, and on what is made of the situation in which the being finds itself during the course of its history. It depends on what shape its particular activity of ‘finding a way’ in the world takes. But this doesn’t mean that ‘anything is possible’, or that life can be made any way one wants it to be. All lives (just as all improvisations) are to various degrees constrained and shaped by given resources and circumstances, both ‘internal’ and ‘external’, and by the ways they can be integrated. Another way to put this: the individual’s parameters of significance – what matters to it, and the way in which it matters – must be understood in relation to the individual context. However, this also does not mean that norms are determined by a power of individual choice that stands outside of the contingencies of life. Rather they emerge immanently, from within the ongoing *interaction* of a living being with its situation. The ‘self’ in ‘self-creative’ is not to be understood as a pre-formed transcendent subject that re-produces itself, or fashions a reflection of itself in the world. This would be to fall back into the logic of *poiesis*. The creativity of the process of becoming and the ‘self’ that is created are, in the *praxic* view, related to each other reflexively, or dialectically.

Secondly, like a musical performance, we will not see becoming as simply the limited process by which its ‘product’, the being of the individual life, is brought about as an end-state separable from the process itself. Rather, the individual’s being is continually in the process of being constituted by its becoming. Whereas the *poietic* view sees the becoming of a living being as a circumscribed process of transition between starting point and realisation of finished form, the *praxic* view sees it as an ongoing activity of exploration and negotiation

² I borrow the specific idea of life as the process of “finding a way” in the world from Ingold (2011: 4).

with the world, through which form is continually created and re-created. This process does not have a point of ‘completion’, apart from the final termination of activity that comes with death. The living individual is understood as always embedded in the process of creating, sustaining, and adapting its particular way of being in the world. Thus, from this perspective, ‘becoming’ corresponds with the whole of a living existence, rather than simply a period of ‘maturation’ in which the organism unfolds into its true form.³

This briefly outlines a certain way of orienting ourselves towards the living. It is what I have already called a ‘metaphysics’, by which I mean a basic conceptual framework that organises experience and understanding of a subject-matter – life, in this case. As with the metaphysics underlying the properness concept (see II:1), the *praxic* view packages together a mode of representation and a mode of evaluation. The way we represent what the subject-matter *is* gives a certain structure to the task of evaluating, of making judgements about the good and the bad in relation to, this subject-matter. If we embrace this way of conceiving ‘living’, how will our concept of living *well* be structured? How will we approach questions of quality of life and the conditions of flourishing?

As just indicated, on one level we will understand what it *is* for life to go well or badly as contingent on the course of the life in question, as emergent from how the particular life finds its way within particular circumstances. On another level, this perspective invites us to see becoming as in some sense ‘for its own sake’. That is, we will see it as more than just a means to a further end, but as intrinsic to life itself, essential to that which we are attempting to think normatively about. So, we will want to articulate some way of considering becoming as intrinsically evaluable, in terms of the performance of the process itself rather than just its ‘outcomes’. I shall now present ways of elaborating both of these ideas.

³ This is one of the reasons I primarily use the more open term ‘becoming’ in this thesis where I could perhaps say ‘development’. The term ‘development’ itself suggests, via its etymology, a notion of circumscribed unfolding of a pre-existent but latent form, as in the development of a photographic image. ‘Develop’ is the opposite of ‘envelop’, which comes from the French *en* – ‘in’ – and *voloper*, a verb of uncertain origin (possibly Celtic), usually meaning to ‘wrap up’, ‘cover’, or ‘fold up’ (<https://www.etymonline.com/word/envelop>); so ‘development’ is the *uncovering*, *unwrapping*, or *unfolding* of something (see also: <https://www.etymonline.com/word/development>). For the same point in relation to organismic ‘development’ (also called ‘ontogeny’ in biological theory), see Lewontin 2000a [1998]: 4-5; 2000b: xii.

2. Flourishing as self-creativity

The concept to be proposed here, which I label flourishing as ‘self-creativity’, or a ‘self-creative’ perspective on flourishing, is more complex than the properness concept, mostly due to the reflexive and immanent logic of *praxis* that it invokes. It can also be decomposed into notions of being-well and becoming-well, but the relationship between the two elements is not quite as straightforward as in the properness framework.

To summarise: This perspective sees the parameters of being-well as particular to the individual, but not in the sense that each of us has a normatively pre-given form to fulfil *qua* individual (a ‘true self’). Rather, being-well is being in a way that is internally harmonious given the contingencies of the individual’s particular life-history and the parameters of significance that emerge from their ongoing process of becoming. The evaluation of becoming, and change in general, has two different dimensions. Firstly, we can talk about some change to the states of the being or its world as constituting an ‘improvement’ or ‘worsening’ of quality of life in terms of enhancement or deterioration of immediate being-well. Secondly, by taking up the view of becoming as an ongoing *praxis* of finding a way in the world, we can evaluate an individual’s existence in terms of *how well they are able to engage in* this process itself, not just for the sake of some good that might result from it, but ‘for its own sake’, as part of what *living* is. I propose that we think about life-evaluation in this respect using a concept I call ‘self-creative freedom’ – the power a being has to explore their possibilities for living, and to shape their own way of being from within this space. From a social or political perspective, the conditions of human life that we ought to promote, insofar as the human good is an end in view, are those which benefit people’s particular being-well, and those which enhance their self-creative freedom. These are inter-related in various ways.

Let’s elaborate. Firstly, being-well – living well from a ‘static’ point of view. In terms of content, the norms relevant to evaluating ‘how things are’ with a being at some point in time are contingent on the history and context of the individual life itself – norms are determined *immanently* rather than transcendently, in this sense.⁴ The individual is thus, in a certain

⁴ I am aware of a number of similarities between the perspective I advocate here and the work of Gilles Deleuze on the concepts of immanence in life, and the distinction between immanent evaluation and transcendent judgment (e.g. 2001; 1983 [1962]), but I do not draw upon him explicitly here because this connection is something that I need to explore more, and hope to do so in future work.

sense, normatively *autonomous* – the norms relevant to the being ‘come from itself’, rather than coming from a source outside of itself.⁵ As mentioned just now, in relation to the self-creativity of *praxis*, this does not mean that just anything can be part of the good of any particular being. For a start, I think a general limit is placed on this in relation to the *way* in which something can be ‘part of one’s good’. In terms of structure, one’s immanently determined ‘way of being’ needs to make sense as a whole; the different aspects of a life need to fit together coherently. Living has the task of figuring out ‘what works’ given the contingencies of the particular life, just as the musical improvisation has to create some coherent expression in interaction with the musical situation, or as the sculptor must figure out what can be made through negotiation with the material on which they work.

This suggests a notion of ‘harmony’ at the heart of the self-creative concept of being-well, but in a different sense to that found in the properness conception. In the latter, being-well has the structure of *correspondence* between life and essence – things are ‘well’ with an individual insofar as they are in harmony with the standards of their proper form. In the self-creative perspective it is a matter of *internal* harmony between the parts of the being’s existence as a whole. If things are ‘well’ with them the elements of their life – their capacities, ends, needs, and so on – are in actively sustained relations of coherence and mutual support with each other.⁶ The bad is, in part, a concept of internal disharmony or incoherence with respect to the life’s whole way of being in the world. These are no doubt matters of degree.

This shows we can think the idea of ‘living in accordance with one’s good’ without implying a relation of correspondence between life and transcendent essence. On this view it is about

⁵ I use ‘normative autonomy’ in two, connected, ways. Firstly, to refer to the basic fact that – given the view of becoming-as-*praxis* – the norms relevant to a particular life emerge from within that life itself, as opposed to being prescribed to it in advance. Secondly, beyond this basic reflexivity I see the autonomy to determine one’s parameters of significance as a matter of degree entailed within what I call ‘self-creative freedom’, to be explained shortly.

⁶ The idea of a ‘life-form’ in Foot/Thompson, and the equivalent in Nussbaum, involves a similar idea of ‘internal coherence’, as I elaborate in IV:3 in relation to the issue of organismic functionality. However (see also IV:3), there is a major difference between the role that this idea plays in their (species-properness) theories and the use of it being made here. In the species-properness view, the species life-form is understood as having an internal coherence or organisational harmony *in itself*, and the good of the *individual* lies in their life corresponding *with* this model. In the self-creative view, the good (being-well) of the individual involves their living in accordance with *an* internally coherent way of being in the world, but it does not demand that the way that they actually *do* live corresponds with an idealised model of life prescribed ‘by nature’.

relations of fit *within* the life as a concrete whole – are these relations positive, coherent, mutually supportive, or are they negative, contradictory, in conflict? This implies that evaluation of some element of a life cannot be done in isolation from the context of the rest of that life. We cannot say, for example, that some particular bodily form, capacity, or activity is *simply* good for the individual, or its absence *simply* bad – perhaps because, e.g., we deem it part of the list of things essential to the human type, and thus necessarily good for all humans – however it might relate to the rest of their life. What *makes* it good or bad is precisely its particular relationality within the life as a whole.

Contrast this with the species-properness view. In a field guide to mammals we might find the statement ‘Horses are four-legged animals’. On Thompson’s way of reading such statements, as ‘natural-historical judgements’ (see I:2.1), any particular *three*-legged horses are therefore ‘defective’ in this respect. Their flourishing is *necessarily* reduced, in this sense, since ‘having three legs’ is an *inherently* bad (improper) thing for any horse. On the self-creative view this is not the case; the normative significance of the bodily form in question depends on the particular life and its context. Imagine a horse with three legs born into a human society that has an important mythology surrounding the number three. This horse is hailed as a sacred being and pampered all of its life. It is given the best food, allowed to mate with its pick of the stable, and has its every need catered for. The other horses, the plain old four-leggers, are forced to toil in the fields, pulling ploughs until they collapse from exhaustion and die young. On the whole, this horse’s *having three legs* stands in positive relations with the rest of its life, as it has come into being. It has a particular quality of life that is not only *consistent* with the bodily form that the Thompsonian view sees as a ‘defect’, but is even *dependent* on it. One could just as easily imagine circumstances in which realising some supposedly ‘proper’ form would, from the immanent point of view, relate to the life as a ‘bad’.⁷ We cannot *assume a particular world* in which the being becomes, prior to our judgement about what will be better and worse within its life.⁸

⁷ Thompson says that finding an individual to be wanting in comparison with its proper species form, and thus to be ‘defective’, “supplies an ‘immanent critique’ of [the individual]” (2008: 81). Unless we mean very different things by ‘immanent’, this is wrong. Evaluation of a particular by comparison with a general standard is not judgement ‘from within’ the perspective of, or on the terms of, that which is being evaluated (what I would understand by ‘immanent judgement’). On the contrary, it is what I would call ‘transcendent’ judgement – judgement of some particular by reference to some standard independent of itself.

⁸ Which is exactly what Foot does. In her view, what counts as ‘excellence’ and ‘defect’ in an individual is explicitly “relative to the natural habitat of the species”, and remains the same even if the actual context of the

It is worth stressing that the emphasis on individual particularity does not mean that the good of every individual must be *different* in some way from all others, or that being-well is to be found in some way of being *unique*. It is perfectly possible, indeed highly likely, that lives which develop in interaction with similar physiological and environmental conditions, will develop similar parameters of significance; that similar things will matter in similar ways for them. Furthermore, this perspective can be perfectly compatible with the proposition that there are indeed, at some level of generality, goods that are *universal* for all members of a species, things that play positive roles in the lives of all actual human beings, for example. It is compatible with this as long as we acknowledge that such a proposition, if true, is true *contingently*, as an *a posteriori* or empirical matter, not as an analytic fact that follows from the individuals in question sharing in a common essence.

For these reasons, certain kinds of empirical generalisations – about the statistically normal needs of members of a biological species, about what is usually considered healthy or pathological, or about things that tend to make human lives meaningful, for example – can indeed play legitimate roles as useful *practical guides* regarding what it is *likely* to be for any individual to flourish, given only certain general information, such as their biological species (or, say, their socio-cultural context). We intuitively feel that it is worse for an eagle to be unable to fly than it is for a tortoise. And rightly so; we have good grounds for the *expectation* that this particular in-ability will be worse for any particular eagle than any particular tortoise. But, on the view being presented here, our intuition is not a good one *because* we have latched onto a truth about their respective essences, but because it is very likely to be correct in any particular case, given the likely presence of many other statistically normal needs and life-conditions, with which the capacity for flight tends to ‘fit together’ in the case of eagles, but bears no such relations of mutual dependence in the case of tortoises.

We might even incorporate such generalisations into our political reasoning about the kinds of things that public action ought to aim at. ‘Given that X is usually an important part of the lives of humans, it is likely that enabling X to be achieved will be beneficial to most

life in question is very different (2001: 34). Aside from the difficulty of saying what constitutes a being’s ‘natural’ environment, this presents an internal problem for her theory. It implicitly admits that *context* is essential for determination of normative significance in life, yet, by assuming a particular context as *the* world in relation to which an individual’s norms are to be defined, it abstracts the individual from its relations with its *actual* world, the one in which its norms ought to be understood if one is to gain any real understanding of the particular case. See also Oyama’s critique of the naturalistic ethics of Mary Midgley (Oyama 2000a [1985]: 102-106).

humans', we might reason. Fine. But this is a very different thing from taking species membership to entail a set of normative standards, an idealised model that determines what the flourishing of an individual *must* involve, given their species.

This highlights the fact that the alternative 'concepts of flourishing' I am addressing here are not claims about *which* norms will be part of some being's 'good', but claims about the *genesis* of those norms. The difference between the two concepts can be seen in terms of how they understand the relation between the process by which a living being comes into the world, and the norms that are relevant to it. For the properness perspective, they are *given* 'by nature' to the organism prior to its becoming, determining ends to be fulfilled via this process. For the self-creative perspective they emerge within this process, and are contingent upon it. I also do not claim to be providing a *method* for determining the content of an individual's being-well, except to say that knowledge in this regard will increase in proportion with depth of awareness regarding the individual's particular context and history. In this respect, the individual themselves will often be the best *guide* regarding their parameters of significance, at least in an immediate respect. And thus for many practical purposes deferral to individual preferences will be reasonable. However, this is not the same as saying that subjective preferences *define* what is good and bad, nor that they are completely *infallible* in this regard (see 3.3-3.4 below for elaboration).

So, if the shape and content of being-well is determined within the process of becoming, rather than given to it as an ideal model, then what is becoming-*well*? This notion is also more complex than in the properness conception. It has two dimensions. The first is really just an extension of what has already been said. It evaluates *change* in general as improvement or deterioration in terms of immediate being-well. Does a change in conditions better enable the individual to live according to their particular way of being, as it stands, or does it prevent this, or disrupt the internal relations between the parts of their life in some way? If the sacred horse in our previous example were to sprout a fourth leg, its actual being-well would likely be hugely reduced. I.e. what would be seen on the species-properness view as necessarily a movement *towards* greater flourishing would, on the contrary, entail decline in overall quality of life. This element of the perspective does, in one respect, reflect the structure of the *properness* notion of becoming-well, in that it evaluates processes of change simply in terms of their outcomes.

However, this perspective *also* allows us to grasp the becoming of life in a way that is entirely different from the logic of properness: as evaluable not only in terms of ‘outcomes’ achieved along the way, but in terms of the ongoing performance of the process itself – in some sense ‘as its own end’, or ‘for its own sake’. The reason for this is that in the *praxic* view of life the process of becoming is intrinsic to life itself. It is the ongoing process of creating and sustaining a way in the world, as life goes along, and continually constitutes the life that it creates (rather than simply producing a finished product beyond itself). Since this ongoing *praxis* of ‘finding a way’ in the world is part of what *living* as such *is*, then our concept of living *well* ought to contain some notion of what it is to *do* this well.

The question of flourishing becomes, in part: What is it to live *well*, when ‘living’ denotes finding a way in the world, from within particular circumstances, as life goes along? What is it to engage in the self-creative *praxis* of life *well* or *badly*? What kind of evaluative concepts can we bring to bear on this idea? What it *can't* mean is successfully uncovering *the* pre-determined proper way for one to be – in the sense that doing a jigsaw puzzle *well* is figuring out how it is *supposed* to fit together – since this would be to reduce it to achievement of correct outcome, i.e. the logic of *poiesis*. Consider instead the *praxic* analogy of exploring a city, when there is no place in particular that you have to get to, or route that you have to follow. You just want to ‘find your way around’, to ‘get to know’ the place, to explore it for the sake of exploring it. The extent to which you can do this *well* depends on a certain relation of openness between you and the city. It depends on the city’s openness to you – if many of the roads are closed off then the possibilities for exploration are much reduced. And it depends on your openness to the city, on your capacity to respond to and actively engage with opportunities and experiences that the city offers up. These two aspects cannot really be separated – for example, a road is only really ‘open’ *to you* if you are capable of travelling down it.

I propose that we think about evaluation of becoming in a similar way, in terms of the openness and richness of the individual’s living *praxis* in this sense. The main measure of becoming-well in this sense is what I call ‘self-creative freedom’ – the extent of the power an individual has to explore a space of possibility, and to shape their own way of being in interaction with this. Becoming, regarded as ‘for its own sake’, is ‘good’ to the extent that it is gone about in conditions of self-creative freedom. Certain changes to conditions and capacities will expand this freedom, others will contract it. The enhancement of self-creative freedom is not just good because it might better enable one to figure out the best ‘outcomes’;

it is *intrinsically* beneficial, from the point of view of becoming-well as a good-in-itself. Freedom in this sense is directly relevant to quality of life, in that greater freedom enables *living* more fully or thoroughly, in the sense of ‘living’ captured by the *praxic* conception of organismic becoming. It enriches one’s ongoing activity of finding a way in the world.

To elaborate: The richer one’s ‘space of possibility’ – the range of ways of being and doing available to the individual – the greater the scope for exploring and experimenting with life, and thus the greater the power to reflexively or autonomously construct a coherent way of being and live in accordance with it, since it means a wider palette of elements from which life can be constructed. In this sense, *possibility or opportunity is itself a dimension of the good*. Widening of possibility increases freedom to explore, and this enhances the power to shape one’s own life. This freedom is not an on/off property, either possessed or not, but is something that can be expanded or contracted through the being’s changing situation and constitution – through its resources, physical and cognitive capacities, environmental conditions, social structures, and so on. As with the city-explorer, we can see this expansion and contraction in terms of the being’s openness to the world or in terms of the world’s openness to the being, but these are really two aspects of one relation.⁹

This relation of openness, and the self-creative freedom it corresponds with, is constituted in different ways, and to different degrees, across the living world. In the (statistically normal) human context, certain intellectual, rational, and creative faculties enable degrees of autonomous self-creativity that are beyond the usual limits of most other living beings (that we know of). As I make clearer in Chapter VI, these ‘human’ capacities should be seen as peaks on a continuous and variable field that spreads across the living world. I.e. the category of ‘freedom’ relevant to this dimension of life-evaluation is not something that uniquely attaches to human mind, separating it from the rest of the living world, but exists to degrees across that world, grounded on the basic reflexivity of organismic becoming. In this way this notion of freedom – one’s ‘space of possible becoming’ – can form part of the conceptual

⁹ This idea is loosely based on Heidegger’s concept of ‘world openness’ or the ‘disclosedness’ of the world (e.g. Heidegger 2009 [1924]: §9b; 2010 [1927]: §§28-29, 12). And, in its correspondence with a notion of power (power-to rather than power-over another), it is influenced by the Spinozan notion of *potentia existendi*, the ‘power of existing’ of a living being (see e.g. Deleuze 1981; Buzaglo 2003; Zuolo 2004; Steinberg 2013). These are two connections I would like to develop further in future work.

apparatus through which we evaluate things as various as the educational systems available to human children to the size of the pot in which a plant can spread its roots.¹⁰

As with the properness perspective, in order to address the issue of whether some particular element of a life (condition, capacity, opportunity, etc.) is a ‘good thing’ or a ‘bad thing’ we can look at it in a number of ways. At one level: Does it constitute part of their living, or does it enable them to live, according to their particular coherent way of being-well? Does it contribute to internal harmony, or does it disrupt relations of mutual support between elements of their life? And, at a different level: Does it constitute an enrichment of the individual’s space of possibility? Does it enhance their opportunities for exploration and engagement with the world, and their power to shape their way of life within this, or does it constitute a restriction on the activity of living in this sense?

Relations between these dimensions of the good can be complex, and there can be conflicts between them. For example, some change to a life might constitute an expansion of self-creative freedom, but at the cost of disrupting the individual’s particular way of being, as it has been constructed and established up to that point (see 3.3 for an example). As with the

¹⁰ A tangential aside: Is it better, in itself, to be a worm or a human? On the properness view there is no way of answering this question. The only sensible evaluative question is whether one is a good or bad *whatever-one-is* (see also Lott on Foot’s view (2012: 366)). An implication of this, I think, is that it is better to be a properly-living worm than a defective human. On the self-creative view, the answer is more complex. Strictly in terms of being-well it agrees with the properness view: it is better to be a worm whose state of being is currently good – whose capacities, opportunities, and needs fit together in a positive way given the particularities of the being and its context – than a human whose life is bad in this sense. The worm’s life is a least more ‘fortunate’ than the human’s in *this* particular sense (see Nussbaum 2006: 192 for the properness equivalent of this claim, comparing a disabled human with a chimpanzee with “typical species abilities”). But this is only a very limited view of flourishing. Most *Homo sapiens* have capacities for interaction with the world that constitute a space of possibility in relation to the ongoing activity of becoming that is vastly enriched in comparison with the average worm. Insofar as this is the case, this perspective would consider the (statistically normal) human condition *intrinsically* better than that of the worm: it has a greater power of living in this sense, is ‘more alive’ to the world. Mill makes a comment, perhaps throw-away, but nonetheless profound, that having what he calls the ‘human faculties’ is a “privilege” (1991 [1859]: 64). As I interpret him (see 3.1 below), this is because, from the standpoint of life in general, they generally enable of a comparatively more expansive suite of powers for the exploration of life, and thus greater self-creative freedom. This is different to saying that cultivating the ‘human faculties’ is good (for humans) *in that* they are part of being-properly-human (i.e. Mill’s belief about the value of the ‘human faculties’ is not dependent on a species-properness logic). I note that Nussbaum herself affirms something similar at one point, saying that it is “plausible for a comprehensive ethical view to judge that some activities and pleasures are “higher” and some “lower”, some lives richer and some more impoverished; [e.g.] that it is better to live as a chimpanzee than to live as a worm, were that choice of lives a coherent thought experiment” (2006: 361). This seems to take us outside of the species-properness logic that she consistently affirms as fundamental elsewhere; it cannot be made sense of given only this logic. This is another example of some of the basic tensions that run through Nussbaum’s thinking, which I will not discuss further here.

properness concept, what I have indicated here is the bare conceptual bones of a way of framing the notion of flourishing. The precise way in which these elements are to be weighted relative to each other is open to elaboration in different ways, and I will not tie the general perspective down to any particular way of dealing with conflicts of these sorts (nor to the necessity to deal with them at all at a theoretical level).

3. Illustrations and implications

3.1. Mill on individuality: the self-creative interpretation

Clearly the self-creative perspective is not compatible with meta-ethical views that treat species essences (or any other greater-than-individual essences) as sources of intrinsic normative standards. It is an inherently individualist approach, in that it sees the good as something particular to each individual living being.

However, when it comes to what exactly this *means*, we can also distinguish it from an individualist version of the properness approach, such as was outlined in I:2.2. On that view, the individual good relates to an innate and transcendent ‘true self’, metaphysically parallel with the idea of the species essence. Insofar as ‘exploration’ of the possibilities of life is valued on this view, it is as a means to the *uncovering* of this true self, in order that it can be fully realised. I.e. becoming is evaluated simply in terms of movement towards proper (individual) being: it is more a concept of flourishing as ‘self-discovery’ than ‘self-creativity’. On the *praxic* view of becoming, there is no such pre-designated proper self. Furthermore, in the self-creative concept of flourishing that arises from this, one’s power to explore life, and to shape it from within, is also seen as intrinsically evaluable, as we have just seen.

We can illustrate the difference between these two individualist perspectives by returning to the philosophy of John Stuart Mill. In I:2.2 I presented Mill’s ethics of ‘self-development’ as a representative of the individual-properness view, or, rather, I referred to one interpretation of Mill in this way. It is also possible (and, I believe, more correct)¹¹ to interpret this aspect of Mill’s thinking as representing a version of the self-creative perspective on flourishing.

¹¹ Although, exegetical accuracy is not the point here; I am using an interpretation to illustrate an idea.

Mill's political theorising in *On Liberty* is a response to what he saw as a growing "despotism of custom" in modern society.¹² This is the tendency for life to be dominated by passive conformity to externally imposed norms; it is the "tendency of society [...] to fetter the development, and, if possible, prevent the formation, of any individuality not in harmony with its ways, and compel all characters to fashion themselves upon the model of its own".¹³ He sees this as a malady in society, and in response he advocates, as was mentioned in I:2.2, a wide extension of political liberties and social toleration of difference. He sees these measures as a way of structuring society so that "individuality [can] assert itself" through "experiments of living", through the expansion of people's ability to explore and critically engage with a rich diversity of ways of being.¹⁴

As well as resulting in a loss to society at large of the benefits of original thought and diversity of perspectives, Mill sees the fettering of individuality to be *directly* detrimental to people's flourishing.¹⁵ When social conformity dominates, he says, "there is wanting one of the leading essentials of well-being", "one of the principle ingredients of human happiness".¹⁶ What is "wanting" is what he calls "the free development of individuality".¹⁷ It is this that he

¹² Mill 1991 [1859]: 78.

¹³ Mill 1991 [1859]: 9.

¹⁴ Mill 1991 [1859]: 63. See also Mill's *Chapters on Socialism*: "human nature should have freedom to expand spontaneously in various directions, both in thought and practice; [and] people should both think for themselves and try experiments for themselves, and should not resign into the hands of rulers, whether acting in the name of a few or of the majority, the business of thinking for them, and of prescribing how they shall act" (1976 [1879]: 745-746).

¹⁵ In *On Liberty* Mill argues for both the instrumental value of individuality to society and its intrinsic value as part of human flourishing. This distinction between these arguments can be seen in the way he explicitly *turns to* the instrumental form of argument, after having made his case for seeing it as intrinsically valuable: "I might here close the argument: what more can be said of any condition of human affairs, than that it brings human beings themselves nearer to the best thing they can be? [...] Doubtless, however, these considerations will not suffice to convince those who most need convincing [because those dominated by conformity can't see the intrinsic value of individuality; see Mill 1991 [1859]: 63, 68]; and it is necessary *further* to show, that these developed human beings *are of some use* to the undeveloped" (71 (my italics)). He later reminds us of the difference between the two arguments (75).

¹⁶ Mill 1991 [1859]: 63. See also: "The evil is, that individual spontaneity is hardly recognised by the common modes of thinking, as having any intrinsic worth, or deserving any regard on its own account" (63).

¹⁷ Mill 1991 [1859]: 63.

sees as one of the prime beneficiaries of his proposals to expand social liberty, toleration of diversity, and so on.

How are we to understand this “free development of individuality”, and the sense in which it is part of flourishing? On the individual-properness interpretation the content of one’s ‘individuality’ is in some sense pre-given, and becoming, as the process of uncovering and expressing this, is therefore, as just mentioned, primarily valued for the sake of the end goal of proper self-realisation. The problem with this reading is that a) it neglects the immanent and active character of *individuation* in Mill, and b) it doesn’t recognise the intrinsic value he places on *freedom* in this process.

Firstly, (a), the properness interpretation doesn’t fully bring out the sense in which Mill sees becoming-well not merely as movement towards fulfilment of a particular individuality, but rather as, to repeat, the “free *development* of individuality”. Much of what he says suggests that an ‘individuality’ is not something we all simply *have*, and which we either succeed in living in accordance with or not. Rather it is something that must be *cultivated* within the individual life itself. As mentioned just now, he sees the despotism of social conformity as the “tendency of society [...] to fetter the *development*, and, if possible, prevent the *formation*, of any individuality not in harmony with its ways, and compel all characters to *fashion themselves* upon the model of its own”.¹⁸ The italicised comments show that Mill sees individuality as something that emerges within the life in question, as immanent to its becoming – at another point he even says that “individuality is the *same thing* [as] development”.¹⁹ It is not a static form with a given content, but is emergent within the process of *individuation*. This quotation also shows that he stresses the active involvement of the individual being in the formation of their individuality – people can “fashion themselves” (but ought not to do so by *simply* following the model dictated by society). In other words Mill’s ethics of ‘self-development’ involves the notion of the immanent generation of the individual’s ‘own way’ of being through their activity in the world, reflecting the *praxic* view of becoming.²⁰

¹⁸ Mill 1991 [1859]: 9 (my italics).

¹⁹ Mill 1991 [1859]: 71 (my italics).

²⁰ It must be admitted that Mill is ambiguous on these issues. There is textual evidence on either side of the interpretive divide I am setting up here, although certain elements of his thought do strongly suggest the more radical interpretation of self-development as self-*creativity*. On the one hand, for example, a person “is said to

Secondly, (b), the extent to which the process of individuation is *gone about well* has, for Mill, to do with the extent to which it is *gone about freely*, in the sense of what I have called self-creative freedom: the power to explore the possibilities of being, and to ‘figure life out for yourself’ through this. Becoming-well is seen in terms of the extent to which individuation is open and autonomous, as opposed to narrow in scope or constrained by outside forces. This is the reason that certain social and political measures such as extending liberties and promoting toleration of diversity, can benefit human flourishing *directly*. They can expand individual spaces of possibility, and thus enhance the freedom within which individual becoming takes place. This is also why, for Mill, life is lived *better* if you do not *simply* follow the model dictated by society. To live by “conform[ing] to custom, merely *as custom*”, does not exercise one’s powers of exploration and evaluation to any great degree.²¹ Mill sees the ‘free development of individuality’ – the open and active ‘figuring out’ of how best to live, and the freedom of “pursuing our own good in our own way”²² – as *part* of what it is to live well, not just as an instrument to living well.

In short, to understand Mill’s concept of flourishing it is important to stress both the “free *development of individuality*”, and the “*free development of individuality*”. This makes it an

have a character” if his “desires and impulses [and presumably his faculties/powers, and his ‘understanding’ – see 1991 [1859]: 66] *are his own*”, and what it is for these to be “his own” is for them to be “the *expression of his own nature*” (67 (my italics)). This might be taken to support the properness interpretation, according to which one’s ‘nature’ is an innate individual essence subsisting independently of development, which is actualised to greater or lesser extents in the person’s concrete existence. However, Mill also allows for a different interpretation of this. For example, when discussing the dangers of social ‘despotism’ he argues that people can become “bowed to the yoke” through passive conformity “until by dint of not following their own nature, *they have no nature to follow*” (68). This seems to suggest something more radical, since an innate ‘nature’ in the sense of an essence independent of concrete becoming could not be ‘lost’ in this way, it would just remain hidden. We could make sense of this by saying that Mill sees ‘following one’s nature’ to be in part a process of creating and defining one’s ‘own good’, rather than simply a matter of achieving transcendent correspondence with an essential good, in the properness sense. The freedom of this process can be expanded or diminished, empowered or suppressed, and this dimension of evaluation is directly relevant to the question of flourishing.

²¹ Mill 1991 [1859]: 65. Mill does not say that you have to *reject* custom in order to freely develop individuality, nor that you have to find some way of being *different*. Rather, for Mill, it means not accepting models of life or rules of conduct *uncritically*, without investigation, deliberation, or reflective evaluation.

²² Mill 1991 [1859]: 17. This cultivating and following of our ‘own way’ is, for Mill, “the only freedom which deserves the name” (17).

expression of the self-creative concept of flourishing, as opposed to the properness concept, even a thoroughly individualist version.²³

Furthermore, we can see Mill's understanding of human flourishing as motivated by, or reflected in, an interpretation of *life* itself as a creative *praxis*, rather than a *poietic* unfolding of pre-given form. He says, in a line quoted as an epigraph to this thesis, that “[h]uman nature is not a machine to be built after a model, and set to do exactly the work prescribed for it, but a tree, which requires to grow and develop itself on all sides, according to the tendency of the inward forces which make it a living thing”.²⁴ To be *living*, it seems, is to be involved in the task of “growing and developing” one's existence as richly as possible, “on all sides”. And human flourishing is identified here with this image of living, explicitly in opposition to the *poietic* one of ‘building after a model’. Elsewhere he suggests an identification of self-creative flourishing with a sense of ‘life’ as an intensive quantity:²⁵ “In proportion to the development of his individuality, each person [... has] a great *fullness of life* about his own existence, and when there is *more life* in the units there is more in the mass which is composed of them”.²⁶ The being that becomes-*well* – actively, openly, autonomously – has “more life” or a greater “fullness of life” than the being which has its possibilities and capacities restricted. A bird in a cage has a narrow power of living, in comparison with a bird in the forest (all else equal); in the sense Mill invokes here, there is ‘less life’ about its existence.

This calls us back to the fact that the self-creative concept of flourishing, as I have presented it here, is an alternative way of taking up a conception of the *living* in relation to the human good, an alternative way of embracing the assumption of human ‘organic facticity’ as ground for evaluative thinking (see 0:3.1). Instead of thinking ‘living’ as *unfolding* of form, and ‘living well’ as *realisation* in this regard, we start from an image of ‘living’ as an ongoing process of the *creation* of form, and think ‘living well’ in terms of the extent to which the

²³ For exegeses of Mill that come to conclusions similar to my own see e.g. Hinchman 1990; Downie 1966.

²⁴ Mill 1991 [1859]: 66.

²⁵ See Deleuze 1981 on the distinction, drawn from Spinoza, between extensive and intensive quantity – the former referring to a material quantity, the latter a degree of power.

²⁶ Mill 1991 [1859]: 70 (my italics). By ‘units’ and ‘mass’, Mill is referring to individuals and the human race as a whole, respectively.

being engages *in* this process freely (becoming-well seen from a *praxic* perspective), and the extent to which their life accords with the parameters of significance that emerge *from* this process (being-well). This point of view is much more complex and context-sensitive, and makes evaluation much more difficult. But perhaps life-evaluation *should* be difficult, *because* life is complex and context-sensitive.

3.2. The capability approach from a self-creative perspective

It is also possible to present a version of the contemporary capability approach in terms of the self-creative concept of flourishing. As discussed in Chapter I, Nussbaum ties her version of the capability approach to the logic of species-properness. However, this framework is not a necessary part of the approach in general. At its most general, it merely aims to orient ethical and political thinking towards a particular ‘informational focus’. It argues that questions of flourishing or quality of life should be addressed in terms of what people are *able to do and be* in their lives.²⁷ In other words, it emphasises an evaluative space defined in terms of people’s *capabilities* – their capacities for doing and being in the world, their ‘positive freedom’ in relation to functionings.²⁸ This is what Mozaffar Qizilbash helpfully calls the ‘thin’ version of the capability approach.²⁹ To go beyond this, and provide some theoretical framework for evaluating particular capabilities or functionings, would be to construct a ‘thick’ version.

A species-properness approach, such as Nussbaum’s, is one way of doing so. To evaluate the quality of some being’s existence we ask which functionings constitute their proper species

²⁷ See e.g. Nussbaum & Sen 1993: 2; Sen 1990: 43-44; 1993: 29-32; 1999: 10, 18, 75, 293-295; 2009: 19, 231-238, 270; Nussbaum 2000a: 70-77; 2011: 18, 24-25. On the notion of the ‘informational focus’ or ‘informational base’ of a normative theory, see also Sen 1999: 18-21, 54-59; 2009: 231-238.

²⁸ ‘Positive freedom’ is more than mere ‘negative’ freedom, as in lack of impediment. One is positively free to do something *to the extent* that one is actually *capable* of doing it (it is a power-to notion). It depends on whether one has appropriate faculties/skills and is situated in appropriate conditions, and so on; not *simply* on whether there is a lack of external agency *preventing* one from doing it – i.e. not simply whether one has negative freedom in this sense. Negative freedom is, no doubt, a necessary condition of positive capability freedom, but is not sufficient for it. See Nussbaum 2011: 65-66; Sen 2009: 282, 304-309; 2002: 586-587. See also Berlin 1969 [1958]: 121-172, although it should be noted that Berlin’s original meaning, especially of the term ‘positive liberty’, was somewhat different and more complex than the basic notion of capability-to that is being employed here.

²⁹ Qizilbash 2011: 28-29.

life-form, and then we compare the individual case with the standards of this universal model. On this view it is, strictly speaking, the set of proper species *functionings* that constitute the good, and we evaluate the individual's *capability* – their space of possible doing and being – derivatively, in terms of the properness or defectiveness of the functionings that are possible.³⁰ The value of some particular being-able-to is derived from the value of the *what-one-can-do*, as its condition of possibility. For various reasons Nussbaum thinks that action at the social/political level should not aim to *make* people 'function properly', but only to create the conditions that make it *possible* to do so, if they so choose.³¹ I.e. political ends are limited to 'capabilities not functionings'. Improvement and deterioration of capability is the enabling or closing off of elements of proper functioning. Whether people go on to *actually* realise proper functioning is not for public policy to determine.

The self-creative perspective offers a different way of constructing a 'thicker' version of the capability approach. On this view, firstly, the functionings that are important to an individual's being-well will not be understood as given, *qua* intrinsic goods, by a fact of species membership. They will depend on the internal relationality of an individual's life, and their history of becoming. This means that, at a theoretical level, this version of the approach will actually remain 'thin' with regard to the content of human being-well, at least insofar as it will offer no determinate list of proper functionings *a priori*. As mentioned above (Section 2), this doesn't mean that statistical generalisations about how members of a species tend to live cannot be useful guides, but just that such facts don't imply necessary normative truths about all members of a species.

Secondly, we will evaluate an individual's space of *capability* in a different way. As with the properness view, we will at one level be concerned with it as a *means* to fulfilling valuable functionings. However, because of the intrinsic value the self-creative concept places on freedom in the process of becoming itself, and the direct significance of the expansiveness of

³⁰ See footnote 6 in I:2.1 regarding some complexities of the interpretation of Nussbaum on this issue.

³¹ A key reason for this is in fact one of the items on the list of human functionings – practical reasoning, which involves choosing which functionings to actually fulfil in the rest of your life. This complicates matters, but doesn't change the fundamentals, because although it is especially important in her schema, it doesn't override the intrinsic value of the other proper functionings (see e.g. Nussbaum 1988: 181-182; 1995a: 110-120; 2000a: 72, 82).

one's space of possibility in this regard, we will *also* value the richness of capability intrinsically, that is, independently of the value of the specific things one can do.³²

Let's take an example to compare approaches. Is person P able to have sexual satisfaction? For the properness view: If yes, then good, because having sexual satisfaction is part of what it is to have a properly human life.³³ If no, then bad, because P will lack this aspect of the human good. For the self-creative view: If yes, and this is positive within their particular parameters of significance at time of asking, then good, because they are able to fulfil this aspect of their being-well. *Also*, whether it matters to their immediate being-well or not, then good, given that it entails a space of possible exploration of life that is richer than if they were unable to have sexual satisfaction at all. If no, then *potential* negatives on both counts, although for someone for whom sexual relations or gratification have no place in their being-well (as is the case for many asexual people, for example),³⁴ the lack of a richer space of possible future becoming, in this respect, will be of minimal significance. The relative importance of these aspects will also vary depending on whether we are talking about someone who has just gained the capacity for sexual satisfaction, has just lost it, has always had it, or has never had it. See 3.3-3.4 below, for elaboration on this way of evaluating abilities and inabilities, and the implications for how we approach the issue of 'adaptive preferences'.

We can also make comparisons in terms of how political or social action would be *justified* by each approach. On the species-properness version, public justification always ultimately comes down to the affirmation of some conception of the 'properly human life'. We might, as Nussbaum does, place certain limits on the ways in which this kind of life can be 'promoted' by social/political powers, but the species-essentialist value judgement always ultimately grounds our motivations, by providing a conception of essential life-form. On the self-creative version we will remain theoretically neutral on the intrinsic value of particular ways

³² Although, the *full* evaluation of any particular capability will *also* take into account the value of the corresponding functioning. The point here is that, *qua* constituent of becoming-well, an expansion of possibility is, all else equal, a good thing. If we only take up the properness perspective, then we can only evaluate a capability in terms of the value of the corresponding functioning; we cannot attribute value to the scope of one's capability in itself.

³³ At least, according to Nussbaum's list (2011: 33).

³⁴ For information on asexuality see e.g. the website of the Asexual Visibility and Education Network (AVEN): <https://www.asexuality.org/?q=overview.html>.

of being and doing *per se*. But as I've said, we may be able for some practical purposes to operate based on generalisations about what is valuable in most kinds of human life. More positively, however, we will advocate social interventions based on whether they create conditions that widen the scope of people's self-creative freedom, their power to explore diverse ways of living and thereby find their way in the world autonomously. In some cases, policy recommendations from either point of view might well end up looking quite similar. For example, both might promote educational systems that cultivate critical thinking, or free access to art galleries. But even if some course of action would be ostensibly the same on either view, the way in which we *justify* it might differ, and this is *itself* a politically important matter, because it reflects the privileging of different value commitments, and can imply *judgements* about people's lives and values in different ways.

A capability approach constructed from the self-creative perspective would in certain ways end up looking more like Sen's version of the approach than Nussbaum's. Sen has repeatedly resisted calls to tie the approach down to a general list of the most valuable functionings, or a determinate account of the relative 'weights' of different functionings, particularly via the strategy that I call species-properness.³⁵ He has concerns that appealing to a view of human nature, "with a unique list of functionings for a good human life" will render the capability approach "tremendously overspecified", and that adopting such a view could undermine the "deliberate incompleteness" of the capability approach.³⁶

There are a number of reasons for this "deliberate incompleteness". The most basic normative reason, I think, is that Sen sees the shaping of one's own life within conditions of freedom as an *intrinsic* aspect of flourishing itself, in a similar way to the self-creative concept of flourishing. In response to the view that freedom is valuable only as a *means* to fulfilling good functionings, Sen says: "That line of reasoning is often driven by the view that life consists of what really happens [...]. There is a bit of an oversimplification here, since our freedom and choices are *parts of our actual lives*."³⁷ In other words, "in assessing our lives, we have reason to be interested not only in the kind of lives we manage to lead, but also in

³⁵ See e.g. Sen 1993: 46-49; 1990: 43; 2005b: 157-159; 2009: 241-243. Sen re-affirmed this position during his key-note lecture, 'On Specification and Measurement', at the 2016 HDCA conference, saying that over-specification in this regard was a worse fate than under-specification for the approach.

³⁶ Sen 1993: 46-49.

³⁷ Sen 2009: 235 (my italics).

the freedom that we actually have to choose between different styles and ways of living. Indeed, the *freedom to determine the nature of our lives* is one of the valued *aspects of living* that we have reason to treasure”.³⁸ Thus, as I said above, one’s space of capability is not evaluable simply in terms of the particular functioning ‘outcomes’ it enables, but also in itself, as the space within which we explore the world, figure out what is good and bad, and shape our lives in relation to this (although Sen tends to reduce this all to a rather narrow idea of ‘choice between options’). The richness and openness of one’s space of capability has a direct bearing on one’s becoming-well in this respect, measured by the extent of ‘self-creative freedom’.

3.3. Disability and identity

Many people have physical and psychological constitutions which render their lives to various degrees closed off from certain of the ‘human functionings’ found on Nussbaum’s list. For example, many are blind, deaf, or lack the use of other sensory or emotional capacities included in the list; many people with Asperger syndrome or other forms of autism have difficulty engaging with others in certain ways, creating attachments, and thus fully achieving the functioning of social affiliation; and many have conditions which prevent bodily mobility, reproduction, certain forms of play, and many other kinds of activity deemed essential to a human life according to ‘the list’.³⁹ These sorts of cases can help highlight the differences between a species-properness version of the capability approach and a self-creative one.

³⁸ Sen 2009: 227 (my italics). This highlights the fact that Sen’s view is closer to a self-creative concept of flourishing than an individual-properness one, in which freedom is good only as a means to realising one’s essential individual identity. One might attempt the latter interpretation of Sen, but I do not think it holds up. Part of what he sees as of value in capability freedom is the power to determine what ways of being really *are* important in our lives through engagement with the world and the activities of judgement. He does *not* see this power as valuable merely as a means to uncovering what is already truly authentic to ourselves. See in particular Sen’s discussion of the role of choice and reasoning in the *constitution* of individual identity, as opposed to the idea that identity is simply ‘discovered’ (2005a: 349-352).

³⁹ See e.g. Nussbaum 2011: 33-34.

The implications of the species-properness approach are relatively straightforward. In any of these cases, the inability⁴⁰ in question is intrinsically bad, and what *makes* it bad is that it constitutes a deviation from proper form. These peoples' lives are not 'fully human'. They have something *essential* missing, and thus cannot be said to be flourishing.⁴¹ Furthermore, gaining the ability in question *would* necessarily make their life better, because it would make it more fully human.⁴²

There is an issue discussed in the philosophy of disability that is particularly problematic for this approach. This is that many of these supposedly 'defective' people would *not* agree that their condition is a bad thing in their lives, or that 'curing' it would make their life better. Many such people, especially when they have grown up with their condition, genuinely regard it as a constitutive part of their identity, or as integral to their particular way of being in the world, and do not see themselves as 'incomplete' because of it. For reasons like this,

⁴⁰ I say 'inability' rather than 'disability' so as not to beg the evaluative question – 'disability', I assume, implies negative judgement about an inability. Thus, not all disabilities need be disabilities. The issue at stake here is when, why, and in what way we ought to treat an inability as a disability.

⁴¹ Nussbaum sometimes claims that, on the contrary, her approach does *not* imply that people with these sorts of inability are cut off from a flourishing life: e.g. "we owe [respect] to people with mental impairments as fully equal citizens who are members of the human community and *who have the ability to lead a good human life*" (2006: 190 (my italics)). However, the implication of her conception of human functioning – with each component seen as essential to a "fully human" life, and thus to a *good* human life (see e.g. 2006: 181) – is precisely this.

A defender of Foot/Thompson might also object that a bodily 'defect' like deafness does not make one less than 'fully human' because, for these thinkers, this is a defect of our animal nature, not our specifically human nature, which consists in excellence of the rational will (see e.g. Foot 2001: 40-44; Thompson 2004: 58-60) (thanks to Edward Skidelsky for raising this point). To clarify, I do not mean to purport that these thinkers take the sense of hearing to be *specific* to the human good, part of what distinguishes humans from other animals, as it were. Rather, the discussion here only imputes the view that, for a human being taken as a whole, deafness is inherently a defect. 'Taken as a whole', the good of the-life-of-a-human can *include* properties/capacities, such as the sense of hearing, that are also part of the good of other animals (see also the beginning of I:2.1). So, by 'less than fully human life' I here mean only 'less than a good-life-for-a-human', which can include both things specific to the human good and things that are not. In short, as long as the species-properness view in question takes the sense of hearing to be an essential feature of the kind of life proper to the species in question, then, I take the implication to be, a deaf individual of that species is inherently defective, or has an inherently less-than-proper life, given what they essentially are. It is the issue of inherent defect in general that is at stake here, not whether that defect involves a lack of something specific to the kind in question.

⁴² See e.g. Nussbaum's comments on the condition of Sesha (a young girl with cerebral palsy (2006: 96)): "[I]f we could cure her condition and [thus] bring her up to the capabilities threshold, that is *what we would do*, because it is *good* [...] for a human being to be able to function in these ways" (2006: 193 (my italics)). (Aside: the reason it is good to *be able* to function in the ways Nussbaum is referring to is because it is good to *function* in these ways – see footnote 6 in I:2.1.) See also Begon 2017.

many deaf people, for example, reject the suggestion that their lives would be improved if they had their condition ‘cured’, as do many people with forms of autism such as Asperger Syndrome. Their lives have a particular internally coherent structure which they have grown into, and in which they are at home. Often, for instance, they have developed particular ways of being-with-others that are atypical but essential, as they see it, to who they are and how they live – see for example the communicative world of the deaf community. What it is for these people to live *well*, they claim, is perfectly compatible with, or even dependent on, their particular atypical states of being.⁴³

Species-properness approaches have great trouble taking such self-understandings seriously, as long as the conception of the human good at play deems these people’s lives *inherently* ‘sub-standard’ in some way. The implication is that at some level they must simply be mistaken in their self-understanding; they just don’t realise that their lives would just be better if they didn’t have these conditions (see also next sub-section, on the notion of ‘adaptive preferences’).⁴⁴

If we feel that this approach neglects something of importance in the self-understanding of such people, or even fails to respect their autonomy and individuality, then I think the self-creative approach can do somewhat better. Firstly, this view certainly does not deny that the kinds of inability mentioned above are, in general, capable of being detrimental to an individual’s flourishing. If they create disharmony within their lives, e.g. by preventing the fulfilment of other important aspects of their being-well, then they would be considered bad in this respect. However, in taking this perspective we will not *pre-judge* the matter in the way the properness approach does. We will at least see it as *possible* for the condition in question to form a genuinely positive part of the individual’s being-well, in the kinds of way just mentioned. So, this approach will at least not dismiss these claims *a priori*, as simply failures by the individuals in question to understand their good properly.

At the same time, however, we will also not take the individual’s subjective appraisals or preferences as *infallible*, or defer to them as absolutely authoritative regarding what is, or would be, good and bad in their life. The self-creative perspective recognises that the shape

⁴³ See e.g. Cooper 2007; Glackin 2016; Begon 2017; 2018. See also information on Asperger Syndrome on the website of the UK National Autistic Society: <http://www.autism.org.uk/about/what-is/asperger.aspx>.

⁴⁴ See also Begon 2015; 2018; Glackin 2016.

of one's being-well is capable of change, since it is the product of the *ongoing* process of figuring out one's way in the world, and it sees this process as neither entirely determined by circumstance, nor simply controlled by the choice or judgement of the individual. On top of this, it includes the dimension of self-creative freedom into the parameters of flourishing. This means that if some change in life would constitute an empowering enrichment of the conditions within which the individual goes on finding their way in the world, this would be understood as in itself a good thing, independently of its significance for the individual's more immediate being-well (although this doesn't mean that this intrinsic good would automatically outweigh any negative effects of the change in other respects – I'll give an example in a moment).

Given these complications, let's examine the case of the deaf person – call him 'Joel' – who is deeply convinced that his deafness is integral to his identity, and that his life would *not* be improved by its removal (a feasible medical option in many cases, and increasingly so). The self-creative perspective acknowledges a range of possibilities.

Firstly, it is possible that Joel is right. The transition to hearing could, all things considered, be detrimental to his quality of life. Most likely this will be the case if his deafness is so integral to the internal harmony of his existence that, were it removed, his ability to flourish in many other important activities and relationships would collapse. Like a body that rejects an organ transplant, he may be unable to integrate the new capacity into the functional whole of his life in a positive way. Thus, even if the acquisition of hearing otherwise constitutes an enrichment of Joel's openness to the world, and an enhancement of self-creative freedom in this *particular* respect, this benefit would be won at the loss of much more. The transition to hearing would be a 'shock to the system' more destructive than empowering. Importantly, this could turn out to be the case even if the individual had predicted that their life *would* be improved by gaining hearing, and had specifically desired the change.

Secondly, whilst we are able to appreciate how Joel's self-evaluation could indeed highlight something deep and important about his particular good as it stands, we will also not preclude the possibility that he turns out to be wrong about the impact of a transition to hearing. If it opens up his life to a richer space of activity and experience, and can be integrated into a newly re-arranged coherent way of being without fundamental disruption, then we would consider it a positive change. New experience can bring genuinely novel change to our

perspective on what is good, and Joel may even come to believe that his view of things had previously been too narrow.

In short, whereas species-properness approaches lend themselves to somewhat black and white conclusions about issues of disability/inability, the approach advocated here introduces a few much needed shades of grey. We are not forced to commit to an abstract categorisation of any particular functioning as in itself either a good or bad thing.⁴⁵ The ultimate point of reference is always the dynamic of the individual context and its particular parameters of significance, which cannot be subordinated to some idea of what is proper, normal, or natural for the kind of being in question. In instances where the transformation from deafness to hearing *does* turn out to be an improvement of life, a Nussbaumian species norm would turn out to have been a good guide. But it would be so by accident, as it were.

One might respond to this discussion as follows. Okay, so some people who happen to have atypical conditions, e.g. deafness, might be better off staying as they are than ‘going normal’, but isn’t it still the case that these people *would have been better off if they’d never been deaf at all?*⁴⁶ This claim is interpretable in a couple of ways. On one interpretation it requires playing fast and loose with the notion of individual identity in a way that renders it meaningless. On another interpretation there *is* a limited sense in which the self-creative perspective could agree with it, as a general statement about the value of hearing over deafness, but even this turns out to require assumptions about context that preclude drawing categorical normative conclusions from it.

Firstly, if we take this claim as it stands, as a counterfactual claim about how someone’s life would have been if they’d never been deaf, then it faces a deep conceptual difficulty regarding the way it treats the identity of the individual referred to. Given that, in the examples discussed just now, the individuals in question are in part *defined* by their deafness, that it constitutes part of *who* they are, then the ‘they’ we claim would have been better off having never been deaf would not be the *same* individual if this were the case, so the comparison becomes very difficult to make. One of the implications of the *praxic* view of becoming is that there is no essential core to the being’s identity that can be abstracted from

⁴⁵ For a detailed discussion of some of the different possible factors involved in answering the question ‘Can it be a good thing to be deaf?’ that comes to a similarly non-categorical conclusion, see Cooper 2007.

⁴⁶ Thanks to Edward Skidelsky for raising this difficult question with me.

the particular history of their existence; their ‘nature’ is the immanent product of this history. The more deeply the state of being that we are attempting to evaluate is bound up with the very identity of the individual *for whom* we are attempting to assess its value, the more meaningless this counterfactual claim becomes. To illustrate this point in a different way: I often think that I would like to have lived on the Left Bank of the Seine in the 1920s, that this would have been a good life for me. Am I right or wrong in this judgement (assuming, that is, that my romanticised idea of this moment in history is even accurate)? A little reflection shows that this is hardly a meaningful question at all. The ‘me’ that I imagine cavorting about in absinthe bars with Hemingway and Picasso is a being whose very identity is bound up with having grown up in rural Britain around the turn of the twenty-first century. The question of whether, had ‘I’ lived in Paris in the 1920s, this would have been a good life for ‘me’ relies on intellectual gymnastics that render the question itself meaningless. If I *had* lived in 1920s Paris, I wouldn’t have been *me*.⁴⁷

But perhaps we should take this claim in a different way, not as a counterfactual about any life in particular but as a general claim about the value of hearing over deafness. The perspective advocated in this chapter allows for a limited way of affirming this claim. As stated, this perspective holds enhancement of self-creative freedom to be in itself a good thing. From this point of view, given the *assumption* that hearing constitutes a comparatively richer space of possibility and openness to the world than deafness, then we would say it has a positive value over deafness, at least in this respect. So, one might reply, have I admitted that hearing is *in itself* better than deafness? No. Although the assumption involved here does seem a natural one to make, this is because we take for granted the presence of a whole set of ‘normal conditions’ that generally enable hearing to constitute a greater scope for engagement with the world than deafness. These conditions do not come for free with the sense of hearing. Imagine that the world was suddenly subjected to a constant high-pitched noise, perhaps due to some meteorological phenomenon, that gave all but the deaf crippling headaches and vastly reduced their ability to act in and experience the world in many other respects. Under these conditions we would no longer assert of one of our deaf associates that they ‘would have been better off having never been deaf’, even in the restricted sense of being able to explore and engage with the world more openly. There is no ‘hearing’ and

⁴⁷ I can conceive of being a time-traveller, and travelling back to this period *as* who I am now, but this is not analogous to the case at hand.

‘deafness’ that we can evaluate as things ‘in themselves’, in isolation from actually existing living beings in interaction with particular circumstances in the world. Although we can make generalisations about the value of different states under ‘normal’ conditions, this does not provide ground for categorical evaluations, not least ones that attach value based on an idea of what is inherently proper for members of a species type.

3.4. From ‘adaptive preferences’ to ‘restrictive horizons’

Part of the reason Nussbaum introduces her universal conception of human functioning is to avoid certain intuitive problems that arise if we simply defer to subjective preferences when evaluating life-conditions. The kinds of case usually cited in this context are ones of domination or oppression – e.g. slaves worn down into willing compliance, or “hopelessly subdued housewives”⁴⁸ – in which, we feel, someone’s declared contentment with their life is more indicative of a way of psychologically coping with their situation than a genuine reflection of their flourishing. By deferring uncritically to subjective appraisals or preferences we fail to recognise that expectations and aspirations can be ‘adapted’ to cope with bad circumstances, and we are left with no way of criticising those circumstances themselves, no way of saying what makes them bad. Also, our understanding of *improvement* of life is restricted simply to the better satisfaction of existing preferences. (See also 0:1.3.)

I think there are important concerns highlighted by these sorts of case, and that they do indeed mean that we should not *simply* defer to subjective appraisals as absolutely authoritative in matters of life-evaluation. However, I do not think, as Nussbaum seems to, that acknowledging this requires swinging to the opposite extreme of asserting a universal list of things that are in themselves good for all humans *qua* human. The implication of this response is to imply that anyone whose preferences don’t match up with our conception of the human essence is simply mistaken about their good. This has its own problems. It effectively excludes these voices from quality of life assessment, which, as we saw above with people like Joel, has the potential to neglect important nuances in the issue.⁴⁹ The

⁴⁸ Sen 1999: 63.

⁴⁹ Others have also expressed concern that the essentialist framing of ‘adaptive preferences’ can fail to respect, and even lead to real restrictions of, individual autonomy, because it licences excluding the voices of those deemed to have simply a mistaken point of view (e.g. Sugden 2006; Antony 2000: 24-25; Clark 2013: 179-181; Glackin 2016: 318-323; Begon 2017). The view I am presenting here, in which immediate preferences are not

discussion of the previous sub-section shows how the self-creative perspective can avoid the problems of uncritical deferral to subjective preference whilst overcoming the limitations of the species-properness response.

From the self-creative perspective, the central matter of concern highlighted by the kinds of case often said to reveal ‘adaptive preferences’ is not that the individual’s circumstances have forced them into the *wrong kinds of preference*, but that these circumstances represent major restrictions on their self-creative freedom. What we will find perturbing about these cases is not simply that, e.g. the subdued housewife has no inclination for something that might, as it happens, improve her life (say, social affiliation beyond the home). The deeper issue will be the conditions within which her particular preferences have arisen, and within which she continues to live. We will be concerned with the openness of her space of possible exploration of the world, with her freedom to engage in what Mill called “experiments of living”.⁵⁰ Our primary object of criticism will therefore not be her preferences *per se*, but the situation they are a response to.

Importantly, we will stress that, through the enhancement of this space of freedom itself, her quality of life could be improved in a way that goes above and beyond simply the better satisfaction of existing preferences. As a result of this it could well be that her particular way of getting along in the world is in turn transformed through engagement with a richer set of possibilities, and that her subjective appraisal of what is good in life changes with this. However, we will not primarily be concerned with *what* it is that she comes to express preference for, but rather with the extent to which those preferences are formed under conditions of self-creative freedom.

The notion of ‘adaptive’ or ‘adapted’ preferences, at least when framed in terms of species essentialism, brings to mind some set of ‘non-adapted’ preferences for all the right and properly human things, preferences which arise naturally as long as they are not warped by

seen as infallible, but nonetheless it is the particularity of the individual context that is the proper ground of evaluation, ought to allay some of these fears. See Sen’s reply to Sugden (Sen 2006: 87-94), which points in a similar direction in certain ways, and also Qizilbash 2006.

⁵⁰ Mill 1991 [1859]: 63.

external influence.⁵¹ This makes no sense on the *praxic* view of becoming. Every individual's way of being and conception of the good emerges from an ongoing interactive negotiation with contingent circumstances. All preferences are, in this sense, 'adapted'.⁵² On this view, we should be less concerned with identifying 'adaptive preferences' than with identifying 'restrictive horizons of possibility'.

As mentioned in the previous sub-section, on this view the ultimate point of reference in matters of life-evaluation is always the immanent dynamic of the individual context. This means that we will not neglect the particularities of individual lives or exclude the voices of those with atypical ways of being from reasoning about quality of life. In questions of being-well in particular – what matters for the immediate harmony of one's form of life at time of asking – subjective preferences will often be relatively reliable guides.

However, this does not mean that we will understand subjective preferences as either *definitive* or *infallible* regarding what is or could be good in someone's life. We will never defer to the declared preferences of the individual *uncritically*, especially with respect to evaluation of some way of being which they lack the capability to explore – whether due to constitution or external restriction. But even when our subjective appraisal of different possibilities is formed under conditions of relatively diverse and open experience, our own good is not necessarily transparent to us, and nor are the processes of development it can undergo entirely under our control. Enhancement of capability in some area of life in which a lack had not previously registered as dissatisfaction, might yet open access to a positive good hitherto not perceived, in such a way that it becomes integrated into the individual's particular way of being-well. Furthermore, this perspective will always assert that the opening up of possibility, and the increase in freedom this represents, has a distinct value of its own, whether or not the corresponding functioning becomes positively integrated in this sense.

Therefore, by taking the individual life as the ontological ground of the norms relevant to it we are not forced to treat subjective appraisal as absolutely authoritative. And by

⁵¹ This bears an interesting structural similarity with the essentialist/neo-preformationist conception of biological development, in which proper phenotype is seen as unfolding from an inner plan as long as external conditions do not force it off course (discussed in detail in Chapters V and VI).

⁵² For a similar point see Begon 2015: 243; and related comments in Barker 2015: 97-98.

acknowledging the intrinsic significance of the dimension of self-creative freedom we have a way to criticise and evaluate the *conditions* through which one finds a way in the world, above and beyond the question of existing preference satisfaction. In this way the self-creative perspective can remain sensitive to the dangers of uncritical deferral to subjective preferences whilst also rejecting the need to resort to a species-essentialist approach that can end up neglecting the unique perspective of the individual.

3.5. A note on ‘individualism’

The way that the self-creative concept affirms individual particularity doesn’t imply a view of becoming as something that happens best in isolation from others – it doesn’t mean that development of individuality must occur through opposition to others, or even independently of social interaction altogether. On the contrary, *relationality* in general is already assumed as part of the notion of becoming as *praxis*, and this can include inter-personal affiliation, social identification, enculturation, and so on. Equally, however, one’s particular way of being is not seen as simply ‘imprinted’ by external circumstance, but rather as constructed through ongoing *interaction* with context. So this view implies neither a crude idea of individual autonomy as independent control over one’s life, nor a simple ‘social determinism’ (see related discussion in VI:2.5, 3.3).

Also, the ‘individualist’ status of the self-creative perspective does not imply a privileging of selfish or egoistic goods. Most, if not all, people cannot imagine a good life that is lived apart from community association, reciprocity, even positive altruism towards others. These things are part of what it *is* for them to live well. They are essential to how they get along in the world, and even positive ends around which much else in their life is organised. The sense in which it *is* ‘individualist’ is, as described, that it treats the individual context and particular history as the ontological ground of the norms relevant to evaluation of life, rather than, say, the species essence.

4. Table: Two concepts of flourishing

	Flourishing as properness	Flourishing as self-creativity
Inspired by...	<i>Poietic</i> interpretation of organismic becoming.	<i>Praxic</i> interpretation of organismic becoming.
Being-well	Being in state of correspondence between concrete life and transcendent form; i.e. ‘properness’ or ‘proper functioning’. Content determined transcendently.	Being in state of internal harmony between elements of the life, e.g. capacities, activities, needs, ends. Particular ‘own way’ of being-well determined immanently.
Being-badly	Lack of fulfilment of transcendent form; ‘improperness’, ‘defectiveness’.	Lack of internal coherence; conflict, tension between elements of life.
Becoming evaluated in terms of outcomes	Movement towards/away from properness. Change that produces greater properness/reduces ability to achieve properness.	Change that enhances/disrupts ability to live in own immanently defined way.
Becoming evaluated in terms of the process itself	[N/A]	Expansion/contraction of self-creative freedom: power to explore a space of possibility, find one’s way in life openly.
Individual understood as...	(Primarily) normatively heteronomous (subject to transcendent prescriptions/standards for the life-form it ‘bears’).	Normatively autonomous (immanent/reflexive determination of own norms) – to different degrees.
Social/political aims...	Create conditions which enable people to live properly, fulfil proper form.	Create conditions which enable people to be-well in their particular way, and those which enhance self-creative freedom.

Part Two

The Question of Biology

Introduction

In Part 1 I contrasted two ways organising the conceptual space between ‘living’ and ‘living well’. I outlined two opposing normative frameworks for approaching the evaluation of life, and related these to two contrasting metaphysics of organismic being and becoming. A *poietic* metaphysics underlies the presupposition of the properness concept of flourishing, as seen in the neo-Aristotelian views presented in Chapters I-II. In a parallel but different way, the self-creative concept is developed by re-framing the becoming of life as a form of *praxis*.

The question of how we *ought* to understand the being and becoming of living organisms, is therefore pertinent to the coherence of these alternative perspectives, when grasped in this way, as ‘organic concepts of the good’. And this is an issue in which biology, the scientific study of living phenomena, has a legitimate role to play. What resources can we garner from an engagement with biological theory for consideration of this issue? Does biology give us reason to embrace one metaphysical view over the other? Does it show one perspective to bring organismic becoming into view more adequately than the other? Part 2 considers these questions through an interpretive engagement with biological theory, and argues that, for reasons internal to this domain, we should indeed take up the shift from a *poietic* to a *praxic* interpretation of becoming proposed at the start of Chapter III.

Chapter IV

Neo-Aristotelianism and the Question of Biology

Introduction

This chapter can be read as an extended aside from the main narrative of the thesis, but it also provides important groundwork for the argument of Part 2 as a whole, *qua* attempt to criticise neo-Aristotelian thinking ‘from a biological perspective’. Before turning to an explicit discussion of biological theory, it is important to address some existing debate on the relation between biology and neo-Aristotelianism, and to clarify where the argument of this thesis stands in relation to this. This serves a strategic purpose. In recent years, a number of biologically-oriented criticisms have been levelled at neo-Aristotelianisms of the sort seen in Chapters I and II. In response to this defenders usually deny that their theories are ‘based on biology’ in the senses assumed. This suggests that criticisms from a biological perspective are therefore generally misplaced, or bound to ‘talk past’ their targets. Thus, it might be asked, am I not heading towards a dead-end by considering the significance of biological thinking for theories of flourishing at all?

My answer to this concern is the following. Firstly, as far as the argument of this thesis is concerned I grant to neo-Aristotelianism that many of the common bio-oriented criticisms it faces are indeed talking past it. They attribute to it kinds of reliance on the biological that, it is reasonably argued, are not the case. The assumption of the most common lines of criticism, which I discuss below, is that the *content* of particular normative claims about species good is straightforwardly derived from empirical claims about biological reality in one way or another. Neo-Aristotelians reasonably respond that judgements about species norms are not derived in this way, but are ‘normative all the way down’, and thus in certain ways immune to things like empirical ‘counter examples’. However, the question of how this content is derived is not the level at which my critique is pitched. The deeper and more interesting way that the approach in question *does*, in fact, ‘rely on biology’ relates to the *form* of the concept of flourishing which is employed, within which any particular conception of species good might be affirmed. It is at this level of analysis that I have already identified the role of a *poietic* metaphysics of life in naturalising the properness concept, and at which I shall continue to address the issue in the remainder of Part 2.

Thus, I allow that much of the bio-oriented criticism directed at neo-Aristotelianism has tended to talk past it, and that defenders thus have reasonable grounds to reject it. However, this does not mean that biology is entirely irrelevant to the coherence of the approach, rather that for a critical perspective informed by biology to have purchase it needs to address it at a more fundamental level.

1. Facts and values

First of all, a general philosophical issue. In considering the validity of attempts to draw normative criteria from claims about the ‘nature’ of one’s species, an obvious place to begin is the question of whether an illegitimate leap from ‘facts’ to ‘values’, or from ‘is’ to ‘ought’, has been committed. It seems that the neo-Aristotelian views I have outlined invite such an objection.¹ They begin from *descriptions* of, e.g., ‘the human species’, and from these they derive *prescriptions* to which individual humans are supposedly subject. However, this general line of criticism can be something of a red herring. The central reason for this is that the descriptions in question, the claims about ‘nature’ or ‘the species’ from which they begin, are understood to be ‘normative’ *from the start* (and so productive of normative implications for individuals). As discussed in I:2.1, these descriptions – which Thompson calls natural-historical judgements – are not empirical descriptions of any individual or group of individuals. In particular, they are not claims about empirical universality or even statistical normality. Rather they are claims about the so-called ‘life-form’ of a species – the way a being’s life must go for it to be a *good* token of some living type, for it to be an exemplary instance of the species. For example, the fact that most mayflies do not breed at all is no refutation of the generalised life-form claim that ‘mayflies breed shortly before dying’; nor can one refute the claim that ‘horses have four legs’ by pointing out that some only have three. These ‘counter-examples’, for the neo-Aristotelian, simply refer to *defective* examples of the mayfly and horse types; life-form judgements describe how the individuals of a type *essentially* are, to which their concrete reality may or may not conform, and in this sense describe how they, as concrete particulars, *should* be. No particular individual need ever have

¹ Thompson acknowledges the likelihood of this challenge (2008: 31).

actually manifested *all* aspects of the life-form successfully in order for these claims to be true – as Thompson puts it, “nobody’s perfect”.²

This situation is reflected in Nussbaum. As also discussed in I:2.1, Nussbaum denies that her view derives conclusions about what is *good* for an individual of some species from an ‘external’ empirical standpoint. Rather, we are invited to consider what the ‘proper functionings’ of the human species are, what activities and ways of being are essential to being ‘truly’, ‘properly’, or ‘fully’ human. This cannot be determined simply by looking dispassionately at humans as they are – it is, from the start, a form of value-laden judgement. No doubt, making this sort of judgement requires observational experience of the species in question, human or otherwise, in order to construct a representation of their ‘proper’ or ‘characteristic’ way of life. But the judgements themselves, which supposedly discover the content of this way of life, are more than simply a statistical aggregation of empirical experience.³ Given these clarifications, the general objection that this perspective simply moves from (value-free) facts to normative claims somewhat misses the mark: the view is not ‘based on biology’, or otherwise empirical facts, in this sense.

2. Essentialism and species universality

Another potential red herring, related to the preceding, has to do with criticism of a particular kind of ‘species essentialism’. In II:2 I aligned the metaphysics of life underlying the properness concept with what I called ‘teleological essentialism’, focusing on the notion that organisms are given ‘essences’ which define their being-what-they-are-*properly*, which specify the proper *teloi* of their development. This metaphysics allows us to imagine a separation between the concrete life of the organism and its underlying essential reality, and thus creates space for the normative logic of proper and defective (realisation of essence). I then introduced the *poiesis/praxis* distinction as a way to characterise this metaphysics, partly in order to avoid certain other connotations of ‘essentialism’. One such, much discussed, variety of ‘essentialism’ in biology provides a way of *classifying* organisms according to species membership. The idea is that each biological species (defined in terms of genealogy

² Thompson 2008: 72.

³ Lott 2012 clarifies this matter very well.

or reproductive relations)⁴ is characterised by a cluster of properties that are universal to all members and sufficient to distinguish them from other species. This classificatory form of ‘species essentialism’ is not the same as the *poietic*/teleological essentialism just described; it is worth clarifying this in order to distinguish the argument of this thesis from another potentially misleading line of criticism.

There is a general consensus in modern biology that essentialism about species classification is untenable, because the actual and possible variation within a biological species need not follow these strict essentialist guidelines.⁵ Whether for any given population there are in fact some universal and distinctive properties is first and foremost an empirical question, the answer to which seems usually to be negative in relation to biological species.⁶ But the deeper point is that biology gives us no reason to assume that the answer *should* be positive. The *temptation* to assume this ‘classificatory’ species essentialism is sometimes taken to be a remnant of what Ernst Mayr calls ‘typological’ thinking – a pre-Darwinian philosophy of nature which accounts for the diversity of species by reference to an ideal reality of distinct type-essences underlying the material world, and accounts for variation between individuals of a type as the more or less perfect realisation of their shared essence.⁷ As Mayr puts it, this ideal reality is composed of “a limited number of fixed, unchangeable “ideas” underlying the observed variability, with the *eidos* (idea) being the only thing that is fixed and real while the

⁴ That is, according to the common ‘biological species’ definition, or related variants based on genealogical relations and reproductive isolation (see e.g. Mayr 1976 [1957]; Richards 2008). I will not go into detail about the various possible ‘biological’ definitions of species; the main point here is to distinguish any such definition from strictly morphological definitions (which could, in many cases, make species essentialism true by stipulation, although it would probably end up dividing most taxa into many more ‘species’ than common biological definitions do).

⁵ For various elements of this anti-essentialist consensus, see e.g. Mayr 1959; 1982; 1992; 1995; Sober 1980; Dupré 1981; 1986; 1998; 2012: 73-74, Ch 16; Hull 1986; Kitcher 1999; Lewens 2012; 2015: Ch 4; Sterelny & Griffiths 1999: 7-10.

⁶ See Sterelny & Griffiths 1999: 7-8.

⁷ Typological thinking might make classificatory species essentialism ‘tempting’, as I say here, but they are not the *same thing* (see also Wilkins 2013). Rather, typological thinking is more closely related with (if not the same as) the ‘essentialism’ behind neo-Aristotelianism (‘teleological essentialism’, or the *poietic* view of becoming). I return to this point in a moment, and in Chapter V.

observed variability has no more reality than the shadows of an object on a cave wall, as it is stated in Plato's allegory".⁸

Darwinian evolutionary science has undermined the idea that biological diversity is carved up in this way, separated into natural kinds with strict boundaries and defining features, determined by some underlying ontological unity within types. Species are "continually evolving clusters of more or less similar organisms",⁹ and the boundaries we appeal to for classificatory purposes can blur into each other, both diachronically and synchronically. In modern biology, claims about the constitution of a particular species, e.g. the composition of 'human nature', are justifiable only as statistical generalisations or abstractions from an empirically circumscribed population of individuals (e.g. the genealogical lineage labelled *Homo sapiens*), not as descriptions of some universal and/or distinctive properties that define species membership.¹⁰ If there does *happen* to be a cluster of properties across a biological species capable of fulfilling this role, that would simply be historical accident, and wouldn't be able to carry the normative weight of a teleological 'essence' inherent in each individual.

As it happens, I think the *poietic* view of life behind the neo-Aristotelian properness concept is a version of the kind of thinking that Mayr calls 'typological', and is undermined by modern biology for related reasons, as I argue in Chapters V and VI.¹¹ However, I think the way to understand this, and to get at the reasons for rejecting the properness view, is *not* to be found by aligning neo-Aristotelianism with the classificatory species essentialism outlined just now. This specific objection is a red herring, as I shall now explain.

Such an objection would go something like the following. The neo-Aristotelian approach to human flourishing assumes that there is a human nature/essence, in the sense of a set of properties universal to all *Homo sapiens* and distinctive of them as a kind, and that it is the human 'essence' in this sense that determines the content of the human good. This presents it

⁸ Mayr 1959: 2; see also Lewontin 2000c: 66-68.

⁹ As Sterelny & Griffiths put it (1999: 8).

¹⁰ This is what, in contrast to typological thinking, Mayr calls 'populationist' thinking, which he takes to be central to biology post-Darwin (see e.g. 1959; 1982; 1992; 1995). On the question of 'human nature' in particular, see Hull 1986; Dupré 1998; Kitcher 1999; Lewens 2015: Ch 4.

¹¹ However, to complicate things further, I think Mayr himself (along with other representatives of neo-Darwinism) fails to live up to his proclamation of the death of typological metaphysics – it re-emerges in the context of developmental theory. I explain this in Chapter V.

with two main problems. Firstly, following the anti-essentialist consensus in biology, there is no such thing as human nature in this sense, and no reason to assume that there should be, so the view is based on flawed biology.¹² Secondly, even if there does *happen* to be a set of universal and distinctive human properties, it doesn't seem that this can give us normative claims of the sort expounded by neo-Aristotelian ethics. Such a move would face the general illegitimacy of moving from facts to values: just because all humans have some particular characteristics doesn't mean it is good for them to have them (whatever we might take this to mean). More specifically, it wouldn't make any sense to posit such characteristics as *oughts* for individuals of a given species, since manifesting these features is the basis on which we determine species membership in the first place. I.e. if one qualifies as a member of the human species, then one *already* manifests the properties that constitute the proposed conception of the human good, allowing no space for comparative evaluation of individual human lives, no space for better and worse cases of 'being human'.¹³ Loss of some essential human property would simply imply that the individual ceased to be human at all, as with my example from II:2 about the water molecule that loses a hydrogen atom: it simply becomes hydroxide, rather than 'defective water'.¹⁴

This sort of objection would indeed present problems for the neo-Aristotelian view, if it understood that view aright. However, for the most part, it doesn't. There are two main reasons for this. Firstly, the kind of neo-Aristotelian claims we have considered, about what

¹² This interpretation and objection is central to Kitcher 1999 (in relation to Hurka's 'perfectionist' approach), and is implied in the brief discussion of biological issues in Lenman 2014: §4.1.

¹³ Dupré makes a similar point in terms of the (normative) notion of 'normality': "We cannot, of course, identify normality with possession merely of the essential properties of the kind to which something belongs, since that is a condition on being a member of the kind at all, normal or abnormal" (1998: 226). Kitcher makes related points at several places in 1999.

¹⁴ This would be the case whether the properties that make up the proposed essence are 'phenotypic' (morphology, behaviour etc.) or 'genotypic', in the sense of properties of the genome itself. If we define a human being as an organism with a particular set of genetic structures, then it wouldn't make much sense to say that the human good was contained in having these definitive structures, since all human beings would, by definition, already have them. A much more likely appeal to genetics would understand the genome as, in some way, defining the proper shape of the organism's phenotype and developmental process. In this case, the good would be the realisation of the form *specified* by the genome, and the genome would constitute or reflect the being's 'essence' in the sense of determining the way it is 'meant to be'. This would be a different kind of biological essentialism to the classificatory variety being discussed here. It would, in fact, be a way of attempting to justify precisely the 'teleological essentialism' I have characterised as *poietic*. For this reason, this conception of genetics is central to the discussion in the following two chapters.

constitutes ‘proper humanness’, for example, are not strictly claims about what determines the classification of individuals as members of the human species *per se*. As mentioned in I:2.1 in relation to Nussbaum, judgements about the good of individuals in terms of species-properness relate to individuals who are already classified as members of the relevant type. Their being so classified is a *condition* of their being subject to the imperatives of a particular life-form.¹⁵ Another way to put this: the objection assumes and attacks the wrong kind of ‘essentialism’.¹⁶ The life-form ‘essence’ that unites all members of a kind is not the properties that determine membership of that kind in the first place, but the properties that they will succeed in manifesting if they fulfil the standards for members of that kind: it’s not about what’s essential for being a human *per se*, but what’s essential for being human *properly*. The objection is correct that essentialism about species classification is unable to provide a rationale for the kind of normative theory we are interested in, but this is not the same kind of ‘essentialism’ that the neo-Aristotelian view involves. The classificatory version imagines organisms as static objects and categorises them according to their actual features. This says nothing about the interpretation of processes of change and development, which is central to understanding the separation of concrete life and essential reality in the properness perspective (see II:2 again).

This response is a special case of the more general response to accusations of fact-value fallacy, given in the preceding section: claims about life-forms are judgements about what is proper or appropriate for beings of a certain kind, not claims about the empirical constitution of any particular individuals, not least claims that all the individuals of some population share some distinctive features universally. Facts about actual and possible variation within a kind are not knock-downs against this view, since variation (read: better and worse realisation of proper form) is to be expected. This is the reason, on this view, that we can make evaluative judgements about the lives of individual beings at all. So, the first mistake of the objection being considered is that it assumes that neo-Aristotelian claims about a species ‘essence’ –

¹⁵ It is also worth noting that the normative implications in question are not only about the development of features that are *distinctive* of one’s kind, which would seem to be implied by the accusation that the approach begins from classificatory species essentialism. Species-properness ethics, at least of the sort I am considering (Nussbaum, Foot/Thompson), concerns the whole form of life of the kind, not just what (if anything) is unique to that kind.

¹⁶ Odenbaugh makes a related point about Kitcher’s (1999) criticism of neo-Aristotelianism – it is off the mark because it assumes that the target is an “excessively strong form of essentialism” (2017: 1039).

about the content of a life-form – refer to some properties actually shared universally in the species. But the neo-Aristotelian view is not derived from empirical claims in this sense (it’s ‘not based on biology’, in the sense of statistical descriptions of biological species). On the contrary, it is precisely the point of this view that not all beings subject to a particular essential life-form need realise all of its features in their existence.

Even if we acknowledge this, however, we might still continue to labour under a second misunderstanding. This would be to think that a ‘kind’ in the neo-Aristotelian schema at least *corresponds* with some standard ‘biological’ demarcation of species, e.g. in terms of genealogical relations or reproductive isolation. This is not necessarily the case. This is another sense in which neo-Aristotelians can claim that their theory is ‘not based on biology’: an organism’s kind-classification, and thus the life-form it is subject to, is not determined simply by its location on the tree of life, as it were.

Nussbaum, for instance, does not include all *Homo sapiens* as subjects of the human life-form. Take the example of individuals with extreme congenital mental impairments, such as anencephalic infants. Instead of classifying them as radically ‘defective’ humans, she treats them as not part of the human kind at all, “but a different form of life”.¹⁷ One might take a different line to Nussbaum, and simply *stipulate* that all *Homo sapiens* are of the human kind. But one would then face the issue of explaining what it is about a genealogically-demarcated group that means all members ought to realise the same characteristic way of living. Nussbaum clearly recognises that the relations that constitute ‘biological species’ are not sufficient for the job of determining the normative life-form that an organism bears.¹⁸ For Nussbaum this seems to be because of the possibility of radical variation in constitution within any such group; thus she ties kind-classification in part to the ‘innate constitution’ of individuals, particularly whether they have teleological ‘potentials’ *for* the functionings that constitute the human life-form.¹⁹ As I argued in II:4, this appeal to innate teleology reflects the (*poietic*) conception of organismic becoming that, I claim, underlies the properness concept of flourishing. On this basis most *Homo sapiens* will, no doubt, be understood to have more or less the same proper form, due to the contingent similarities of their innate

¹⁷ Nussbaum 2006: 187.

¹⁸ As does Thompson (2008: 58-60).

¹⁹ As discussed in I:2.1 and II:4.

constitution, so for practical purposes the neo-Aristotelian will often be able to generalise and treat the human ‘kind’ as co-extensive with *Homo sapiens*. But there is no necessary correspondence between the latter and the former.²⁰ It is worth noting that this separation between ‘kind’ and biological taxonomy is also another way that neo-Aristotelianism can be seen as ‘normative from the start’ – even the classification of an individual into a kind in the first place relies indirectly on judgement about the proper form of the kind in question, combined with, in Nussbaum’s case, an understanding of whether the individual is innately structured towards realising that form.²¹

To summarise, objections against neo-Aristotelianism that appeal to some fact of empirical variation within a biological species can be rebutted by stipulating either that a) the differences in question render some members of that population simply ‘defective’ examples of the kind; or b) place them outside of the ‘kind’ in question altogether. In this way the neo-Aristotelian view protects itself against general accusations of fact-value fallacy (because their idea of species ‘essence’ is normative from the start), and also against the more specific accusation that they draw normative implications from a classificatory form of species essentialism which is biologically untenable, and unable to provide grounds for normative imperatives even if true.

3. Function and evolution

Another major source of bio-oriented criticism, to which we again get the response that the neo-Aristotelian view is ‘not based on biology’ in the sense assumed, has to do with the concept of *function*. Foot and Thompson talk about species ‘life-forms’ not simply as collections of independent elements, but as coherent or integrated wholes. They use a notion of functionality to talk about the internal relations of a life-form.²² The features, activities, and capacities that compose the proper life-form of a particular kind – that constitute “how

²⁰ I will not pursue further the question of whether and how neo-Aristotelians ought to draw lines between ‘defective’ humans and beings subject to different life-forms altogether. This is because the more fundamental issue is whether biology justifies thinking about living beings in terms of the logic of essence-realisation *at all*. This is the focus of the next two chapters.

²¹ It’s not entirely clear to me what determines kind-membership in this sense in the view of Foot/Thompson.

²² See Foot 2001: Ch 2, especially 28-33; Thompson 2008: Ch 4, especially 77-78.

creatures of this kind live”²³ – are all things that ‘play a part’ in that characteristic life, that *fit together* in some specific way.²⁴ That is, they stand in functional relations to each other, in the sense of having “relations of dependence”²⁵ as parts within the integrated whole of the life-form. They make particular contributions to the development, maintenance, or reproduction of the life-form itself, they constitute its ‘way of getting along’.

This gives us some more detail regarding how the content of a species life-form is understood in the Foot/Thompson view. It doesn’t include just any features that we might deem ‘normal characteristics’ of a kind, but only those which stand in some relations of mutual dependence with each other, or with the continued existence of the life-form as a whole.²⁶ To take Foot’s example,²⁷ the noisy rustling of a tree’s leaves when it is windy might in some sense be ‘characteristic’ of the kind of tree in question (i.e. to be expected, perhaps because it is a consequence of its proper development in other respects), but this noise-making (we assume) does not in any way feed back into “the ‘how’ of what happens in the life cycle of that species”.²⁸ It is organisationally irrelevant with respect to the rest of the life-form of trees of this kind. Insofar as it does not ‘play a part’ in the tree’s proper life, the tree’s rustling ‘has no function’, in Foot’s sense of the term. On the other hand, the opening of colourful flowers when it is sunny plays a role, for many kinds of plant, in attracting pollinators, which contributes to other aspects of the life-form, such as its very reproduction. We can link natural-historical judgements such as ‘the iris has colourful petals’ and ‘the iris reproduces

²³ Foot 2001: 28.

²⁴ Nussbaum has also expressed this aspect of the life-form idea. When comparing an individual that has its proper species functionings to one that is missing one of other of them, she says that the life of the former will have “an organic harmony about it, whether the animal is human or nonhuman: the various abilities [will] interlock in a way that is more harmonious than disharmonious” (2006: 192). Thus, she assumes that the components of the life-form of any species ‘fit together’ in a certain internally coherent way. The life of the properly-formed individual will, it is assumed, therefore reflect the internal “organic harmony” of the species life-form.

²⁵ Thompson 2008: 78.

²⁶ This specification was proposed by Foot as an amendment or clarification of Thompson’s earlier discussion of the life-form idea (e.g. Thompson 1995), as a way of specifying the particular normative significance of natural-historical judgements (Foot 2001: 30). Thompson acknowledges this, and incorporates it into his own analysis (2008: 77-78).

²⁷ Foot 2001: 30, 33.

²⁸ Foot 2001: 32.

via insect pollination' by understanding the relations of mutual dependence between the parts and processes referred to.²⁹ These relations can be expressed in functional terms, e.g.: 'The iris's colourful petals *function to* attract insects'; 'the attraction of insects *plays a role in* spreading pollen', and so on.³⁰

To take another example, part of the way that the *human* life-form is enabled and sustained is through certain kinds of social relations. On this basis Foot and Thompson develop their theory that moral virtue be understood according to the same logic of judgement that is applicable elsewhere in life. The virtues of honesty and trustworthiness, for example, play roles in maintaining the integrity of certain forms of communicative and cooperative social relations through which humans live their characteristic kind of life – “we can't get on without” the moral virtues.³¹ An individual with a disposition to lie and break promises is thus 'defective': they fail to realise behavioural characteristics that have functional roles within the human life-form, or, more strongly, such individuals may be positively *mal-*functional in this respect – detrimental to the maintenance of aspects of the human life-form. Moral vice, according to Foot and Thompson, is in this sense a kind of 'natural defect' in humans, like having drab or un-opening flowers is in certain plants, or having no sting is in a bee.

A number of critics of the Foot/Thompson approach have raised objections by latching on to their use of the language of 'function'. The general idea uniting these objections is that a *proper* understanding of evolutionary biology undermines the neo-Aristotelian perspective, by showing that its approach to function in the living world is in some way misguided.

A number of lines of criticism start from the idea that evolution reveals biological functionality to be aimed at the ultimate end of reproductive fitness, usually seen in terms of genetic replication, and that this undermines various elements of the neo-Aristotelian

²⁹ See also Thompson 2008: 72: For any living kind there is a “system of true natural-historical judgments” that are internally related to the “totality” which is the life-form of the kind. Individual (true) natural-historical judgements are “out-takes from such an ensemble”.

³⁰ Thompson states that such inter-relations can also be described in 'teleological' terms, with linking phrases such as 'in order to', etc., but argues that such phrases do not introduce an element of intentionality into the relations (2008: 77-79). Whether we buy his argument or not, I do not think that such language – which certainly *suggests* intentionality – is necessary to express the notion of inter-related and reciprocally dependent systems of parts and processes (see also footnote 55 below).

³¹ Quote from Foot 2001: 17, see also in general Ch 3.

normative perspective. For example, William FitzPatrick focuses on what he sees as a mistaken alignment in neo-Aristotelianism between ‘natural function’ and what is ‘good for’ the organism.³² Because biological functionality is supposedly aimed at reproductive or genetic fitness, rather than organismic welfare, this general alignment is false. Moreover, often the fulfilment of ‘genetic’ functions is positively *bad* for the welfare of the organism, in a straightforward sense to do with their health and survival.³³ For example, a bee’s sting has a function in protecting the hive, and thus promoting the reproductive success of genetic relatives. Yet, fulfilling this function, for the individual bee, is fatal. Similarly, male elephant seals engage in violent competition for dominance, which often leads to serious injury for many individuals. This behaviour has a purely ‘genetic’ function as well; it is not for the sake of benefiting the elephant seals that engage in it. Thus neo-Aristotelians cannot ground claims about the organism’s flourishing in ‘natural facts’ about biological function, because the *real* facts about biological function are that individual welfare is not the general end of biological organisation, and many traits even have biological functions which are contrary to the individual’s own good.

Similar arguments are made regarding the validity of deriving claims about moral virtue from natural functionality. Critics such as Joseph Millum and Jay Odenbaugh appeal to evolutionary biology in ways similar to the above, and argue that on this basis neo-Aristotelianism either ends up being committed to repugnant moral implications, or it ought to reject the idea of deriving moral conclusions from biological function, in order to uphold moral intuitions.³⁴ The objectionable implications can arise in various ways. For example, one might argue that a neo-Aristotelianism that understands biology aright must be committed to seeing reproductive fitness as the *measure* of moral virtue. For example, neo-Aristotelians would only be able to claim that dishonesty is a moral vice if/when it is bad for reproductive fitness. Or it might be seen to imply that what most consider moral virtues are only really so if they have historically been adapted by natural selection for the general end of genetic replication. At the very least this makes virtue and vice contingent and instrumental

³² FitzPatrick 2000. See Lott 2012 for a summary and response.

³³ See e.g. FitzPatrick 2000: 62, 186; Lott 2012: 363-364. Lewens raises a similar objection (2015: Ch 10).

³⁴ Millum 2006; Odenbaugh 2017; see also a similar comments in Andreou 2006.

in a way that neo-Aristotelians clearly do not intend.³⁵ Evolutionary biology seems to imply that the neo-Aristotelian either needs to give up on the idea that moral goodness is a variety of natural goodness, and vice natural defect, or radically revise their moral intuitions about right and wrong – because ‘nature’ seems to play by different rules.

A number of kinds of response are available to the neo-Aristotelian.³⁶ I will focus here on one of the key issues – the different concepts of function at play in these arguments. Neo-Aristotelians tend to respond to this issue in the following way. ‘Evolutionary’ objections like the above either misunderstand the kind of ‘function’ concept that neo-Aristotelians are employing, or if they do understand it they falsely believe that evolutionary biology undermines its validity. This means that there is a certain amount of talking at cross purposes going on. I think they have good grounds for this response.

The concept of function usually appealed to in these ‘evolutionary’ objections is an ‘etiological’ one. Etiological accounts of function do not attempt to simply describe relations between parts of a system as it exists at any one time, but to ascribe to particular parts a ‘proper function’, a role that the entity in question is really ‘for’. Specifically, etiological accounts define the proper function of an entity in terms of what *explains* that entity’s existence in the system.³⁷ According to Larry Wright’s original definition of etiological function, ‘The function of X is Z’ “means (a) X is there because it does Z; (b) Z is a consequence (or result) of X’s being there”.³⁸ For example, I might point at some part of a

³⁵ See also Lott 2012: 360-361.

³⁶ For detailed responses to these and similar objections, see Lott 2012; Hacker-Wright 2009; Woodford 2016. I will not respond specifically to the issues about moral virtue and vice, since my primary subject-matter in this thesis is not this but the concept of ‘flourishing’ more generally (which may or may not include moral virtue – see 0:1.2). Another important response which I won’t consider in more detail relates particularly to the first objection – that evolutionary function is in conflict with the ‘welfare’ of the organism. The response is that the neo-Aristotelian concept of ‘flourishing’ is not necessarily the same as the kind of ‘welfare’ assumed in the objection in the first place. What constitutes flourishing in the sense of ‘being a proper exemplar of the species’ need not be ‘good for’ the individual in the narrower sense assumed (i.e. the objection begs the question about the content of ‘the good’). For example, for the individual bee, the neo-Aristotelian might say that what it *is* to live well, *qua* bee, involves having the capacity and disposition to act in a way that, in certain circumstances, would sacrifice the individual’s very existence. Foot uses this example to make roughly this point (2001: 35). See also Lott 2012: 357-358, 364-366; Hacker-Wright 2009: 313.

³⁷ See e.g. Wright 1973: 154-168; Garson 2011: 526-537. The term ‘etiological’ is derived from the Greek *aitia* for ‘cause’ or ‘reason’ (Garson 2011: 526; Boorse 2002: 65).

³⁸ Wright 1973: 161.

machine and ask the inventor, ‘Why is that there?’, and be satisfied with the answer, ‘Because it makes it go faster’. Part X makes the machine ‘go faster’, and that explains why it is there in the machine – its capacity to produce this effect is the reason the inventor put it there. Thus the ‘proper function’ of X is ‘making it go faster’; that is what X is ‘for’.

In modern biological theory a popular account of functionality in organisms understands the concept etiologically, by attributing the determination of biological function to a history of adaptation by natural selection. This is often known as the ‘selected effects’ account of biological function.³⁹ A trait can have many kinds of ‘effect’, and can ‘contribute’ to the life of the organism in many ways, but what it is really ‘for’ is producing the effect that it was ‘selected for’ in the history of the organism’s lineage, it is ‘for’ playing that role by virtue of which it is an ‘adaptation’. I.e. the proper function(s) of a trait is doing the thing(s) by which ancestors of that trait contributed to the differential reproductive fitness of ancestors of that organism, because this is what explains the part’s existence today, via its proliferation within the benefited lineage.

As an extension of this view we can say that contribution to reproductive fitness (whether in terms of genetic replication or reproduction of offspring) – since this is ultimately what explains the current existence of all parts of an organism ‘with a proper function’ – is the “ultimate purpose” of all functional biological structure,⁴⁰ is the over-arching organising principle in life. Hence the suggestion by some critics that, if Foot *et al* are serious in their appeal the notion of biological functionality, then reproductive success ought to play a central role in the derivation of their conceptions of species good.⁴¹

Defenders of the Foot/Thompson view protest that a) the concept of ‘function’ in their claims about the constitution of life-forms is *not* an etiological one; and b) the concept they do use is

³⁹ See e.g. Garson 2011: 530-537; Griffiths 1993; Godfrey-Smith 1994; Wright 1973: 159.

⁴⁰ George C. Williams uses the phrase “ultimate purpose” in this connection (Williams 1996: 43-44, 157) and the same idea is suggested by Richard Dawkins when he says that the preservation of genes is “the ultimate rationale for our existence” (1989 [1976]: 20). See also Pinker 1997: 42-44.

⁴¹ Although the selected effects concept can be a useful heuristic in certain contexts, I think there are deep problems with it as a basic account of biological functionality, and with the notion of reproduction as an over-arching purpose that emerges from it (for reasons similar to those expressed in McLaughlin 2001: 208-213; Lewens 2004). But this matter will not be discussed in this thesis – all that is needed here is to show that the Foot/Thompson approach is not simply another kind of etiological concept, and that the notion of function they do employ is independently valid.

an independently important one that is not undermined, and cannot be replaced, by etiological analysis.⁴²

Regarding a), they do not in any way tie ascriptions of function to what *explains* the existence of the thing being described. What they are interested in is not what explains why something exists, or why it is the way it is, but rather the *role that it actually plays* in the ‘way of life’ of a being currently in existence.⁴³ *A fortiori*, their descriptions of functional relations within a life-form are not attempts to make claims about evolutionary history. Foot says that statements about a life-form are claims “about a species at a given historical time”; that they deal with “‘stills’ [...] from the moving picture of the evolution of species”.⁴⁴ Distinguishing her meaning from the selected effects (or adaptation) concept, she says: “To say that some feature of a living thing *is an adaptation* is to place it in the history of a species. To say that it *has a function* [in her sense] is to say that it has a certain place in the life of the individuals that belong to that species at a certain time”.⁴⁵ As Micah Lott puts it, “[n]eo-Aristotelian judgments articulate the functional relations within a life form; they do not attempt to explain how the life form came to be as it is”.⁴⁶ None of the thinkers I am considering deny the fact of evolution, nor the importance of natural selection in its explanation, but since their function claims are not etiological, they would also, as it happens, be consistent with other explanations of organic form, such as theological or intelligent design theories.⁴⁷

One might be tempted to respond that, despite these claims, the Footian notion of function *is* really an etiological concept, just one that specifies a particularly narrow time-frame for explanation, e.g. only paying attention to the life-cycle patterns of recent generations.⁴⁸ I

⁴² For elaboration of these points, see Lott 2012; Hacker-Wright 2009; Woodford 2016.

⁴³ Or that was in existence at the time our natural-historical judgements refer to (see Thompson 2008: 65). For example, we might say that ‘The stegosaurus has spikes on its tail’, and ‘Stegosaurus tails spikes play a role in defence against predators’, without implying that there are currently any stegosauruses in existence.

⁴⁴ Foot 2001: 29.

⁴⁵ Foot 2001: 32 (fn 10) (my italics), see also 40 (fn 1).

⁴⁶ Lott 2012: 363, see also 358, 372; Thompson 2008: 79; Woodford 2016: 11, 14; Hacker-Wright 2009: 312.

⁴⁷ Both Foot and Thompson make this point explicitly (Foot 2001: 32; Thompson 2008: 79).

⁴⁸ In this way one might align it with specifically ‘modern history’ versions of selected effects accounts, which are a way of dealing with the fact that functionality changes over time by attributing the determination of current proper function just to the most recent action of natural selection on that trait (see e.g. Godfrey-Smith 1994).

think this would be to miss the point – they are very different *concepts* of function altogether. Let's take an illustration. I still have an appendix; what is its function? There is a straightforward sense in which it 'has no biological function'. That is, the modern human appendix is *vestigial* – it is something which currently *plays no role* in the organisation or maintenance of modern human organisms, even if ancestors of it did so in the lives of ancestors of modern humans (e.g. by helping to digest tough or fibrous kinds of vegetation), and were promoted by natural selection on that basis.⁴⁹ That is, my appendix has no significant 'relations of mutual dependence' with other aspects of my organisation as a living being. This intuitive notion of 'function', according to which vestigial traits are features *without* function, has the same structure as that present in the Foot/Thompson idea of organisational relations within a species life-form. It is not an etiological concept. Employing an etiological concept, one could say that the appendix *does* 'have a proper function' – e.g. helping to digest tough vegetation, assuming that this capacity helps explain why we have appendixes at all – it's just that it no longer *fulfils* that function. These are two different uses of 'function' language altogether, and it is not inconsistent to believe both that the appendix is vestigial in the first sense, and has a 'proper function' in the etiological sense.

The concept Foot and Thompson appeal to is a generalised version of what Dan Nicholson calls the 'organisational' concept of function in biology, "according to which the attribution of functions to the parts of an organism is [...] determined by the means in which each of the parts individually contribute to the realization of the systemic organization that generates and maintains them".⁵⁰ It is a concept that starts from a system of parts and processes that stand in

⁴⁹ On the issue of vestiges in relation to selected effects concepts of function, see e.g. Garson 2011: 535. Regarding the human appendix, this is at least the standard story (Darwin relays it, for example (2010 [1871]: 12-13)). Not everyone agrees that the human appendix has no current function – see e.g. Bollinger *et al* 2007 for a theory about its providing a 'safe house' for certain kinds of gut bacteria. But this is beside the point; for the sake of the example I am simply assuming that the modern human appendix is genuinely vestigial.

⁵⁰ Nicholson 2014a: 355; see similar approach in McLaughlin 2001. Note that this goes beyond both the etiological concept of function and the 'dispositional' concept, which has been its traditional opposite (see also Garson's overview of what he calls 'consequentialist' theories of function (2011: 537-545)). The organisational account, continues Nicholson, "avoids the familiar problems with the two classical philosophical accounts of function: the etiological and the dispositional. The etiological account, grounding function in selected effects, is too narrow to accommodate function talk in areas of biology not directly concerned with historical explanations (such as physiology, development, and molecular biology), whereas the dispositional account, by interpreting any means–ends relation as functional, is too broad to discriminate genuine functions from other kinds of causal relations. The merit of the organizational account is that it explains why some traits are functional while others are not (like the etiological account), whilst focusing on current contributions of function bearers rather than on

relations of mutual dependence with each other and with the whole system, and has to do with internal coherence within the system, holistic integration, how the parts ‘fit together’. One would need to incorporate many levels of analysis, including evolutionary-historical, in order to give a full *explanation* of the structure of the system at any point in time, but this is a different matter to giving a *description* of the functional relations within it, which is what Foot/Thompson are doing by describing the species ‘life-form’ in functional terms.

Regarding b), the organisational concept is a valid and important one for our understanding of living systems, and cannot be replaced by or reduced to etiological terms. Firstly, as just explained, the two concepts are not in competition over the same conceptual turf, but have different subject matters – the first, the relations of integration and dependence between parts of a system (‘how it works’); the second, why something exists as part of the system (‘why it is there’). Secondly, it is the former that is most pertinent in a number of important practical and theoretical domains, such as physiology and medicine. In these fields, the central issue is whether and how something currently plays an active role in the life of the organism in question. It is on this basis that, for example, appendectomies are usually considered safe (the dangers of the actual procedure aside). What we care about is not why the organ is there at all, but if it is *doing* anything of importance. Pointing out that the appendix has a ‘proper’ adaptive function is not evidence against removing it; it is not, in itself, medically relevant. There’s a joke in here somewhere. How about: A selected effects theorist walks into an operating theatre. ‘Stop the appendectomy!’ he cries. ‘That appendix *does* have a function, it’s for digesting tough leaves!’.

To take another example of the precedence of the organisational function notion: when, in the early seventeenth century, William Harvey ‘discovered the function of the heart’ in circulating blood, he did not understand this as explaining the origin (not least the evolution) of cardiovascular systems, but rather as revealing ‘how they work’ in existing animal bodies, as disclosing some significant relations of integration between the activities of existing parts in the context of a whole.⁵¹ Evolutionary history might help us explain how the heart came to be the way it is, and this may well have a lot to do with the roles it currently plays in the life

their histories (like the dispositional account). For this reason, it appears to provide a rather promising means of coming to terms with the functional aspect of life” (Nicholson 2014a: 355).

⁵¹ See also Garson 2011: 534.

of the organism, but the two issues are at least conceptually distinct, and the former cannot replace the latter.

Neo-Aristotelians are therefore able to respond to certain ‘evolutionary’ objections that their conceptions of species good are, once again, not ‘based on biology’, at least not in the way appealed to in the objections. Neo-Aristotelian claims about ‘good functioning’ are not claims about origins or causal history; in particular, when they say that something is part of an organism’s proper species form, they are not saying specifically that it is an adaptation, nor that its function is in general determined by the logic of selection according to reproductive fitness. Moreover, since the organisational concept deals with a different subject-matter – one which is itself important in the life sciences – evolutionary etiological analysis does not undermine or subordinate the general kind of function concept used in the Foot/Thompson view. Thus, criticisms that employ etiological claims about bio-function in an attempt to push neo-Aristotelians into admitting the necessity for different content in their conceptions of the (e.g. human) good, either misunderstand the kind of ‘function’ concept that neo-Aristotelians are employing, or if they do understand it they falsely believe that evolutionary biology undermines its validity.

At this point it is worth noting some similarities and differences between the Foot/Thompson notion of proper life-form and the perspective that I advocate in this thesis. The notion of organisational functionality we have just seen manifested in the context of the former is structurally very similar to the way I describe the character of ‘being-well’ in the self-creative perspective (III:2). That is, in terms of integrative coherence or internal harmony between ‘parts’ of the life as a whole.⁵² Reflecting this, when I talk about organismic ‘functionality’ in the remaining two chapters I will also be invoking the organisational concept, unless otherwise stated. I have praised Foot and Thompson here for their use of the organisational concept of function *in general*. It calls attention to a mode of thought central to understanding

⁵² The correspondence is between being-well and functioning *well*, of course, not merely a description of the relations of dependence within a life – these relations can be fulfilled through the successful performance of component processes etc., or they can be unfulfilled, integration between parts can break down through some part failing to play a role through which the coherence of the whole is sustained, etc. The same logic applies in both organisational-functional understanding of physiology and in my concept of individual being-well, which is a more general application of the same idea.

living phenomena, and provides, as Peter Woodford puts it, an important “corrective” to the dominant focus on the etiological evolutionary concept.⁵³

However, the way they apply it is still problematic. The main problem – and the main way that my use of the idea differs from the Foot/Thompson use – has to do with *the object that is being functionally described*. The primary object of description in the Foot/Thompson view is not the actual ‘way of getting along’ of any particular organism, but that determined by what they call the species ‘life-form’ – a general model understood in abstraction from individual particularity and turned back on individuals as a transcendent standard, entailing normative criteria for those seen as falling under it, as tokens to its type (see I:2.1). However, organisational functionality should be understood, first and foremost, in relation to a *particular* concrete living system, i.e. as a description of what constitutes the internal coherence of an *individual* life. To quote Nicholson on this idea again: “In a way, it is *the organism itself that adjudicates the ascription of functions* to its parts according to how they help *it* meet *its* physiological needs and cope with *its* environmental surroundings”.⁵⁴ As is explained in much more detail in Chapter VI, organisms can be ‘put together’ in many different ways. Research into plasticity and context-sensitivity is showing how the most coherent a picture of organismic becoming is one in which the being’s form and functional relations are established *within* its particular ontogeny, rather than somehow pre-designated as particular ends for this process to realise.

We might well draw statistical *generalisations* about functionality within some set of individuals, e.g. a biological species – and our ability to do so more or less reliably is the basis of standardised medical practices, for example – but it is the concrete individual which is ontologically (and normatively) prior here, in understanding the determination of *actual* functional relations. On the Foot/Thompson view, it is instead the ‘life-form’ that ‘adjudicates’ proper organisation in the individual: it presents individual organisms as falling under a transcendent model according to which their (proper) functional organisation is pre-designated. Although they invoke the organisational concept of functionality in their description of *this transcendent model*, functionality *in the organism* is seen as subordinated to this, as having this model given to it as a representation of the functional organisation it is

⁵³ Woodford 2016: 2.

⁵⁴ Nicholson 2014a: 355 (my italics).

supposed to manifest. I.e. the species life-form is understood as having an internal coherence or organisational harmony *in itself*, but the good of the *individual* lies in their life corresponding *with* this model.⁵⁵

Thus, according to the perspective advocated in this thesis, the Foot/Thompson perspective gets the ontological relationship between organismic becoming and form/functionality the wrong way round. In the self-creative view, the good (being-well) of the individual involves their living in accordance with *an* internally coherent way of being in the world, but it does not demand that the way that they actually *do* live corresponds with an idealised model of life prescribed ‘by nature’, as it were. This indicates how engaging with developmental biology can provide valuable resources for understanding the possibilities for conceiving flourishing as an ‘organic’ concept of the good.

4. The fact/value dilemma revisited

The various ‘not based on biology’ responses that we have seen here are designed to immunise neo-Aristotelians against a variety of bio-oriented criticisms, such as those that take facts about empirical variation in a biological species to undermine their claims about the content of a species essence, or those that attempt to push them into deriving conceptions of the good from ideas about evolutionary adaptation. As far as the argument of this thesis is concerned, I grant the legitimacy of these responses here, and thus also that many of the common bio-oriented criticisms neo-Aristotelians face are, as they tend to say, talking past them.

However, before moving on it is worth discussing a general dilemma that arises as a *result* of this defensive strategy. This has to do with how far neo-Aristotelianism can immunise itself

⁵⁵ Foot and Thompson also use the language of ‘teleology’ to describe the internal functionality of the life-form (e.g. Foot 2001: 32-33). I have avoided this language in the discussion of functionality here, primarily in order to avoid conflation with the way I have used the term earlier, referring to the general (*poietic*) characterisation of development as a process with ends fore-seen in a pre-given essence, towards which it aims. This kind of teleology is implied in the life-form view, when applied to particular individuals (see Chapter II) (and is in this respect parallel with Mayr’s notion of ‘teleonomy’ – see V:2.4). If one wants to use the term ‘teleology’ in the sense implied by Foot/Thompson – as a synonym for internal organisational functionality (whether that of an individual organism or a species ‘life-form’) – then that is fine. But it means something quite different in this application to the notion of teleological *process* that I invoked in the characterisation of the *poietic* metaphysics of life. See also Oyama’s critique of Mayr’s notion of teleonomy (2000a [1985]: 149-154), and her reading of ‘goals’ in biology as functional relations in inter-dependent processes, subject to change (185-187).

against ‘empirical defeaters’ and still claim the mantle of ethical ‘naturalism’ (Foot and Thompson), or (in Nussbaum’s case) the claim to be giving an ‘objective’ account of human essence that can stand in authority over subjective preferences. Each time neo-Aristotelians dismiss empirically-grounded objections, they hang the content of their conceptions of the good more and more on independent normative judgement. The logical end-point of this is that, in Thompson’s words, it “seem[s] to cut our propositions entirely free of ‘the facts’”.⁵⁶ If any inconvenient empirical fact can be rebutted as irrelevant in this way, then it is hard to see what is left of the ‘natural’ or ‘objective’ facts that they claim to stand upon. It seems that, e.g., ‘the proper human form’ can be anything we want it to be.⁵⁷

Let’s look at this dilemma firstly in terms of Nussbaum’s view, and the issue of intra-species variation as discussed in Section 2 above. Nussbaum introduces her approach to quality of life in order to counter the perceived problem of ‘adaptive preferences’ (see 0:1.3 and III:3.4). Nussbaum goes beyond Sen’s critique of utilitarianism by arguing that simply moving from a focus on pleasure/satisfaction to functionings will not counter the problem of adaptive preferences, because we will still have the question of which functionings are the most valuable, and which it is thus the proper aim of social policy to enable. If this question is also answered by simply asking the individuals whose good is in question which functionings they most value, then it is no better off than the utilitarian approach.⁵⁸ We need, she says, “a procedure of objective evaluation by which functionings can be assessed for their contribution to the good human life”.⁵⁹ The procedure she proposes, as explained in I.2.1, is to “[ask] ourselves what is most important, what is an essential part of any life that is going to be rich enough to count as truly human”.⁶⁰ The idea is that this procedure is less susceptible

⁵⁶ Thompson 2008: 72, see also 81. Although it does go beyond the facts about any particular individual or group of individuals, Thompson still insists that judgements about a life-form are capable of truth and falsity, that there *are* facts about life-forms to which they answer (e.g. 81). I think this idea is easily pushed into incoherence.

⁵⁷ This general line of criticism – presenting neo-Aristotelian ‘naturalism’ with a dilemma in which it must either accept the normative significance of certain inconvenient ‘biological’ facts, or accept that it is not really ‘naturalism’ at all – is found in some of the critics I have already referred to (e.g. Kitcher 1999; Millum 2006; Andreou 2006; Odenbaugh 2017), and in some others (in particular Antony 2000; Woodcock 2006; 2015).

⁵⁸ Nussbaum 1988: 174-178.

⁵⁹ 1988: 176.

⁶⁰ 1988: 175.

to ‘adaptive preferences’ because it asks us to identify ways of human life that are valuable universally.

Enter the criticisms of ‘human nature’ from within-species variation, which put in question the necessity, or even the existence, of a shared universal ground on which such a judgement might be made. If the response to this sort of threat is to retreat to a ‘normative all the way down’ position (or what Nussbaum calls ‘internal’ essentialism),⁶¹ then the claim to determinacy and objectivity is severely weakened. From this position, the line between mere ‘variation’ and ‘deviation from proper form’ will be determined by the normative judgement of the proponent (see Sections 1 and 2 above), which means that the account of ‘proper human form’ will only be authoritative to those who already value the things deemed to be essential, or who can be convinced to value them.⁶² Thus we have still gained no secure ground above ‘subjective preference’ in the way Nussbaum hopes.

This problem also exists for the Foot/Thompson approach, and again has to do with the derivation of content for claims about the species life-form. Even given the *general* validity of the organisational concept of function that they appeal to, they seem to face problems justifying the claim that the internal functionality of every member of a species ought to be organised in the same way.⁶³ How are they justified in insisting, for example, that certain traditional moral virtues are a necessary part of the coherence of *all* human lives, by virtue of a shared ‘nature’? Some commentators, such as Chrisoula Andreou and Alasdair MacIntyre, have argued that based on this general idea of ‘how certain kinds of lives characteristically get along’ it is equally plausible that there is a plurality of ‘life-forms’ within the human species, some of which manifest contrary functional facts.⁶⁴ Consider, for example, the cunning and manipulative liar, or talented free-rider. These kinds of people have a holistically coherent way of life, but one that involves taking advantage of the kinds of cooperative structures that make other people’s kinds of life possible. These are kinds of human life that

⁶¹ See also e.g. Nussbaum 1992.

⁶² See in particular Antony 2000 on this point. For Nussbaum’s response see her 2000b: she accepts this point, but doesn’t seem to acknowledge the problem it presents for her attempt to identify ‘objective’ grounds for normative judgement, beyond subjective preference.

⁶³ See in particular Woodcock 2006; 2015.

⁶⁴ See Andreou 2006; MacIntyre 2002: 626-627.

(we assume) most would consider morally vicious, yet, given that they are internally coherent ways of ‘getting along’, of which moral vice is a part, then we cannot, as Foot/Thompson would wish, describe their vicious character traits as ‘natural defects’. These kinds of people might even be considered valuable for strengthening the cooperative social structures on which they are parasitic, because they make others more vigilant.⁶⁵ Consider also my example of the sacred three-legged horse from III:2. The point of this was that the internal organisational functionality of its *particular* life was consistent with, even dependent on, its having what the neo-Aristotelian would deem a ‘defect’. They can’t justify the claim that the ‘normal’ horse standards are relevant for this particular horse based simply on the idea of organisational functionality – the problem is explaining why the functional relations internal to the supposedly universal ‘species life-form’ *ought* to be re-produced in any particular individual.

Yet defenders of Foot and Thompson can (and do)⁶⁶ reject such ‘counter examples’. The general argument seems to be: if you think these kinds of case present alternative candidates for accounts of human/horse flourishing, then you simply have not grasped the content of the human/horse good. With a little reflection we are all supposed to see that these kinds of people simply are defective humans, and the sacred horse simply a defective horse; these are the facts, and they tell us what is good for the individuals in these cases, end of. What this ultimately comes to is the assertion that their normative intuition, about how a token of ‘the species’ *ought* to be, trumps all. In relation to the human/moral vice examples, Hacker-Wright is explicit about this, and admits that the Foot/Thompson view is “*counting on our recognition of certain moral norms* to validate [the posited view] about the characteristic human life”, a position “that will no doubt sound to many readers decidedly non-naturalistic”.⁶⁷ Indeed. If so, then it seems that this view cannot *also* claim that it is ‘natural facts’ about ‘human life’ that validate the moral norms they advocate.

This debate seems to lead to something of an impasse: regarding any putative content of the human form, critics can argue that empirical grounds for its universality are lacking, to which neo-Aristotelians respond that their affirmation of this particular content is not based on

⁶⁵ This is MacIntyre’s point (2002: 626-627).

⁶⁶ See e.g. Hacker-Wright 2009: 317-319.

⁶⁷ Hacker-Wright 2009: 315 (my italics).

empirical grounds, but on an already-normative idea of the species essence. To the extent that neo-Aristotelians aspire to ‘objectivity’ or claims about ‘nature’, they invite such criticisms, but when faced with them it is always possible to retreat to a position in which they fall on deaf ears.

5. Flourishing and the question of biology: from content to form

For many, this impasse may well be sufficient reason to abandon any discussion of the relationship between neo-Aristotelianism and biology. If we take neo-Aristotelians at their word, then their theories are *not* ‘based on biology’ in any substantive sense, and so continuing this line of enquiry is futile. At one level, I think this is probably the case, or at least I grant it to the neo-Aristotelian for the sake of argument. However, to abandon the issue here would, I think, be to miss the more interesting level at which the properness concept of flourishing as such interacts with an underlying conception of biological reality. The lines of criticism discussed in this chapter all, broadly speaking, concern how the *content* of a particular conception of the good is derived. It seems to me that the deeper ‘question of biology’ in relation to neo-Aristotelian ethics relates not to the grounds for including particular content in one’s conception of species flourishing, but to the *form* of normative logic that characterises the general concept of flourishing employed, whatever that content.

I have already outlined this underlying conceptual structuring, at least as revealed in the thought of Foot/Thompson and Nussbaum, in Chapters I and II. It is worth stressing here that allowing to neo-Aristotelianism the defensive strategy discussed above, of denying the derivation of particular norms from empirical claims and retreating to a ‘normative all the way down’ position, does not undo this earlier analysis: the structuring of the properness concept itself by the assumption of a metaphysics of proper living form etc. is *independent of the issue of how content is derived*. Hacker-Wright makes this explicit (see also II:1):

[G]rasping something *as an organism* requires us to situate the organism against its species or life-form. [...] The existence of a life-form *is presupposed whenever we identify anything as an organism*. [...] [T]o identify something as an organism is *ipso facto* to look

at it from [this] normative standpoint; and this is (logically) *before* developing any empirical theories of the organism.⁶⁸

The last part of this statement alludes to the now-familiar denial that empirical/biological claims are the basis for the particular *content* of a conception of species life-form – understanding of what is proper to a species is not simply taken from statistical generalisations about a population or theories about evolutionary history, for example. However, regardless of how this content *is* actually derived – the issue on which the debates discussed in this chapter centre – what this statement also reveals is the way in which the *form* of what I call the ‘properness’ concept, the particular normative logic of this concept, is nonetheless *presupposed by apprehending the organic as such in a particular way*, as something that inherently demands the logic of judgement-according-to-a-proper-form. Simply “grasping something *as* an organism” requires that we “situate [that] organism against” what we understand to be its *proper* way of living *qua* member of its kind. This *concept* of flourishing is, as Scott Woodcock (a critic) puts it, “derived from a logical form that is presupposed when we categorise something as a living organism”.⁶⁹ This is why, in Part 1, I focused on this more fundamental normative conceptuality, rather than on the content of any particular conception of the good.

To summarise, it may be allowed that many of the biologically-oriented criticisms faced by neo-Aristotelianism are misplaced, at least at a certain level of analysis. Nonetheless, the logic of properness itself is seen as arising simply from the fact that the objects of evaluation are living beings. As I argued in Chapter II, this presupposition is naturalised by a particular understanding of living nature – what I call a *poietic* metaphysics of life. Therefore, the more fundamental question of whether the living world does in fact necessitate, or even support, the assumption of this metaphysics, is pertinent to the coherence of the perspective itself. And this *is* a question in which biological theory has a legitimate role to play.

Thus, after this extended aside, we can return to the questions posed at the beginning of Part 2 (Introduction), regarding the adequacy of different interpretations of organismic becoming for apprehending living phenomena as such, and regarding the resources we can garner from

⁶⁸ Hacker-Wright 2009: 310-311 (my italics, apart from “*ipso facto*” and “*before*”). See also Lott 2012.

⁶⁹ Woodcock 2015: 20.

biological theory for addressing this issue. This is the level at which the remainder of Part 2 is pitched.

Chapter V

Get with the Programme: Becoming as *Poiesis* in Modern Biology

Introduction

Over the remaining two chapters I argue for the following response to the questions posed at the beginning of Part 2: The most coherent picture we have of the becoming of living beings is one that rejects the *poietic* and affirms the *praxic* metaphysics of life. Therefore, the interpretive lens assumed by the ‘properness’ theories of Foot/Thompson and Nussbaum is not a necessary part of a proper apprehension of living phenomena as such. On the contrary, it is inadequate to the reality of organismic becoming, and, furthermore, a conception of life that reflects the logic of *praxis* emerges as superior.

In making this argument I appeal to a theoretical perspective on ontogeny that has risen in prominence in recent years, which I refer to as developmental constructivism (see Chapter VI). This view sees organic form and functionality as the unique product of each particular life course, as emergent from the contingent series of interactions within a system of heterogeneous elements that constitutes the being’s particular ontogeny. The organic ‘product’ – the organism’s form, structural/functional relations and norms, ‘ways of living’, and so on – is not prescribed in advance of ontogeny, but ‘constructed’ within the process itself. And this process is ongoing throughout life; there is no state of ‘completion’ in which the organism fully realises an essence, only the continuous generation and re-generation of living existence through multiple layers of interactivity. Developmental constructivism therefore sees the immanent creativity and reflexivity of *praxis* as central to the becoming of living beings as such.

I return to this picture and the positive argument for it in the next chapter. But first, it is important to gain an understanding of the thinking that developmental constructivism attempts to overcome, since it is defined as much by what it opposes as by the positive picture of ontogeny that it presents. In this chapter I outline the main target of this perspective in the context of modern biological thought – the neo-preformationist concept of the genetic ‘programme’, and related notions – and show how it is instead part of a *poietic* metaphysics of life. In Chapter VI I then outline the constructivist critique of this way of thinking, and argue that developmental constructivism presents the most coherent picture we have of

organismic becoming, and that this demands a general aspect shift in our apprehension of living form and process, from the *poietic* to the *praxic*.¹

How should we understand the status of the discussion of biology in these two chapters, in relation to my analysis of the conceptuality of ‘flourishing’ in Part 1? As follows: The significance of this theoretical dispute over the nature of ontogeny is that it shows the antagonism between *poietic* and *praxic* metaphysics of life to be *playing out within the arena of contemporary life science*. By disrupting the former, previously dominant, way of thinking, and opening up space for the latter, the ‘constructivist turn’ thereby provides a philosophical resource for the task of re-thinking the notion of flourishing as an ‘organic’ concept of the good, and provides ground for the kind of re-thinking proposed in Chapter III.

As this suggests, as well as looking outwards from biological theory towards the concept of flourishing, the argument of these two chapters also provides an *internal* critique of modern biology. I shall outline this sub-narrative first.

1. Darwinian biology: beyond ‘Platonism’?

The question of the biological validity of what I have called the *poietic* view of life – the thinking present in the teleological essentialism of ‘folk biology’ (II:2), the Platonic dualism of transcendent *eidoi* and concrete appearance (II:3), and neo-Aristotelian life-form ethics – might seem straightforward. As mentioned in IV:2, modern biology tends to see itself as having jettisoned this sort of metaphysics due to the revolution in worldview precipitated by Darwin’s theory of evolution and the historicisation of species.² As Mayr puts it, modern biology has shifted from ‘typological’ (or ‘essentialist’, or ‘Platonist’) thinking, in which variation between individuals of a species reflects the more or less perfect realisation of an *eidos*, to a ‘populationist’ view in which statistical generalisations can be abstracted from the actual composition of a population, but not essences inferred.³ The implication seems to be that the *poietic* dualism of essential form and concrete becoming, in-forming *eidos* and in-

¹ The conceptual alignment of constructivism/*praxis* and neo-preformationism/*poiesis* has also been articulated by Rehmann-Sutter (2006).

² See e.g. Mayr 1959; 1982: 39, 45-47, 87.

³ See IV:2; Mayr 1959; 1982; 1992; 1995; also e.g. Sober 1980; Hull 1986; Lewontin 2000c: 66-68.

formed matter, no longer holds water. Thus, we might think, surely the metaphysical assumptions of the neo-Aristotelian concept of flourishing are an obsolete format for apprehending living phenomena?⁴

Ultimately, the answer to this is yes: the idea of a transcendent ‘nature’ that prescribes proper form to individuals is undermined by our most coherent understanding of life. However, as I shall explain in this chapter, the story is not quite as simple as ‘Darwinian biology has buried Plato’. This is because modern biology (primarily in its dominant ‘neo-Darwinian’ incarnation)⁵ has failed to live up to this anti-essentialist self-image; it has in certain ways remained tied to a framework of understanding that it purports in general to have overcome. ‘Species’ might have been historicised, and taxonomic classification correspondingly de-essentialised (see IV:2), but due to the prominence of certain (*poietic*) concepts at the level of the individual, particularly the notion that ontogeny is the unfolding of a genetic ‘programme’, “[b]iology remains in many ways obdurately Platonic”, as Richard Lewontin put it over thirty years ago.⁶ In the decades since, developmental constructivism and related approaches, which attempt to go beyond this conceptual framework, have moved from the fringes of theory to gain prominence in a number of fields of biology.⁷ However, *poietic* metaphors remain to a large degree embedded in both popular and scientific understanding.⁸

Thus, as I argue, Darwinian biology is yet to fully complete its own revolution against Platonic essentialism; it is still in the process of articulating it.⁹ By providing a way to purge

⁴ Overviews of the question of biology in neo-Aristotelianism often present the issue as straightforward in more or less this way (see e.g. Lenman 2014: §4.1).

⁵ By ‘neo-Darwinism’ I refer here to the school of thought, dominant in biology in the latter half of the twentieth century, that combines the early-century ‘modern synthesis’ of natural selection theory and Mendelian genetics with the dominant assumptions of molecular genetics, in particular the idea that biological inheritance is exclusively mediated by nuclear DNA (see Dupré 2012: 144 for more detail on this definition). The element that primarily concerns me in this and the next chapter is the idea that DNA contains coded ‘instructions’ for producing a particular phenotype, and thus ‘programmes’ development. This idea, if not a strict implication of neo-Darwinism in the above sense, is almost always promulgated alongside it.

⁶ Lewontin 2000c: 67 (first published 1983); he has repeated the claim more recently (e.g. 2000a [1998]: 6-10). See also Oyama 2000a [1985]: 137, 159.

⁷ See Chapter VI Introduction.

⁸ See also Rehmann-Sutter 2006: 323-327.

⁹ See also Lewontin 2000c: 66-68.

its lingering *poietic* tropes, and thereby render the thinking of modern biology coherent with its self-image, developmental constructivism represents an important moment in the advancement of Darwinian biology's metaphysical revolution (see Section 3 below and VI:3.2).

2. Genetics and the *poietic* view of life

2.1. Genetic essentialism and the programme concept

The rise in the twentieth century of molecular biology as the dominant arena for the study of life centred on the analysis of a certain macro-molecular structure found in the nuclei of all the cells in a living body: DNA. The full collection of DNA molecules in a cell, arranged into chromosomes, is called a genome. Genomes, as material objects, are causally involved in a number of processes, such as the production of proteins, and the specific sequences of nucleotides (molecular elements) in a genome, often understood as divided up into 'genes', can make important differences to the results of such processes. What is interesting for our present purposes is not so much the empirical detail of the processes in which DNA is involved – although I return to this in Chapter VI – but the structure of a certain popular mythology and “mystique” that has built up around DNA and the genome.¹⁰

In this mythology the genome has come to represent an apparently materialistic version of the notion of the organism's true 'nature' or 'essence' that I traced in various forms in Chapters I and II. The pinnacle of this popular mythology was reached in the rhetoric around The Human Genome Project (HGP), the late-century undertaking to sequence the full set of DNA nucleotides in a human cell nucleus. Walter Gilbert, an early scientific proponent of the project, prophesied in the early 1990s that upon its completion, we will have put “three billion bases of sequence [...] on a single compact disc (CD), and one will be able to pull a CD out of one's pocket and say, “Here is a human being; it's me!”¹¹ This essentialist enthusiasm was amplified by the comments made by project leader Francis Collins and US

¹⁰ I borrow the term “mystique” from Nelkin & Lindee's seminal sociological study “The DNA Mystique” (1995).

¹¹ Gilbert 1992: 96.

President Bill Clinton to mark the completion of a ‘rough draft’ of the human genome in 2000:

Today, we celebrate the revelation of the first draft of the human book of life. [...] It is humbling for me and awe-inspiring to realize that we have caught the first glimpse of our own instruction book, previously known only to God. [...] What more powerful form of study of mankind could there be than to read our own instruction book?¹²

Today, we are learning the language in which God created life.¹³

Thus, it seems, the secret to fulfilling the Delphic maxim ‘know thyself’ lies in revealing the content of this inner message.¹⁴ The genetic ‘book of life’ can tell us who we really are.¹⁵ This ‘who we are’ can be read at an individual level: the genetic essence as secular equivalent of the soul, defining each individual’s true character, identity, and even destiny.¹⁶ Or it can be read at a species level: ‘the *human* genome’ as defining what it really is to be human, the fundamental nature that unites all individuals *qua* humans. Often it is both at once, as in Gilbert’s claim that the CD in his pocket will contain the essence of both “a human being”

¹² Collins 2000.

¹³ Clinton 2000.

¹⁴ See the comments of Charles DeLisi, another key architect of the HGP: “[T]he quest for the type of knowledge that the [HGP] will generate has, in one form or another, been an integral part of our intellectual heritage for centuries. It recalls one of the three great precepts chiselled on the temple at Delphi and echoed two millennia later in Alexander Pope’s *Essay on Man*: [‘know thyself’]” (1988: 488).

¹⁵ As well as increased *knowledge* of ourselves, another hugely important promise of the science of genetics is the possibility of increased *control* over ourselves. The vision of modern genetic technologies as giving us the power to cure diseases, decide the characters of our children, and even transcend the limitations of our ‘natural’ human condition, by re-writing the instructions of life itself, is animated in part by the very idea of the genome as essence (see e.g. Mauron 2002: 957). On this mythology rests much of both the confident aspiration (e.g. Bostrom 2003; Harris 2007) and moral repugnance (e.g. Kass 1998 and Sandel 2007, discussed in Lewens 2015: Chs 2 & 4; and Habermas 2003, discussed in Barnes & Dupré 2008: Ch 7) that can be inspired by advances in technology for genetic manipulation. The topics of genetic engineering, transhumanism, and so on, bring up an entire field of issues – philosophical, technical, moral, and political – that I am deliberately leaving to one side here. The relationship between these issues and different concepts of flourishing, or the good and the bad in general, is a question that I would like to pursue in future work.

¹⁶ Or, perhaps a not-so-secular equivalent, as the Collins and Clinton quotes suggest (Collins is a Christian scientist who is explicit in his understanding of DNA as the ‘language of God’ – see Collins 2007). See Nelkin & Lindee 1995 for a plethora of illustrations of this modern ‘folklore’ of the genome as soul, essence of individual identity, and embodiment of fate; also Mauron’s (critical) analysis of the same idea (2001; 2002), and similar in Scully 2006; Rehmann-Sutter 2008; Oyama 2009; 2010.

and “me”.¹⁷ As well as representing our ‘true nature’ in these ways,¹⁸ the genome is seen as an “instruction book”, a set of commands for the proper manifestation *of* this nature in the concrete organism.

Comments such as these might seem like lyrical flourishes added atop hard-nosed science in order to capture public imagination, and to some extent they are. But they are not simply this; the essentialism they express is in fact validated by the dominant language of modern life science. Of particular importance in this regard is the alignment of the genome with the concept of a ‘programme’, and some closely related notions such as ‘code’, ‘blueprint’, and ‘information’, semantic/quasi-intentional concepts to which the genome seems well-fitted by the omnipresent depictions of it as a sequence of letters (As, Cs, Gs, and Ts). These informational metaphors were borrowed from computer science and communications theory, fields that were burgeoning around the time of the molecular discoveries of Francis Crick and James Watson in 1953, and DNA’s subsequent rise to fame.¹⁹ The first uses of the term ‘programme’ to interpret genetic material came a few years later.²⁰ This is the aforementioned Ernst Mayr, leading figure in neo-Darwinism, in 1961:

The completely individualistic and yet also species-specific DNA code of every zygote (fertilised egg cell), which controls the development of the central and peripheral nervous

¹⁷ Gilbert 1992: 96. Incidentally, this ambiguity highlights a major flaw in the notion that what the HGP eventually published in 2003 was ‘*the* human genome’ (see ‘International Consortium Completes Human Genome Project’ (2003), non-authored article by the National Human Genome Research Institute (NHGRI)). It published a ‘full’ genome, but this was not a sequence of nucleotides that is found in all humans, since there is much variation between individual genomes. It was actually composed by combining information from a number of different individuals. It was, at best, a potential human genome, although in reality, as Lewontin puts it, “a mosaic of some hypothetical average person corresponding to no one” (2000c: 155).

¹⁸ And possibly in other ways (see 2.2 below). The ideas of species essence and individual identity are just the most common ways of understanding the genetic definition of ‘true nature’.

¹⁹ On the history of these connections, see Kay 2000; Keller 2000: Ch 3; 2002: Ch 4; Peluffo 2015.

²⁰ It seems (see Keller 2000: 80, 159 (fn 11); Peluffo 2015) that this term was first used in print simultaneously by Mayr (1961) and Jacob & Monod (1961: 353-354). It was soon after elaborated more explicitly, e.g. in Jacob’s *The Logic of Life* (1993 [1970]: e.g. 1-10). Erwin Schrödinger’s popular book *What Is Life?* (1992 [1944]) is a key example of even earlier use of informational and textual metaphors such as ‘code-script’ to refer to the contents of the cell nucleus (see Ch 2 in particular). Chromosomes, he claims, “contain in some kind of code-script the entire pattern of the individual’s future development and of its functioning in the mature state” (1992 [1944]: 21); see also Nicholson 2014b: 164.

systems, of the sense organs, of the hormones, of physiology and morphology, is the *program for the behaviour computer* of [an] individual.²¹

And this is François Jacob, Nobel Prize-winning molecular biologist, in 1970:

Heredity is described today in terms of information, messages and code. [...] What are transmitted from generation to generation are the ‘instructions’ specifying the molecular structures: *the architectural plans of the future organism*. They are also the means of executing these plans and of coordinating the activities of the system.²² In the chromosomes received from its parents, each egg therefore contains its entire future: the stages of its development, the shape and the properties of the living being which will emerge. *The organism thus becomes the realization of a programme prescribed by its heredity*.²³

Jacob also makes explicit the derivation of the programme concept from computer science:

The programme is a model borrowed from electronic computers. It equates the genetic material of an egg with the magnetic tape of a computer. It evokes a series of operations to be carried out, the rigidity of their sequence and their underlying purpose.²⁴

These are typical examples of the language of the genetic programme; the notion that the chromosomes carry lines of coded information that instruct the development of the organism, and thereby specify the structural and behavioural properties it is to manifest when fully formed. The genome is seen as both a coded ‘instruction book’ for building the organism, and, implicitly or explicitly, as its ‘architectural plan’, a representation of the organism’s essential nature, and thus of the way it is *meant to turn out* in concrete reality.²⁵ In this way the popular essentialist mystique around DNA is validated by the scientific use of the genetic

²¹ Mayr 1961: 1504 (my italics).

²² I.e. the genome is not just a set of templates for specific proteins, but also the instructions for the coordination of their production and use in constructing the organism – i.e. a whole programme for ontogeny. See Jacob & Monod 1961 for a detailed exposition of this idea.

²³ Jacob 1993 [1970]: 1-2 (my italics).

²⁴ Jacob 1993 [1970]: 9.

²⁵ See also Dawkins 1989 [1976]: Ch 3.

programme metaphor, and related notions.^{26 27} As Oyama *et al* put it, “[o]nce an outcome is seen as an expression of the genetic information that controls development, it acquires a special status. It represents what the organism is “meant to be,” and deviations from it are misrepresentations of the true nature of the organism – its inner essence, which was conferred on it at the moment of conception”.²⁸

The programme concept has also been described as a modern version of ‘preformationism’ by some critics.²⁹ Preformationism in its classical form, prevalent in debates about the nature of ontogeny in the seventeenth and eighteenth centuries, was the theory that a fully-formed but miniature ‘homunculus’ of the organism was present in the zygote, which simply grew larger once placed in the appropriate conditions.³⁰ The genetic programme conception can be seen as a neo-preformationism because, in the words of Lewontin, “there is no essential difference, but only one of mechanical details, between the view that the organism is already formed in the fertilized egg and the view that the complete blueprint of the organism and all the information necessary to specify it is contained there”.³¹ In the modern version, the organism’s ‘finished’ phenotype is not literally already there in miniature, but is there in essence, represented in informational form. And its ontogeny, rather than a literal physical unfolding, like the petals of a flower opening up, is the reading out of this coded information,

²⁶ See e.g. Oyama 2000a [1985]: Chs 5-6; 2000b: 152-155; 2002; 2009: §§3.2.2-3.3; 2010: 406-407, 410-416; 2011; 2016; Oyama, Griffiths & Gray 2001: 3; Lewontin 2000a [1998]: Ch 1; Mauron 2001; 2002; Scully 2006; Barnes & Dupré 2008: Chs 7 & 8; Godfrey-Smith 2007: 113; Rehmann-Sutter 2008: 39; 2010.

²⁷ There is of course much more to the history of the ‘genetic’ or ‘hereditary’ substance as an informational representation of the organism’s essence. It goes back at least to Wilhelm Johannsen’s distinction between ‘genotype’ and ‘phenotype’, the former meaning the “inner constitution” of the being, and the latter merely a perishable manifestation or appearance of this (‘phenotype’ was named after the Greek term *phainein*, ‘to appear’) (Meloni 2016: 60-62). For lack of space, historical matters such as this must unfortunately be side-lined here.

²⁸ Oyama, Griffiths & Gray 2001: 3.

²⁹ E.g. Lewontin 2000a [1998]: 5-7; 2000b: xii; Oyama, Griffiths & Gray 2001: 4; Oyama 2000a [1985]: 28-31; Moss 2003; Noble 2006: 44; Dupré 2012: 237, 251; Nicholson 2014b. This connection has also been embraced by some supporters of the programme concept, e.g. Mayr 1982: 106.

³⁰ See e.g. Lewontin 2000a [1998]: 5-7.

³¹ Lewontin 2000a [1998]: 6.

like the running of a computer directed by its programming.³² In development, as Mayr puts it, “the program is *translated into* [...] individual organisms”.³³

Whether we call this view genetic essentialism or neo-preformationism its significance for our purposes is the same – it is a version of the metaphysics of life that I have labelled *poietic*. Over the remainder of Section 2 I shall highlight some of the key points I want to make in this respect.

2.2. Genome as *eidos*

The role played by the genetic programme in this picture reflects that of the *eidos* in the logic of *poiesis*, i.e. the pre-conceived idea, model, or design for the end-product to be made, the guide from which multiple copies – tokens of a type – can be produced (see II:3).³⁴ At least, the genome is seen as a *representation* of the organism’s *eidos*, since it contains coded information about the organism’s proper development and phenotype.³⁵ We can detail a number of conceptual parallels. These can be summarised by saying that the genetic programme has a *transcendent* relation to the organism and its becoming. By this I mean a

³² There is a disanalogy here between a computer programme and the notion of the genetic programme. A computer programme only controls the *operation* of a computer, it does not build the physical components of the computer in the first place. The genetic programme is primarily a way to understand an underlying set of instructions as directing the ‘production’ of the organism itself, the development of its form – a power not analogous to the computer programme. Although, in most versions of the genetic programme metaphor its power *also* extends to the ‘operation’ of the organism, to the control of functioning/behaviour. Jacob himself noted this disanalogy (1993 [1970]: 9); for a more critical view in relation to this point, see Nicholson 2014b: 165.

³³ Mayr 1982: 827 (my italics).

³⁴ I combine two elements here: the image/model of the final product’s form and functionality – the ‘blueprint’ or ‘architectural plan’; and that which guides the process of its production – the ‘instructions’. Some might object that the Greek term for the latter should not be *eidos* but *logos* – see e.g. Zwart (2018: 35) for an analysis of the genetic programme as *logos* of the organism. Firstly, I have combined the two ideas here mainly in order to avoid the introduction of more terminology. Secondly, we can think of the conceptual role played by the genetic programme as both *logos* and *eidos*. They are connected, since the instructions (*logos*) for making something implicitly contains an idea (*eidos*) of the thing to be made, as the descriptions of the genetic programme cited above suggest, and as does Zwart himself (2018: 35).

³⁵ For the moment I shall ignore the distinction between the *eidos* itself and a representation of it. In Section 4 below I discuss a version of the *poietic* view of development in which these two ideas come apart.

number of things: the *eidos*/programme is *given to*, is *independent of*, and has a normative *authority over*, the product/organism (see also I:1-2 and II:2-4).

Let's elaborate. Firstly, the *eidos* in the logic of *poiesis* is temporally and logically prior to the process of production. In genetic essentialism, the programme is inherited innately, 'given by nature', and is seen to constitute the identity of the individual organism as such. Secondly, the *eidos* is independent of, unaffected by, the product and its production. In genetic essentialism, the particular life-history and activity of the organism has no effect on the structure of its genetic essence.³⁶ This is a conceptual necessity – it wouldn't be much of an essence if its content was determined by the process of its expression.³⁷ And it is also apparently confirmed by what is sometimes called the 'central dogma': that 'information flow' is one-way, from genome to organism, never vice versa.³⁸ Thirdly, the *eidos* has a certain kind of normative authority over its product; it is the design of the product, it *designates* proper form to the product and ends to its production. In genetic essentialism, the genome carries 'instructions' and 'architectural plans', which the organism is supposed to follow and realise if it is to develop properly. These carry the same kind of normative significance, conceptually speaking. I expand on this point below (2.5).

The genetic *eidos* can be imagined at a number of levels. The most obvious is the species level: that is, some specific genetic sequence or set of sequences shared by all members of a

³⁶ See e.g. Jacob 1993 [1970]: 3; Mayr 1982: 56; Delbrück 1971: 54-55; Dawkins 1989 [1976]: 23.

³⁷ That is, the transcendence of the genetic *eidos* is integral to it as an idea. The fact that the developmental significance of genetic material is constructed in the process of ontogeny, and thus that the genome is not an essence/*eidos*, is the crux of the developmental-constructivist critique of the programme concept, elaborated in Chapter VI (see VI:1.3 in particular).

³⁸ The original version of the 'central dogma' of molecular biology, articulated by Francis Crick (1958: 153; see also 1970), was the specific thesis that DNA sequence can be used to specify the amino acid sequence of proteins, but the latter could not be used to specify DNA (nor other proteins, RNA, etc.). That is, there is no 'reverse translation' of DNA from protein structure (see Meloni 2016: 195). However, the term is now often used more broadly, in the sense just mentioned, to mean that developmental information is in general transmitted from genome to organism, but never vice versa; that the genetic programme is sequestered from environmental influence in this regard (Meloni 2016: 194-195; Dupré 2012: 135, 251). It is this broader sense that I refer to here (see also 3.3-3.4 below and VI:1.3). (The term is also sometimes used to refer to the slightly different claim that germ-line DNA is unaffected by parental life-course, which, when combined with the neo-preformationist assumption that the zygotic genome contains 'all the information' for the organism – often an implicit assumption in this context – implies that there is no 'inheritance of acquired characteristics' – see e.g. Dawkins 1989 [1976]: 23; Noble 2006: 90. I am not directly concerned with this issue here, but see VI:1.3 for some related comments.)

species, which identifies and makes them what they are *qua* members of that general type, as suggested by the idea of ‘*the human genome*’ as containing the human essence, in the rhetoric of the HGP.³⁹

Or, when the genome is understood as also defining an individual’s personal identity and specific character, as the essence of ‘me’,⁴⁰ then it is seen as containing an *eidōs* for that organism *qua* individual. This might seem like a contradiction at first: if the genome identifies an *individual*, then how can it also represent a ‘type’, of which, presumably, there could be many individual tokens? The answer is quite simple: a given genome – defined as some particular full sequence of DNA nucleotides – need not *uniquely* identify a particular spatio-temporal individual. As it happens, most (multicellular) individuals *do* in fact have a unique genetic code, thanks to the effects of genetic recombination in sexual reproduction, but, in principle, any number of actual living organisms could be produced (or ‘cloned’) from that particular genome.⁴¹ In this sense, each ‘individual’ genome represents a *type*. The difference with the species *eidōs* is really just one of level of specificity. Compared with the species version, these ‘individual’ types are defined at a very fine-grained level of specificity, but they imply this logic of type and token nonetheless.

The genetic *eidōs* might also be imagined in relation to various other categories as well, at various levels of generality – e.g. gender, race, genus, and so on.⁴² These different versions of the genetic *eidōs* are not mutually exclusive – recall, for a start, that Mayr calls the genetic code in each zygote “completely individualistic and yet also species-specific”.⁴³ We could extend this and imagine one’s particular genome, as a whole, as the *eidōs* for a particular organic product that is specifiable in multiple ways: e.g. as mammal, *Homo sapiens*, male, Caucasian, and as having a particular ‘individuality’ (albeit one that could also, in principle,

³⁹ This idea could also be derived from an (albeit misleading and naïve) interpretation of the concept of a genetic ‘species barcode’ (see Dupré 2012: 116-117).

⁴⁰ See again the quote from Gilbert 1992: 96. See also Mauron (2001; 2002) and Scully (2006) on this topic.

⁴¹ There is an everyday example of this: monozygotic (‘identical’) twins are genetically identical in the relevant sense (that is, in terms of the nucleic DNA sequence in the parental zygote from which they developed).

⁴² Compare comments at the end of I:2.2 regarding different versions of flourishing as properness.

⁴³ Mayr 1961: 1504.

be programmed into any number of other products, all ‘identical’ in terms of their particular essence).

2.3. Ontogeny as *poiesis*

Naturally, the genome-as-*eidōs* goes hand in hand with a conception of ontogeny as a process of *poiesis*.⁴⁴ As we’ve seen, in neo-preformationism the proper form of the organism is prescribed in advance, encoded in a programme that is transcendent of the process through which it unfolds. And the organism’s coming-into-being is the unfolding of that programme into concrete reality; a process of “revelation”, to quote Jacob’s colleague, Jacques Monod.⁴⁵ In this way, the processes of organismic development – of growth, cellular and systemic differentiation, structural transformation, learning, habit and skill formation, and so on – are simply the middle term between *eidōs* and *telos*, the translation of design into product. The organism’s becoming is therefore normatively subordinate to the essence it aims to fulfil; it takes place *for the sake of* fulfilment of that essence. In other words, it is understood as a form of *poiesis*. The organism itself, if its development proceeds *properly*, “thus *becomes the realization* of a programme prescribed by its heredity”, as Jacob puts it.⁴⁶

2.4. Teleology

The *poietic* notion of becoming has a certain kind of teleological, goal-directed, structure, as I have discussed already (II:2-4). Mayr and Jacob are open about the importance of this in the neo-preformationist conception of ontogeny, but perceive it as having been rendered unproblematic by the genetic programme idea. As Jacob puts it, although biology has for a long time had an uneasy relationship with the teleological – like “a woman [it] could not do without, but did not care to be seen with in public” – the genetic programme concept has now “made an honest woman of teleology”.⁴⁷

⁴⁴ See also Rehmann-Sutter 2006.

⁴⁵ Monod 1971: 87; see also Oyama 2000a [1985]: 32.

⁴⁶ Jacob 1993 [1970]: 2 (my italics).

⁴⁷ Jacob 1993 [1970]: 8-9.

Mayr defines the programme concept in terms of goal-directedness: it is “*coded or prearranged information that controls a process (or behaviour) leading it toward a goal*. The program contains not only the blueprint of the goal *but also the instructions of how to use the information of the blueprint*”.⁴⁸ Rather than ‘teleology’, Mayr calls the goal-directedness of the programme ‘teleonomy’ in order to differentiate it from similar ideas, including ones that he does not endorse, such as ‘cosmic teleology’.⁴⁹ The latter is the view of nature/the universe as a purposively organised whole, or as containing ascending levels of perfection in relation to an over-arching ideal, either diachronically (e.g. evolution by orthogenesis) or synchronically (e.g. the *scala naturae* or ‘great chain of being’).⁵⁰

On Mayr’s definition, a process or activity is teleonomic if it “owes its goal-directedness to the operation of a program”.⁵¹ This includes “[a]ll the processes of individual development (ontogeny) as well as all seemingly goal-directed behaviors of individuals [...], [because they] are characterized by two components: they are *guided by a program*, and they depend on the existence of some *endpoint or goal which is foreseen in the program* regulating the behavior. The endpoint might be a structure, a physiological function or steady state, the attainment of a new geographical position, or a consummatory behavioral act”.⁵² The programme exists “prior to the initiation of the teleonomic process”,⁵³ and the genome, seen as the entire programme for an organism, thus gives to ontogeny (transcendently, as I put it) a pre-given mature form as end to aim at: “[t]he *telos* of the fertilized egg is the adult into which it develops”.⁵⁴

In other words, a teleonomic process, for Mayr, reflects the logic of *poiesis*, as I have defined it: it is for the sake of achievement of a goal, a goal that is “forseen” in the plan that guides the process: translation of *eidos* into *telos*. Thus – it is worth clarifying – when I align the

⁴⁸ Mayr 1992: 127-128 (italics in original).

⁴⁹ Mayr on the various uses of teleological language: see 1961: 1503-1504; 1982: 47-51; 1992; 1998.

⁵⁰ Mayr 1982: 305, 48-50; 1992: 133-135.

⁵¹ Mayr 1982: 48.

⁵² Mayr 1982: 48 (my italics).

⁵³ Mayr 1992: 127.

⁵⁴ Mayr 1992: 123.

genetic programme with, e.g., ‘teleological essentialism’, I do not impute to it anything more than Mayr does by calling it teleonomic. What I mean by teleology in the context of becoming-as-*poiesis* is the same as what Mayr calls teleonomy.

I will say some more shortly (3.4) about why thinkers such as Mayr and Jacob understand the programme concept to have made this sort of developmental teleology unproblematic for modern life science, and suggest that their optimism is premature.

2.5. Normativity: programme and properness

As the above suggests, and as explained in Chapter II, *poietic* thinking, in taking life as its object, imposes a particular *evaluative* or *normative* framing on our apprehension of the organism and its becoming: it brings with it what I have called the logic of properness. This normativity is implied by the genetic version of this view, just as it is by essentialist ‘folk biology’, the neo-Aristotelian ethics of proper life-form, and Nussbaum’s related idea of ‘basic capabilities’.

In the logic of *poiesis*, the *eidos ought* to be manifested, and instructions for its manifestation *ought* to be followed, if the product is to be a good example of what it is, if it is to achieve its *teloi*. The *eidos* provides standards for evaluation of the product itself and, by derivation, the production process. This logic is also implicit in genetic essentialism. To quote Jacob again, the genetic programme “evokes a series of *operations to be carried out*”.⁵⁵ The developmental course of the organism can *succeed* or *fail* to carry out the operations prescribed by its programme, or to realise the phenotypic form implicitly represented in it. Genomes carry a message that is *supposed* to be expressed, and this expression can go wrong; the information about the organism’s true nature can be *misrepresented* in the phenotype, the organism can deviate from what it is meant-to-be.⁵⁶ The other normative aspect implicit in these ideas, less often remarked upon, is that it renders development itself simply instrumental to production of a properly formed phenotype. The point of producing from a

⁵⁵ Jacob 1993 [1970]: 9 (my italics).

⁵⁶ On the connections between concepts of programme/code/instruction/information in biology, and the kind of normativity I am referring to, see also Godfrey-Smith 2007: 107, 113; Oyama, Griffiths & Gray 2001: 3; Barker 2015: 43-45; Oyama 2000a [1985]: 12-13, 25, 73-74, 90; 2009: §§3.2.2-3.3; 2011; 2016; Scully 2006; Rehmann-Sutter 2008: 39-40.

design is to bring about an end-state that realises that design; by itself this gives no reason to consider the process as having any intrinsic normative significance, as being undertaken in any sense ‘for its own sake’.⁵⁷

Neo-preformationism therefore implies an apprehension of the life of the concrete organism as a more or less perfect realisation of its genetic essence, which is already to take this kind of normative perspective on it. The (transcendent) mode of judgement implied can operate at a number of levels (connected to the different levels of *eidōs* specificity discussed above): an individual human, for example, can be evaluated in terms of their individual essence, in terms of the generic human model of which they are a particular token, or in terms of some other category (also compare my discussion at the end of I:2.2 regarding the different possible kinds of proper form in terms of which an individual’s flourishing can be framed). In either case the concept of the genetic programme implies a sense in which the organism can be intrinsically *proper* or *defective*, according to norms or criteria derived *not* from the particular existence of the organism itself, but from a plan given to it from outside (transcendent of its becoming).

If we were to begin from this picture of biology in an attempt to think ‘flourishing’ as an organic concept of the good then a now-familiar framing of the concept is privileged: flourishing as properness, fulfilment of proper form. As we saw in I:2.1, for Foot, “[t]o flourish is [...] to instantiate the life form of [one’s] species”.⁵⁸ And as is drawn out by Nussbaum’s conception of development (II:4), this implies a view of becoming as normatively subordinate to, for the sake of, essence-fulfilment. From the point of view of the genetic programme the same basic logic applies: to flourish is to instantiate the kind of existence that is instructed by one’s genetic essence, and development is aimed at realising this, whatever it may be. In either case, to fail with respect to one’s proper form is to be inherently defective, inadequate to one’s essence, an inferior version of the way one is *meant* to be.⁵⁹

⁵⁷ Rehmann-Sutter highlights this aspect of the normativity of neo-preformationism (2006: 314, 325-327).

⁵⁸ Foot 2001: 91.

⁵⁹ See similar comparisons made by Oyama between genetic essentialism and the naturalistic ethics of Mary Midgley (Oyama 2000a [1985]: 102-106).

The programme metaphor of the genome encourages us to see the normative logic of properness as simply part of the given structure of the living world. It validates an idea of ‘nature’ as something transcendent of our concrete activity and life history which governs what it is for living to go well or badly, in the sense of pre-figuring the shape of the ‘proper’ and the ‘defective’.⁶⁰ Neo-Aristotelians do not identify their notion of life-form with the idea of the genetic programme, but they *share* with this idea a way of looking at living beings as such: as objects *given* a proper form, whose becoming is *for the sake of* instantiating that form – what I’ve called the *poietic* metaphysics of life. This mode of interpretation underlies concepts of both the genetic programme and the neo-Aristotelian life-form. I return to these comparisons/relations below, Section 5.

2.6. Genetic essentialism is not genetic determinism

The genetic programme is often aligned with genetic determinism.⁶¹ Whilst issues of causal determinacy/indeterminacy regarding the role of the genome in ontogeny are important (see next chapter), this particular alignment can be something of a red herring for our discussion. The preceding comments on the normative character of the genetic programme show why genetic essentialism is not, and does not strictly imply, genetic determinism. In fact, it is a certain *lack* of causal determinism that makes the normativity of properness *possible* in this context. Let me explain.

‘Genetic determinism’ could mean a number of things. For example, it might be the belief that DNA – either a ‘gene for’ some specific trait, or the whole genome ‘for’ a particular organism – is *causally sufficient* in bringing about its specified outcome, that it requires the input of nothing else in particular. This is surely a very radical notion, and it’s not clear that anyone actually believes it, either in scientific or lay spheres. Everyone is familiar with the fact that a fertilised egg cell (which is already adding a lot beyond just DNA!) only develops at all given certain environmental conditions – seeds don’t grow until you plant and water them, eggs don’t turn into chickens if you keep them in the fridge, and so on.

⁶⁰ See also Oyama 2000a [1985]: 100-106; 2002: 165-167; 2007: 13-14; 2009: §§3.2.2-3.3; 2011; 2016; Scully 2006; Barnes & Dupré 2008: 220-224; Rehmann-Sutter: 2008; 2010: 24-26.

⁶¹ See e.g. Noble 2006: 3-6.

Or, it could mean that for any one genotype there is only one possible phenotypic outcome – again, either in terms of some specific trait, or the organism as a whole. That is, given that a viable organism develops at all, the emergence of its particular form will be *insensitive to environmental context*. This one genotype-one phenotype view is a more likely candidate. It is indeed sometimes *suggested* in descriptions of the role of the genetic programme in development. See again the above quote from Jacob: “In the chromosomes received from its parents, each egg [...] *contains its entire future*: the stages of its development, the shape and the properties of the living being *which will emerge*”.⁶² Related is the idea that, if we had the full DNA sequence of an organism, and knew how to ‘de-code’ the representation of the phenotypic end-product that it supposedly contains, then we could derive a complete description of the future organism from its genotype. Lewontin tells tale that he once heard Sydney Brenner, another Nobel Prize-winning molecular biologist, “say, in the opening address of a scientific congress, that if he had a large enough computer and the complete DNA sequence of an organism, he could compute the organism, by which he meant totally describe its anatomy, physiology, and behaviour”.⁶³ By inserting Walter Gilbert’s CD, we could ‘compute’ Walter Gilbert.⁶⁴

It is likely that in much *popular* understanding of biology variations of this kind of genetic determinism are still common.⁶⁵ But within scientific and philosophical circles, despite claims like those just mentioned, it is now all but universally agreed that such a picture (and its environmental-determinist opposite) is false, and that any given phenotypic character is sensitive to both ‘genes’ and ‘environment’, to various degrees. That is, not only does a genetic programme require certain environments in order to unfold at all, but the *particular* forms that do emerge are the products of interaction between genes and environment, of both

⁶² Jacob 1993 [1970]: 2 (my italics).

⁶³ Lewontin 2000c: 147; 2000a [1998]: 10; 2000b: vii. Schrödinger, pioneer of the genetic ‘code’ metaphor, suggested more or less the same idea back in 1944 (1992 [1944]: 21-22). On this notion of developmental ‘computability’ in general, see Nicholson 2014b: 166-167.

⁶⁴ See also Noble 2006: 3-6, 29, on this view.

⁶⁵ See e.g. a recent study by Dar-Nimrod & Heine (2011).

‘nature’ and ‘nurture’, as popular discourse would put it. This agreement is sometimes called the ‘interactionist consensus’.⁶⁶

The interactionist consensus denies the crude genetic determinism just described. But it would be wrong to think that it has killed off the essentialist concept of the genetic programme. And nor should we expect it to, by itself. This is because the programme metaphor does not stand and fall with genetic determinism, and is perfectly consistent with (at least a particular way of interpreting) this ‘interactionism’. As mentioned in the previous sub-section, instructions, plans, designs, and so on, can be followed or realised to greater and lesser degrees; an *eidos* does not guarantee its own manifestation. Certain influences from ‘outside’ might be needed to produce the planned outcome, but others can cause deviation from the proper form of some trait, or even prevent it from emerging at all. If we look at ‘interaction’ this way then the essentialist view of genetics remains intact. The crux of this view is not an idea about *causal* efficacy, but the *poietic* and teleological structure I have been discussing.⁶⁷ The genetic programme does not *determine* developmental outcomes, it determines what the *proper* developmental outcomes are. Teleological process – at least, what I mean by the term here, in line with Mayr’s ‘teleonomy’ – involves foresight of an end, pre-designation of an ideal end-state, not, strictly speaking, causal determination of that end.

Since Jacob would, I expect, also reject the environment-insensitive determinism that I imputed to his words above, I think it would be fair to ‘correct’ the quote as follows: “In the chromosomes received from its parents, each egg [...] contains [*a plan for*] its entire future [*as nature has designed it*]: the stages of its development, the shape and the properties of the living being which will emerge [*if this plan is properly realised*]”.⁶⁸ The suggestion of determinism in claims such as the original of this quote results from simply *assuming* that the environmental conditions needed for the proper phenotype will be present. In which case the

⁶⁶ See e.g. Sterelny & Griffiths 1999: 13-17, 97-100; Oyama, Griffiths & Gray 2001: 1-2; Oyama 2000a [1985]: 2; Barker 2015: 38.

⁶⁷ In most uses of the genetic programme concept, it is of course *also* seen as causally involved in phenotype development, e.g. as ‘initiating’, ‘controlling’, or ‘directing’ it. My point here is not to deny this, but to highlight the even more fundamental but often hidden teleological/ideational/normative aspects of the programme idea. See also Oyama 2000a [1985]: 239 (fn 3); 2002: 165-167; 2009; 2010; 2016.

⁶⁸ Jacob 1993 [1970]: 2 (my additions in square brackets).

unfolding of the programme *appears* deterministic in this one genotype-one phenotype way, although this is not strictly the view being presented.⁶⁹

As mentioned in II:2,⁷⁰ a certain degree of *indeterminism* in the relation between essence and appearance is in fact crucial to the inherently *normative* structure of teleological essentialism/*poietic* thinking. If something happens deterministically or inevitably then it makes no sense to say either that it should or should not happen. Not only, as Oyama notes, does “the absence of perfect outcomes [do] no harm to our belief that a plan underlies the variable results”,⁷¹ but the potential for imperfect outcomes, for *deviation* from *eidos*, is what makes the normativity of ‘plan fulfilment’ possible, since it makes the conceptual difference between ‘proper’ and ‘defective’ realisation. In the genetic programme idea, it is this implicit teleological-essentialist structure and the normative logic that it entails, rather than the apparent suggestion of determinism, that is its most fundamental and stubborn characteristic.⁷² As I explain in the next chapter, issues of causal complexity in ontogeny can put pressure on the adequacy of ideas like the genetic programme, but what is ultimately required to overcome this thinking is a shift in conceptual framing.

Another way to understand how the genetic programme can survive happily within the interactionist consensus is in terms of how the ‘environment’, and organismic interaction with it, is understood in the context of ontogeny. As we’ve seen, this consensus recognises that the input of environmental conditions is causally important to what actually happens (i.e. genetic determinism is false), but the most common versions of ‘interactionism’ nonetheless maintain the structure of genetic essentialism. This is in part because ‘environment’ – usually meaning anything outside of DNA/genome,⁷³ including the internal milieu of the organism, and its interaction with external conditions – is understood as having a fundamentally different ontological status to the genome. The genome carries the ‘information’ about or

⁶⁹ Also, as Godfrey-Smith notes (2007: 112-113), the inference from neo-preformationism to determinism is not surprising, because the language of programming and coding suggests more or less determinate outcomes.

⁷⁰ Some of the discussion about facts and values, and different meanings of ‘essentialism’, in IV:1-2 is also relevant here.

⁷¹ Oyama 2000a [1985]: 90.

⁷² See VI:1.3 for more detail.

⁷³ See e.g. Oyama, Griffiths & Gray 2001: 1-2; Griffiths & Gray 1994: 277.

‘instructions’ for the organism, whereas the environment is seen as merely a set of ‘assisting’ or ‘obstructing’ conditions on the realisation of this content-specific information.⁷⁴ The version of interactionism that presents phenotype as simply a product of interaction between ‘genes’ and ‘environment’ is not only consistent with this ontological dualism, but encourages it, by presenting ontogeny as the coming together of two separate channels of influence – the core, essential, informational message, and all the contingent causal influence from the outside that can affect in various ways the ‘expression’ of this message, but does not change the message itself.⁷⁵ Genetic essentialism persists as long as we interpret interactionism in this dualistic way.⁷⁶ I return to critique of this picture in Chapter VI.

3. The unfinished Darwinian revolution: developmental Platonism of the genetic programme

3.1. ‘Platonism’ in Mayr

Where does this leave the idea that Darwinian biology has abolished the metaphysics Mayr calls Platonist or typological thinking? It depends what we mean by this, of course. I shall now outline the ways in which this metaphysics has and hasn’t truly been left behind, focusing on Mayr’s claims and comparing them with the logic of the neo-preformationist view of ontogeny that he endorses.

Mayr aligns a number of things with the thinking he calls interchangeably ‘Platonism’, ‘typological thinking’, ‘idealism’, or ‘essentialism’:⁷⁷

1. Living organisms are manifestations of an underlying *eidōs*; they are ‘appearances’ of their essence.⁷⁸

⁷⁴ Oyama, Griffiths & Gray 2001: 1; Griffiths 2001: 395-396; Sterelny & Griffiths 1999: 100; Barker 2015: 43-45.

⁷⁵ See e.g. Oyama 2000a [1985]: 2-3, 6-7, 158-162, 174-175.

⁷⁶ Oyama calls this version of interactionism ‘developmental dualism’ (e.g. 2000a [1985]: 6).

⁷⁷ I focus on claims from: Mayr 1959; 1982: 11, 38-39, 45-47, 87, 92, 129, 255-256, 304-305; 1992; 1995.

⁷⁸ See e.g. Mayr 1959: 2; 1982: 38. In Plato (according to Mayr’s interpretation) the *eidōi* designate ‘types’ – a level of classification *above* individuals, but not specifically what we would now call species, as sub-categories of genera. Mayr says that Plato did not make that distinction systematically, and nor did Aristotle (1982: 255).

2. Variation between individuals of a type reflects the more or less perfect manifestation of their shared *eidōs*.⁷⁹
3. *Eidoi* are “separate from and independent of the phenomena of appearance”.⁸⁰ “As ideas they can exist independent of any objects”.⁸¹
4. *Eidoi* are fixed, eternal, unchanging across natural history.⁸²
5. *Eidoi* are discontinuous – “there is no gradation between types”, there are unbridgeable ‘gaps’ between types, and thus no possibility of gradual evolution in living forms.^{83 84}

The final two elements of this picture – historical fixity of, and discontinuity between, types – cannot be imputed to genetic essentialism in the Darwinian mould. Given the fact of evolution, organic lineages undergo historically continuous change in constitution, both genetically and phenotypically. In this sense, types are not *fixed* across trans-generational time, and there are not, as a general rule, unbridgeable gaps between them. One ‘species’ – or other taxonomic category – can, over time, gradually evolve into a ‘different’ one without our needing to imagine ontological leaps or discontinuities. The implication, of course, is not that an organic lineage is composed of a *series* of essences that pop in and out of existence at particular transition points in this continual flow of change, but rather that this is a process in which there are no such essences.⁸⁵

As I have argued already, and shall reinforce in a moment, the level of specificity at which we understand the *eidōs* doesn’t matter too much for our purposes, regarding its normative implications for the individual and individual becoming.

⁷⁹ See e.g. Mayr 1982: 38.

⁸⁰ Mayr 1982: 305.

⁸¹ Mayr 1982: 38.

⁸² See e.g. Mayr 1959: 2; 1982: 38.

⁸³ Mayr 1959: 2.

⁸⁴ This list is not exhaustive. There are some other things that Mayr includes in ‘Platonism’ that I will not discuss here, as they are not directly relevant. In particular: the view that the cosmos was created by a *demiurge* – a creative power (God) modelled on a craftsman or architect (1982: 87, 92, 304-305); and the related notion of ‘cosmic teleology’ (see above, 2.4).

⁸⁵ See e.g. Dupré 2012: 73-74; Barnes & Dupré 2008: 209-210.

However, I argue that despite this, when neo-Darwinian biology turns from describing evolutionary process to describing individual ontogenetic process the first three elements of this picture, which imply a transcendent relationship between an *eidōs* and the individual organism, are re-instated fundamentally intact. From the perspective of the individual organism and its becoming, the historicisation of living forms does not undermine the metaphysics of the Platonic *eidōs*, and this metaphysics is affirmed by the genetic programme and the neo-preformationist conception of ontogeny. What we might call ‘historical Platonism’ is gone, but a ‘developmental Platonism’ persists,⁸⁶ as I’ll now explain.

3.2. Essence, appearance, and typological variation

Regarding point 1, we have seen in Section 2 how the metaphor of the genetic programme grasps the organism in terms of a fundamental dualism between essence and appearance. What the organism ‘really’ is, its ‘true nature’, is contained within its genetic essence, and the *concrete* organism is the product of the ‘unfolding’ of this essence into reality – a ‘manifestation’ of it.

As we’ve also noted, not all instances of life fully achieve essence-realisation – and any not-yet-mature organism is still in the process of doing so – so, any particular individual at any particular time is to be understood as in a state of more or less perfect manifestation of its essence (which is also to take a particular kind of normative perspective towards it, as discussed in 2.5-2.6). Regarding point 2, this frames the issue of individual *variation* in a particular way. Given any group of individuals understood to bear the same genotype in some respect, then any relevant variation between them is implicitly attributed to the more or less perfect reflection of this essence – i.e. the approach to variation Mayr calls ‘typological’.

This could work in a number of different ways. In terms of a species-level *eidōs* we would understand phenotypic variation between any bearers of, e.g., ‘*the human genome*’ to reflect various degrees of ‘proper humanness’ (at least variation that relates to traits we take to be programmed by this species-general genotype). Or, the essential feature in question could relate to individuals of multiple species. If some set of individuals all contain genetic programming ‘for’ some particular feature, such as having four legs, then any variation in

⁸⁶ As suggested by Lewontin 2000a [1998]: 6-10; 2000c: 66-68; and also Oyama 2000a [1985]: 137, 159.

actual leg number among them will imply degrees of realisation of this aspect of their genetic essence (which might *also* be part of what it means to be ‘properly dog’, or ‘properly horse’, for example). Or, we could take the same approach in terms of the highly specific ‘individual’ genetic essence. The simplest way to grasp this is to imagine a population of genetic clones. The variation between them, with respect to the traits we understand as particular to this individual form, will also be analysable as reflecting different degrees to which their shared genetic identity has been successfully expressed. Again, these levels of analysis are not mutually exclusive.

Mayr projects an image of biology post Darwin in which so-called ‘populationist’ thinking prevails. According to this, the dual reality of essence/appearance, and the interpretation of variation as degrees of essence-realisation, are rejected:

The populationist stresses the uniqueness of everything in the organic world. [...] [N]o two individuals are alike [...] even the same individual changes continuously throughout his lifetime and when placed into different environments. All organisms and organic phenomena are composed of unique features and can be described collectively only in statistical terms. [...] Averages are merely statistical abstractions, *only the individuals of which the populations are composed have reality*. [...] For the typologist, the type (*eidos*) is real and the variation an illusion, while *for the populationist the type (average) is an abstraction and only the variation is real*. No two ways of looking at nature could be more different.⁸⁷

Or, as he says elsewhere, “[t]here is no “typical” individual, and mean values are abstractions”.⁸⁸ I agree. Yet, I argue, the very idea of the genetic programme, embraced whole-heartedly by neo-Darwinians such as Mayr, works to undermine this shift in thinking. It reinstates into the organic world precisely the ‘Platonic’ dualism of transcendent essence and derivative appearance; and it thereby allows us to identify, by reference to a given genotype, ‘typical’ and ‘defective’ individuals in just the way Mayr purports to reject.⁸⁹ The fact that, from an historical perspective, the points of reference will transform over time, much as a car-maker will continuously redesign a particular model, and new models will

⁸⁷ Mayr 1959: 2 (my italics).

⁸⁸ Mayr 1982: 46.

⁸⁹ Oyama makes similar points made about the tension between Mayr’s stated anti-essentialism and his teleonomic concept of the programme (2000a [1985]: 61-63, see also 159).

come into existence and go out of production, does not undermine this basic type-token logic. Each particular car is still a manifestation of its particular design, and can be evaluated by measurement against this design.

Read again the first few lines of the block quote above, about individual uniqueness and change. Now add in the developmental Platonism of the programme concept and see how these claims acquire caveats: no concrete living individual is quite like any other, but, *in essence*, they *can* be identical (as genetic clones, or tokens of a broader type); individuals change continuously, but *in essence* they remain the same throughout their life (I return to this in a moment, 3.3); and as collectivities they can be described in statistical terms, but the differences between individuals are also implicitly attributed to the more or less perfect realisation of a shared genetic essence, in appropriate circumstances.

3.3. Independence of the programme

This story repeats regarding point 3, which has also already been briefly addressed (2.2). The genetic programme is *transcendent* of the organism – it is innately given to, and is itself unaffected by, the organism’s becoming. As Mayr himself says, invoking the so-called ‘central dogma’, “the genetic program itself remains unchanged while it sends out its instructions to the body”.⁹⁰ Or, as he puts it in his description of *Platonism*, the *eidōs* is “separate from and independent of the phenomena of appearance”.⁹¹ In *this* sense, regardless of the historicisation of the evolutionary point of view, the organism’s *eidōs* is *just as fixed*, in relation to its becoming, as if it were something eternally unchangeable.

Mayr also says, of Platonic *eidōi*, that “[a]s ideas they can exist independent of any objects”.⁹² By this he presumably means something like: even if there are no material manifestations of an *eidōs* it can still in some sense ‘exist’ – perhaps in the famous ‘realm of Forms’, or ‘in the mind of the *demiurge*’. With respect to a genetic programme, firstly, in a straightforward material sense, it can also exist independently of any organismic manifestation. Anyone who’s seen modern crime dramas involving forensic investigation

⁹⁰ Mayr 1982: 56. See footnote 38 above, on the meaning of the ‘central dogma’ here.

⁹¹ Mayr 1982: 305.

⁹² Mayr 1982: 38.

knows that genetic codes can be left lying around anywhere. On the essentialist interpretation, the material DNA swabbed up from crime scenes still ‘contains the information’ that is said to be de-coded in development. Secondly, when the genome is understood as carrying information in this way, the programme itself is also independent of any particular material substrate. It can be stored in, and transferred between, a variety of media, such as DNA, an electronic computer, a compact disc – see once again Gilbert’s digital vision of the ‘book of life’ – or more traditional formats such as paper and ink.⁹³ In this sense, the information that DNA carries can be replicated many times, in multiple different specific material instantiations, without itself being affected by the material world that it in-forms. This is part of what makes genes potentially ‘immortal’ for Dawkins – material DNA is of course perishable, but the ‘plans’ it carries can be written out over and over.⁹⁴ Could a genetic programme exist independently of *any* objects, simply ‘as an idea’, as Mayr says of Platonic *eidoi*? Well, if there is a God, then I expect he could hold such information in mind as well.

3.4. Related issues: matter and form, ‘vitalism’, and Mayr’s Aristotle

This raises some other issues, and allows us to look at the argument being made here in another way. Mayr’s easiness with the teleology (sorry, teleonomy) of the genetic programme seems to stem in part from the notion that it is “purely materialistic”.⁹⁵ This supposedly places it outside of the realm of ‘vitalism’, which requires that some non-material agency or force (*élan vital*, *nisus formativus*, etc.) be added to or infused with the substrate of mere matter, in order to guide ontogeny towards its *telos*.⁹⁶ Indeed, the genetic programme in its natural state is seen as *represented* in a material entity – DNA. But, as we’ve just seen, there

⁹³ Scientists at the University of Leicester have made the latter into reality, and printed “the entire human genome” in 130 hardback volumes, for an educational exhibition to “show just how much information it takes to make up one human body”. See: <https://www2.le.ac.uk/news/blog/2012/december/you-in-130-volumes-entire-human-genome-printed-for-exhibition>.

⁹⁴ See Dawkins 1989 [1976]: Ch 3. See also Dawkins’ description of DNA-in-history as “a river of abstract instructions for building bodies, not a river of solid bodies themselves. The information passes through bodies and affects them, but it is not affected by them on its way through” (1995: 4).

⁹⁵ Mayr 1982: 124.

⁹⁶ See e.g. Mayr 1982: 51-53, 90. See also Rehmman-Sutter 2006: 317 for a brief summary of this meaning of ‘vitalism’.

is also a sense in which it is not *itself* a material entity. If it were, then we could not have multiple copies of the *same* programme in materially different media, since these are, in material terms, not identical. Genetic ‘information’ is seen in this sense as floating free of, or at least supervening on, materiality.⁹⁷ For this reason, George C. Williams even places genetic information within a special ‘codical domain’ of reality, different and separate from the material spatial realm.⁹⁸

Regardless of how exactly we see the relation between genetic information and the material media it is instantiated in, there is a more important conceptual point here. What we have seen in this chapter shows that genetic neo-preformationism shares a conceptual structure with what Mayr derides as ‘vitalism’: they both rely on the idea of an ontologically independent form-giving element added *to* a substrate of ‘raw matter’ in order to guide ontogeny towards a pre-conceived *telos*, even if they understand the constitution of this element in different ways.⁹⁹ I will let Mayr make this argument for me, via his reading of Aristotle’s biology.

According to Mayr, “[Aristotle] clearly saw that raw matter lacks the capacity to develop the complex form of an organism. *Something additional* had to be present, for which he used the word *eidos*”.¹⁰⁰ This additional something is a “form-giving principle”,¹⁰¹ a communicative entity that “[orders] the raw material into the patterned systems of living beings”.¹⁰² For this reason, Mayr argues¹⁰³ that Aristotle’s conception of development ought to be seen as

⁹⁷ See Oyama 2000a [1985]: 198; 2006: 283; 2009: §§3.2.2-3.3; 2010: 410-416; 2016.

⁹⁸ Williams 1996: 167-170.

⁹⁹ As Oyama puts it, neo-preformationism, as well as both the original version of preformationism and the vitalistic epigenesis theory traditionally opposed to it, all agree on the “pre-existence” of form, “whether miniaturized and encapsulated, re-created by a vitalistic force, or in-scribed on a molecule. The corollary is that the preexisting form must be the “same” as the final one; for the preformationists both were concretely material, for the epigeneticists form was first disembodied, then embodied, and for most modern thinkers it is initially material but cryptic, then manifested in the phenotype” (Oyama 2000a [1985]: 29, see also 1-3, 24-25, 61-63 87-90, 158-159; 2009: §3.3; 2010: 410-416; 2016).

¹⁰⁰ Mayr 1982: 88 (my italics).

¹⁰¹ Mayr 1982: 636.

¹⁰² Mayr 1982: 56.

¹⁰³ Following the suggestion of molecular biology pioneer Max Delbrück (1971).

equivalent to genetic neo-preformationism: “Aristotle’s *eidos* is a teleonomic principle which performed in Aristotle’s thinking precisely what the genetic program of the modern biologist performs”.¹⁰⁴ It is “conceptually virtually identical with the ontogenetic program of the developmental physiologist”.¹⁰⁵

I agree.¹⁰⁶ But, we could add: this notion of *eidos*, at least in its ‘form-giving’ role, and as something ontologically separate and independent from the developing organism itself, also reflects precisely the notion of an *élan vital* or *nisus formativus*. I would therefore add that, as well as reflecting Aristotle’s *eidos*, the genetic programme implies the conceptual structure of the ‘vitalism’ that Mayr disparages (as well as, in similar ways, the developmental ‘Platonism’ I have been outlining).

Mayr would no doubt object. Regarding use of the term *eidos* in Plato and Aristotle – the first he rejects, the other he appropriates – he says: “the major meaning of the term is totally different in the two authors”.¹⁰⁷ One way to see my argument in this chapter is that, from the point of view of understanding individual development, they are in fact, conceptually speaking, precisely the same, and if the genetic programme is an Aristotelian *eidos*, as Mayr understands it, then it is also a Platonic one.

What is “totally different” about the *eidos* of Mayr’s Aristotle and that of Mayr’s Plato?

There seems to be two main differences. The first is that Aristotle saw individual organisms as having unique *eidoi*, responsible for their “specific individuality”, as well as, like Plato,

¹⁰⁴ Mayr 1982: 88.

¹⁰⁵ Mayr 1982: 56. Loewenstein makes the same connection explicit: “In Latin, *eidos* eventually became *informatio*, from *informare*: to “give form”, to “shape”, to “guide”. This meaning persisted through medieval times in the Indo-European languages, as in Middle French, *enfourmer*, and Middle English, *enfourmen*. That connotation was lost in modern times, until it was resuscitated for use in physics and eventually found its way back to biology [as ‘genetic information’]” (1999: 338).

¹⁰⁶ At least, given Mayr’s reading of Aristotle, I agree. I make no claims here as to the accuracy of Mayr’s interpretation of Aristotle himself, nor indeed his interpretation of Plato. This is why I refer to ‘Mayr’s Aristotle’ and ‘Mayr’s Plato’. I am concerned with the internal consistency of *his* perspective, and this question of exegetical accuracy makes no difference to my argument. I note, however, that the view of Aristotle’s biology presented here is questioned by others – e.g. Rehmann-Sutter (2006: 317-319, 325) advocates a somewhat different reading.

¹⁰⁷ Mayr 1982: 11.

being tokens of more general species types.¹⁰⁸ As I explained above (2.2), this difference is just a matter of level of specificity at which we understand the essence, and the same teleological-essentialist and transcendent-normative logic is implied in both.

The second main difference seems to be the notion that Plato's *eidōs* is 'external' to the organism, an "outside force", whereas Aristotle's is in some sense 'internal' to, or part of, the organism it in-forms.¹⁰⁹ If 'internal' here means 'material' then, as we've already seen, even though genetic programmes are *represented* by material components of the organism they in-form they are still in a sense themselves independent of this materiality.¹¹⁰ Either way, as I've suggested, the material-or-not status of the transcendent formative principle is not crucial to its conceptual role. The fact that, in the genetic version, it is carried into development via a substrate that is in a brute, spatial sense *internal* to the organism (as opposed to... beamed in by a supernatural agency?), makes no difference to the role that it plays in our understanding of organismic becoming.¹¹¹

More likely is that the difference Mayr is imputing to Plato's *eidōs* is what I have called a transcendent relation to the organism – as implied in points 1-3 of Mayr's 'Platonism', above. If so then, as I've explained in response to these points, the *eidōs* of Mayr's Aristotle (material or not) and that of Mayr's Plato are equally 'external' to organismic becoming, equally 'outside forces' imposed onto 'raw matter' in order to produce some specific form. They are equally transcendent as far as the individual is concerned – principles given *to* them as their essence, prescriptive of proper form, and unaffected by the particularities or activities of their life-course; and, therefore, becoming is understood as fundamentally *poietic* in either case.¹¹²

¹⁰⁸ Mayr 1982: 637.

¹⁰⁹ Mayr 1982: 88.

¹¹⁰ As it happens, this is probably not what Mayr means, since he also notes that the *eidōs* for Aristotle was "nonmaterial" (1982: 637, 56).

¹¹¹ Compare my discussion in II:4 of the status of Nussbaum's 'basic capabilities', as involving a vision of transcendent ends embodied in the concrete.

¹¹² A similar distinction is often made between the notions of developmental teleology in Plato and Aristotle: that the former is 'transcendent' or according to an 'external model', whereas the latter is 'immanent' or driven by an 'internal principle of change' (e.g. Walsh 2008: 118-119; Ariew 2002: 8-12; Von Sydow 2012: 71-73). *If* we understand Aristotle's biology as Mayr and Delbrück do (and I'm not necessarily saying we should), then I would repeat my point in this context: as long as the 'form' that is realised through ontogeny is independent of

3.5. An unfinished revolution

Darwinian biology sees itself as a revolution against Platonic essentialism. While it has, indeed, broken through this metaphysics at the historical level, at the developmental level the continued dominance of the genetic programme, and related concepts, prevents its full overcoming. The *eidoi* of genetic neo-preformationism might have been historicised – made historically specific, and gradually changeable over trans-generational time; they might be more specific than the ‘types’ Plato had in mind (see the notion of individualised genetic essences); and they might be carried into life by part of the being they in-form (i.e. DNA), but from the perspective of the individual their *status* has not changed. They are still fixed models that determine how the organism is meant to be, as I have explained in this chapter. Thus this revolution is yet to complete itself; the relevant conceptual structures have only been overcome at one level of analysis.¹¹³

The evolutionary worldview sees living nature as undergoing a continual process of self-transformation, as gradually adapting itself through variable interaction with the environment across time. In this process there is no instruction manual, no pre-given form to be realised, and no fixed ends to be reached. Life figures itself out as it goes along. One of the upshots of the argument of the next chapter is that this picture of living process, now perfectly natural to modern biology at the evolutionary scale, is also reflected at the level of individual organismic becoming, *contra* the view examined in this chapter. Developmental constructivism affirms this, and in doing so provides a way for modern biology to overcome its internal metaphysical tensions, and complete its anti-essentialist revolution (see VI:3.2).

and pre-exists the process of its realisation, then teleological description of ontogeny is ‘transcendent’ whether that form is imposed by a supernatural *demiurge* or is in some sense ‘internal’ to the organism. A truly *immanent* conception of ontogeny would involve a shift in how we understand the relationship between the *process* of ontogeny and the emergence of form and functionality in the organism. I argue for just such a shift in the next chapter (see in particular VI:2.2 and 3.1).

¹¹³ See also Nicholson (2014b: 168-171) for a similar argument about the tension between the Darwinian rejection of the traditional theological ‘argument from design’, and the maintenance of the ‘machine concept of the organism’ in neo-Darwinism, which relies on notions of design by extrinsic intentional agency. I will not discuss these issues further, but I believe they are connected with the argument I have made, and that a full understanding of the influence (and contradictions) of a *poietic* metaphysics in modern biology requires uncovering these connections. See also Section 4 in a moment.

4. An added complication

In my analysis of genetic neo-preformationism in this chapter I have at times presented the genome as if *it* played the role of the *eidōs* in this picture. Strictly-speaking, this is to blur the lines. The genome, as a sequence of nucleotides, is seen as a *representation* of the plan/instructions for the organism, like the sequence of letters on this page are a representation of my ideas.

This distinction would not need mentioning were it not for the prevalence of another way in which genetics often feeds into our normative language about organic form and functionality. The context here is so-called ‘genetic diseases’, such as Huntington’s, cystic fibrosis, or PKU, in which some specific genetic ‘mutation’ (or often many possible particular genetic differences),¹¹⁴ in this case meaning deviation from what is considered the species-normal genotype, is strongly correlated with development of a disease.

In these cases, the ‘defect’ is understood to reside not in the process of translating genetics into phenotype, but in the genome itself. The assumption is that the organism’s proper form is a phenotype without the disease in question, but in a diseased individual this form is not realised because there was a *mistake in the programming* that was used to produce them. The genome in question is a *bad* representation of the *eidōs* that *it* is supposed to represent. Let’s draw an analogy with flat-pack furniture. In these cases it is like if the cryptic little piece of paper that came with my wardrobe components had been *mis-printed*, so that I was instructed to build the item in the wrong way. Even if I properly follow the instructions given, the end-product would not be as intended by the furniture designers. In this way we can see how the *eidōs* itself and the material representation of it might helpfully be distinguished in certain cases.

This raises a question: if, in genetic neo-preformationism, the proper form of an organism is not strictly prescribed by their actual genetic sequence, but by the *eidōs* of which this is supposed to be a particular representation, then what is the source of this real *eidōs*? There is a story to be told here about an implicit idea of ‘nature’ as a quasi-intentional, purpose-giving

¹¹⁴ For discussion of the interpretation of these sorts of ‘mutation’, see e.g. Dupré 2012: 109-110, 137, 249-250; Moss 2001.

agency or force responsible for the production of organic ‘designs’, and which is the ultimate source of the *eidoi* that are translated into DNA code. I think a lot can be said here to reveal the links between *poietic* thinking in the context of genetics/development and the idea of natural selection as a ‘design’ process in modern evolutionary thought, but this would be to go further down this rabbit hole than is required for my argument.¹¹⁵

5. Neo-Aristotelian ethics and genetic essentialism

I have argued in this chapter that the dominant understanding of ontogeny in modern biology, based on a neo-preformationist reading of genetics, is an incarnation of the *poietic* view of life outlined earlier. It therefore shares a basic metaphysics with the neo-Aristotelian concept of flourishing as natural ‘properness’. It is worth saying something briefly about the status of the argument in relation to this philosophical target, in order to head off a likely objection.

As discussed in Chapter IV, neo-Aristotelian theories of flourishing of the sort addressed in this thesis do not – or, at least, can reasonably deny that they do – derive specific content for their conceptions of species good from claims about biological or otherwise empirical facts. They do not, for example, understand species-form as a statistical generalisation, or the good as fundamentally tied to some archetypically ‘biological’ process, such as genetic replication. Either way, as I argued, the deeper and more interesting level of connection is instead between a general interpretation of living phenomena as such and the form of the properness concept itself, which is presupposed as a necessary and natural consequence of the fact that the relevant objects of evaluation are living things. However, they might also reasonably respond at this point that their notion of a species life-form, essential nature, or “inner design” as Thompson puts it,¹¹⁶ does not depend on the validity of the genetic programme concept; or that they do not necessarily see a being’s essence as something that is transmitted

¹¹⁵ In an earlier, much longer, version of this chapter I extended the discussion of *poietic* themes in modern biology to address the way in which natural selection is presented within neo-Darwinism as a process of ‘design’, and thereby a source of intentionality (see Maynard Smith 2000 for a clear example of this conceptual connection). For brevity’s sake I have cut this discussion of the interpretation of natural selection from the final version, but for related critical discussion of the notion of design in neo-Darwinian evolutionary theory see e.g. Nicholson 2013; 2014b; Lewens 2004; Reiss 2009; Oyama 2000a [1985]: 12-13, 31, 44-45, 88-89, 155-157, 184; Ingold 2013: Ch 5.

¹¹⁶ Thompson 2008: 13.

to and represented *in* the organism via some aspect of its material constitution, such as DNA sequence. And, thus, they might claim, if the genetic programme metaphor misrepresents ontogeny (as I argue in the next chapter), their way of viewing living phenomena does not necessarily fall with it. This, as I say, would be a reasonable response. None of Nussbaum, Foot or Thompson appeal explicitly to some empirical theory about innate constitution, not least genetics, as providing reason to think in terms of life-forms.¹¹⁷ And, strictly speaking, this response is correct: there is no necessary connection between the neo-Aristotelian life-form concept and any particular interpretation of the material contents of cell nuclei.

However, my argument does not rely on the connection being quite so direct. Firstly, I hereby assert the somewhat speculative claim that the continued prominence of *poietic* metaphysics in modern biology provides a nourishing context for the properness logic of contemporary neo-Aristotelianism. The presupposition that living beings are given models to follow, prior to and independent of their concrete history, which provide ends and normative imperatives to development, and the general idea connected with this of ‘nature’ as a transcendent source of such prescriptions, is all perfectly natural, so to speak, to the dominant language of modern biology. This acts at an intellectual-cultural level to naturalise – validate, make normal – the metaphysics underlying the normativity of ‘properness’, even if, strictly speaking, this way of thinking can be affirmed independently of any *particular* appeal to biological theory.

¹¹⁷ Nussbaum comes the closest in her notion of ‘basic capabilities’ as innate potentials with particular states of realisation, i.e. *teloi* fore-seen within the innate constitution of the individual, whose fulfilment is the ‘point’ of development (see II:4). Nussbaum does *mention* genetics in this context, but only to point out that genetic constitution does not by itself guarantee the proper fulfilment of these inner potentials: “[T]he development of basic capabilities is not hard-wired in the DNA: maternal nutrition and prenatal experience play a role in their unfolding and shaping”; i.e. this unfolding is “environmentally conditioned” (2011: 23). This is clearly a denial of genetic causal *determinism*, which is to be commended. However, as I discussed above (2.6), this denial (which at least puts Nussbaum within the ‘interactionist consensus’) is perfectly consistent with the genetic *essentialism* under scrutiny here. Indeed, the normative character of genetic essentialism derives precisely from the fact that proper developmental outcome is *not* guaranteed, hence the possibility of ‘defective’ existence. I argue that if Nussbaum were to embrace the radical aspect shift involved in the constructivist turn (see next chapter), then the notion of ‘innate potentials’ that she appeals to, whether understood as represented in DNA or not, would collapse (see VI:3.3).

Thompson, in fact, explicitly rejects the definition of essence in terms of DNA, because it is insufficient to specify ‘all the information’ for an organism’s species-typical ‘life-form’ (2008: 55-56). He makes important points here, but I feel that the further he continues down the line of bringing context-specificity into the construction of organic form, the less viable becomes the central thesis of normative assessment of individuals by measurement against a general type that applies in abstraction from *actual* context. See also footnote 8 in III:2, on the assumption of particular context in Foot.

Secondly, and more importantly, my claim is weaker than the one that this hypothetical response addresses. My argument is not that neo-Aristotelian properness stands and falls with the *genetic* incarnation of *poietic* metaphysics, but rather that it relies on the validity of this interpretation of living phenomena in general. And, the point is (see VI:3.1), *developmental constructivism undermines this way of thinking in general*. Although it emerges from a critique of a particular understanding of *genetics* (hence the content of this chapter, which provides necessary background for the next chapter), developmental constructivism encourages us *not just* to reject the notion of DNA as material representation of a set of instructions for ontogeny, but to reject the very notion of ontogeny as a process of essence-realisation altogether. The genetic programme is just the most prominent manifestation of the *poietic* conception of organismic becoming in modern thinking about life. The most coherent picture we have of organismic becoming, which emerges from extending the anti-essentialist revolution of Darwinism to the individual life-course, requires a different conceptual framing altogether.

Chapter VI

Developmental Constructivism and Becoming as *Praxis*: Re-thinking Flourishing via Internal Critique of Modern Biology

Introduction

In this chapter I appeal to a shift in perspective on ontogeny that is occurring in the life sciences and connect it with my discussion of flourishing in Part 1. This shift, to what I label developmental constructivism (henceforth simply ‘constructivism’),¹ is exhibited in a number of important theoretical approaches and fields of research that have gained prominence in recent decades.² It involves rejecting the special (essentialist) ontological status often given to the genome via metaphors like the programme, as discussed in the previous chapter, and re-distributing developmental (and evolutionary) significance across an heterogeneous system of context-sensitive elements, including the activity of the organism itself. Form and functionality is then no longer seen as prescribed by a transcendent plan given to the organism, but as continually constructed within each organism’s unique process of becoming.

In the first section I argue for this ‘constructivist turn’. I am only able to scrape the surface of the relevant empirical and theoretical (not to mention historical) matters here, for reasons of space. Furthermore, this section contains little original argument. It is a brief survey of some

¹ The perspective I refer to as ‘developmental constructivism’ is sometimes also called ‘constructivist interactionism’, a ‘constructivist’ or ‘constructionist’ approach to development, or theory of ‘constructive development’. My main reference point re this perspective is the work of Susan Oyama (e.g. 2000a [1985]; 2000b; Oyama, Griffiths & Gray 2001). See also various elements of the work of Richard Lewontin (e.g. 1991; 2000a [1998]; 2001; Levins & Lewontin 1985); John Dupré (e.g. 2012; Barnes & Dupré 2008; Dupré & Nicholson 2018); and Christophe Rehmann-Sutter (e.g. 2006; 2008; 2010).

² Developmental constructivism, and related critiques of the genetic programme concept and gene-centrism more generally, are central to areas of contemporary biological theory and research such as ‘developmental systems theory’ (DST) (e.g. Oyama, Griffiths & Gray 2001; Oyama 2000a [1985]; 2000b; Griffiths & Gray 1994; Dupré 2012); ‘Eco-Devo’ and ‘Eco-Evo-Devo’ (e.g. Gilbert & Epel 2009; Gilbert, Bosch & Ledón-Rettig 2015); the move towards an ‘Extended Evolutionary Synthesis’ (e.g. Laland *et al* 2015; Pigliucci & Müller 2010); the conceptual aspects of ‘postgenomic’ research (e.g. Richardson & Stevens 2015; Meloni 2016: Ch 7); and certain versions of ‘systems biology’ (e.g. Noble 2006). See also the role of similar ideas in the recent call for a turn to ‘process ontology’ in biology (Nicholson & Dupré 2018).

of the main reasons for turning from neo-preformationism to a constructivist perspective on ontogeny, and for the most part I repeat the arguments of others.

In the second section I outline the key elements of this constructivist re-conception of ontogeny. Then, in the third section, I argue that taking this turn involves a profound shift in our understanding of organismic becoming. Rather than simply undermining one particular *poietic* metaphor (i.e. the genetic programme) it requires an entirely different interpretive perspective, one which sees the becoming of life as an immanently creative and reflexive – or *praxic* – process. In this way, I argue, we can harness this internal critique of modern biology as a resource for re-thinking flourishing in the way proposed in Chapter III.

1. Biology beyond the programme: reasons for the constructivist turn

1.1. Argument from conceptual adequacy

I showed in V:2.6 that genetic essentialism is not strictly the same as genetic determinism. It only seems to imply determinism when we assume the environmental conditions needed for successful essence-realisation. Given that these conditions are not guaranteed, the genetic essence can manifest itself to greater and lesser degrees of perfection: it does not causally determine its own full realisation. Thus, the simple fact that an organism's actual developmental path is determined by more than just genetics (see the 'interactionist consensus') does not by itself undermine the notion of the genetic essence. As I explained in V:2.6, this notion persists as long as we maintain the dualistic interpretation of 'interactionism' in which developmental influences are divided into two distinct ontological categories: the 'information' about the organism, or 'instructions' for its ontogeny (encoded in the genome), and external 'environment' – anything other than genetic code – that either assists or obstructs the unfolding of the programme.

Many in recent decades have argued that this picture ought to be rejected, and replaced with one in which ontogeny is constructed through interaction between multiple context-sensitive elements, none of which uniquely provides 'the information' about the forms to be produced; that we should think about ontogeny in a way that "does not rely on a distinction between privileged, essential causes and merely supporting or interfering causes", to quote Oyama *et*

*al.*³ I shall outline some of the reasons for this in this section. But first I'll say a little about the status of the argument.

In principle, I will allow, any amount of ontogenetic causal complexity and context-sensitivity can be accommodated within the above dualistic framework, if we are determined to preserve it (see final paragraphs of 1.3 below). In practice, however, the more we learn about these matters, the less conceptually *adequate* this dualism becomes, and the more conceptual gymnastics are required in order to perpetuate it. So, whilst no single empirical fact is a knock-down against this conceptual edifice (at least, I do not rely on such a claim in this case), this doesn't mean that empirical matters are irrelevant. An accumulation of observations can put pressure on the key assumptions of a framework and play the role of *shifting the burden of conceptual justification*, as I put it. This is how I see the situation in this case. The argument for the constructivist turn ultimately hinges on this issue of conceptual adequacy, or coherence in interpretive perspective, rather than *simply* the recognition of some particular empirical facts.

1.2. Plasticity and context-sensitivity 'all the way down'

The phenotypic and developmental *plasticity* of an organism, or part of an organism, is its capacity to develop and function in flexible ways in response to different contexts.⁴ Various degrees of plasticity are found across all levels of biological organisation, and it is much more important in ontogeny – much more important regarding how the organism can *become* – than one would gather from the rhetoric of the genetic programme, according to which, as we saw in the previous chapter, the genome contains (the plan for) the organism's "entire future: the stages of its development, the shape and the properties of the living being which

³ Oyama, Griffiths & Gray 2001: 1.

⁴ See e.g. Laland *et al* 2015: 3; Gilbert & Epel 2009: 6-7.

will emerge”.⁵ I’ll outline here how plasticity at various levels of biological organisation puts pressure on this idea.⁶

At the scale of whole-organism morphology and behaviour there are many cases in the natural world of significant developmental variation that correlates primarily with external environmental context rather than genetic difference. For example, in many social insect species, such as ants, aphids, and honey bees, genetically identical individuals take on different functional roles within their colonies (e.g. queen and workers), and can develop vastly different physical phenotypes as they grow into these roles.⁷ Juvenile brown trout spawn in freshwater rivers, and are largely indistinguishable both genetically and morphologically. At a later stage some migrate to the sea and some stay in the river. The former adapt to salt-water, gain a distinctive jaw structure, and often grow to a much larger size than their homely siblings. Although commonly distinguished as sea trout and freshwater trout, they are in this sense actually developmental variations of the same species.⁸ In the presence of chemicals given off by its major predators, tadpoles of the gray tree frog develop different coloured tails and a different muscular structure than they do in the absence of these chemicals, changes that better enable them to avoid predation.⁹ In many species of fish, turtles, and alligators the sex of the individual is highly sensitive to developmental conditions, such as the temperature at which an egg is incubated. The same egg (‘same’ in terms of genetics) incubated within one temperature range will become male, but at another it will become female.¹⁰ The blue-headed wrasse, among several other fish species, can even

⁵ Jacob 1993 [1970]: 2.

⁶ On the renewed interest in the scope and significance of plasticity in both development and evolution, see e.g. West-Eberhard 2003; 2005a; 2005b; Moczek 2012; 2015; Gilbert & Epel 2009: Ch 1; Gilbert, Bosch & Ledón-Rettig 2015; Laland *et al* 2015; Dupré 2012: 257-260.

⁷ This depends on interaction with a variety of factors such as different pheromonal nest cultures, microbial symbionts and sources of food. See variously Gilbert & Epel 2009: 20-21; Griffiths & Knight 1998: 254; Sterelny & Griffiths 1999: 97; Meloni 2016: 198.

⁸ There seems to be a whole host of factors that contribute to the ‘decision’ of some of the trout to migrate to sea and some to stay in the river, such as differing metabolic rates and the environmental conditions of early life (Caballero, Morán & Marco-Rius 2013).

⁹ Gilbert & Epel 2009: 3-5.

¹⁰ Gilbert & Epel 2009: 5, 17-19.

change sex during early life depending on the sex of other individuals of its species that it encounters.¹¹

These cases relate to early developmental stages, but phenotypic plasticity is important throughout a being's life. In the case of humans, see for example the way that our digestive and immune systems are maintained and adapted through responses to the presence of different kinds of bacteria and viruses in the body;¹² and the huge scope our brains have for structural adaptation through learning throughout adult life.¹³ The plasticity of living systems and behavioural capacities enables the organism to continuously maintain and adapt itself in interaction with varying and unpredictable conditions.¹⁴

The more we recognise the importance of environmentally-responsive plasticity in directing ontogeny, and its capacity to enable multiple coherent and viable organismic forms, the harder it is to hang on to the view that genetics provides fixed instructions for what is to be developed, whilst 'environment' (everything else) merely provides enabling (or divergence-producing) conditions. If we want to maintain the structure of this dichotomy at all then, in cases like the early developmental examples given above, it makes just as much, if not more, sense to reverse the relationship; i.e. to see the pathways taken as 'instructed' by the external environment, and to relegate genetics to background condition.¹⁵ But the better conclusion, as I shall explain, is that this is a similarly inadequate description. Either alternative neglects the rest of the complex nexus of interactive elements, including the activity of the organism itself, through which form and functionality emerges.

This story gains texture when we look at lower levels of biological organisation. Take the process of cell development. Because all the cells in an individual's body are descended from

¹¹ Gilbert & Epel 2009: 5.

¹² Gilbert & Epel 2009: 5; Dupré 2012: Ch 13.

¹³ See e.g. the seminal study by Maguire *et al* (2000) of the brains of London taxi drivers, which showed growth of the posterior hippocampus, a part of the brain associated with spatial awareness and navigation, to be positively correlated with length of time in this line of work.

¹⁴ See e.g. Oyama 2000a [1985]: Ch 2; Barker 2015: 55-60, 68-69.

¹⁵ See e.g. Gilbert & Epel 2009: 10. Couldn't we instead see these developmental variations as programmed by genetic instructions that specify *different forms relative to different environments*? Yes, this option is open to the genetic essentialist. I offer critique of this particular idea at the end of 1.3 below.

the same parental zygote, they contain the same genetic code.¹⁶ Yet we have many different kinds of cell in our bodies, with different morphologies and functional capacities – blood cells, bone cells, skin cells, neurons, and so on. The production of specific kinds of cell, and variation in their properties, depends on many factors other than the DNA sequence the cell contains, including chemical structures such as methylation patterns that modify nuclear DNA and regulate how the genome of that cell can be used.^{17 18} This ‘epigenetic’ patterning is shaped by a number of contextual factors.¹⁹ These include the chemical milieu of the tissue or organ in which the cell develops – for example, embryonic skin cells placed in the location where an eye is being formed can change their epigenetic patterning and develop into lens cells;²⁰ and hormonal signals caused by activity in the nervous system, which is in turn the product of sensory interaction with the external environment – for example, cells in the hippocampus of a rat’s brain acquire different methylation patterns depending on the extent of maternal grooming that the pup experiences during the first week after birth, and these patterns can in turn affect nervous system functioning later in life, leading to different abilities to deal with stress through adrenal regulation.²¹

¹⁶ This is not strictly true. Firstly, not all cells in the body (‘in’ both spatially and functionally) are descended by mitosis from the parental zygote. A huge number within, e.g., a human body belong to different organic lineages altogether. These include many microbial symbionts such as bacteria, archaea, and fungi, upon which the functional whole of the human being depends. Amazingly, these amount to around 90 percent of the cells and 99 percent of the genes in the living human organism (Dupré 2012: 220-226; 124-128). Secondly, taking only the ‘native’ cells in an organism (descended from parental zygote), there are a number of reasons why they could be genetically heterogeneous, such as ‘errors’ in DNA copying during mitosis, and various other kinds of genetic mosaicism and chimerism, some very common (see Dupré 2012: 119- 122). But these exceptions are beside the point here, which is that even genetically identical cells, based on the standard 4-letter representation, can be of different kinds, and perform different functions.

¹⁷ Gilbert & Epel 2009: 38-46; Noble 2006: 93-94; Sterelny & Griffiths 1999: 128-132; Dupré 2012: 114; 122-124, 158-159, 279-280.

¹⁸ There are many other within-cell factors that are important, including the very physical shape of the genome *qua* material object. The way chromosomes in a particular cell are folded and spooled (in interaction with histone proteins, etc.) affects how they can be used (Dupré 2012: 3-4; Barnes & Dupré 2008: 64-65; Sterelny & Griffiths 1999: 131).

¹⁹ See in general Gilbert & Epel 2009: Ch 2; Noble 2006: 45-51, 93-94.

²⁰ Noble 2006: 94.

²¹ Gilbert & Epel 2009: 44-45.

There are complex cycles of causation and dynamic interaction here, rather than bottom-up control by an underlying code. Cell morphology and functionality is constructed out of interactions between and across multiple levels of organisation. DNA plays important parts in this, e.g. in protein synthesis, to be discussed in a moment. But, again, there seems no better reason for attributing to *it* the special role of ‘informing’ or ‘instructing’ cell development, than for awarding that status to, e.g., methylation patterns that affect how the genome is used in a particular cellular context, or to the multiple wider factors that shape those patterns, and so on.²²

Let’s go down further. One of the central ways the genome is used in the cell is in protein synthesis, the area in which the concept of ‘genetic coding’ has been most successful.²³ Each time a protein is produced, a section of DNA is ‘transcribed’ into a strand of mRNA (‘messenger’ RNA), and then this is ‘translated’ into a protein by molecular apparatus in the cell cytoplasm called a ribosome.²⁴ The ribosome connects together amino acids, the units of protein structure, in a particular order according to the nucleotide sequence of the piece of mRNA that is fed into it.²⁵ On the face of it, then, a particular amino acid structure is ‘coded for’ by the section of DNA that is used in the process of protein synthesis (i.e. the particular ‘molecular gene’ transcribed).²⁶ However, even in this narrow context, the notion that gene sequences ‘instruct’ a particular end-product is thoroughly misleading.

²² See e.g. Oyama 2000a [1985]: 35-36.

²³ See e.g. Godfrey-Smith 2007 and Griffiths 2001: both are critical of uses of genetic ‘information’ that involve a special semantic or essentialist status, yet both allow that the notion of a ‘coding’ relation between DNA and proteins has a legitimate basis, due to the determinate (but not one-to-one) chemical ‘mapping’ between DNA triplets and amino acids. In what follows I do not deny the mechanical facts appealed to for this claim, but do deny that the amino acid structure of the protein synthesised is simply ‘instructed’ by the DNA sequence used, since relations at this level can be many-to-many.

²⁴ The terms in inverted commas here are just a few of the many semantic/intentionalistic/teleological metaphors, along with ‘code’, ‘programme’, ‘information’, ‘blueprint’ etc., that are now thoroughly embedded in the language of genetics and subtly validate a *poietic* metaphysics in modern biology. See Oyama (2009; 2010; 2016) for a more detailed analysis of this ‘language of language’ in biology.

²⁵ On these processes in general, see e.g. Sterelny & Griffiths 1999: 103-104, 124-132.

²⁶ On the ‘molecular gene’ or ‘reading sequence’ gene concept, see Sterelny & Griffiths 1999: 78, 132; Orgogozo, Peluffo & Morizot 2016; Dupré 2012: 80, 107-108, 138.

It was once thought that RNA was merely an intermediary between DNA code and protein structure.²⁷ In fact, whilst it is true that the primary mRNA sequence corresponds one-to-one with the base sequence of the strand of DNA transcribed (due to unique chemical bonds between the different nucleotides),²⁸ before mRNA is translated into a functional protein product there are various mechanisms that ‘edit’ it. Some sections are removed, and the remaining sections recombined. This editing and recombination can occur in multiple ways, a phenomenon known as ‘alternative splicing’: each ‘splice variant’ makes a different final mRNA sequence, specifying a different amino acid structure.²⁹ Further changes can also then be made to the chains of amino acid before they are used as functional proteins.³⁰ Also, molecular genes sometimes ‘overlap’, in the sense that a certain bit of sequence can be transcribed into more than one primary mRNA.³¹ Therefore, one section of DNA can be involved in the production of many, sometimes hundreds of, different proteins.³² Furthermore, in some cases a single protein is made using DNA sequence from separate sections of the genome.³³ Thus, the relationships between DNA sequences and proteins are not one-to-one, nor even one-to-many, but many-to-many.³⁴ Regulation of protein synthesis depends on complex interaction between genome and cellular environment, interaction which

²⁷ Dupré 2012: 1, 81, 138.

²⁸ See e.g. Sterelny & Griffiths 1999: 126.

²⁹ Noble 2006: 6-10, 30; Sterelny & Griffiths 1999: 103-104, 124-132.

³⁰ Dupré 2012: 80, 108, 138, 251.

³¹ Dupré 2012: 80, 138; Sterelny & Griffiths 1999: 126. The implication of this, and yet further complications (such as the *direction* in which the DNA sequence is ‘read’), is that what *counts* as a ‘molecular gene’ depends on the particular instance of protein synthesis we are looking at – there is no objectively unique division of the genome into discrete molecular genes, such that they can be straightforwardly countable (Dupré 2012: 80-81, 138-139, 250-251; Sterelny & Griffiths 1999: 132-133).

³² This is borne out by the fact that there is usually said to be 20-30,000 molecular genes in the human genome, whereas we have at least 100,000 different types of protein (Noble 2006: 4; Dupré 2012: 250-251). The number of different splice variants a gene has depends on a variety of things, including its size. E.g. the *Dscam* gene in the fruit fly has around 115 exons (sections which correspond to particular amino acids), and can potentially be used to make around 38,000 different protein products (Noble 2006: 30). This indeterminacy is common: around 95% of multiexon molecular genes in the human genome undergo alternative splicing (Pan *et al* 2008).

³³ Dupré 2012: 80, 108, 251.

³⁴ Dupré 2012: 80, 108; Sterelny & Griffiths 1999: 132; Rehmann-Sutter 2008: 39-42.

is in turn influenced by wider contextual factors.³⁵ So, again, even at this relatively simple level, the ‘specification’ or ‘instruction’ of organic form can be no more meaningfully attributed solely to DNA structure than it can to any other aspect of the dynamic system of structures and processes through which that form is constructed.³⁶ Once we get up to the scale of the whole organism, this many-to-many indeterminacy is hugely amplified, such that the notion that we might portion up the genome into a set of ‘genes-for’ phenotypic traits is now all but dead.³⁷

Thus we find context-sensitive plasticity across the levels of biological organisation. DNA sequences can be used in multiple ways in synthesis of RNA and proteins, and even the very structure of the genome in a cell is modifiable through its relations with the rest of the cell.³⁸ Even if DNA-amino acid relations were one-to-one, DNA would still not fully determine

³⁵ Noble 2006: 7-8; Sterelny & Griffiths 1999: 103; Dupré 2012: 81-83, 108, 113-114, 122-124, 134-136, 249-253; Barnes & Dupré 2008: 45-59.

³⁶ See Oyama 2000a [1985]: 31-33. Noble makes the salient point that, for these reasons, calling protein synthesis ‘gene expression’ is thoroughly misleading because it “gives the impression that the whole process is implicit in the gene, or at least in the information that the gene holds, which simply needs to be ‘expressed’” (Noble 2006: 6-7).

³⁷ See e.g. Noble 2006: 8-9, 37; Rehmann-Sutter 2008: 39-42. This is often expressed in terms of the impossibility of reducing Mendelian genes – hypothesised discrete ‘factors’ that account for trait differences – to specific segments of the genome (e.g. Sterelny & Griffiths 1999: 121-124, 132-136; Dupré 2012: 105-111, 137-139, 249-253; Barnes and Dupré 2008: 47-59). Even the most strongly correlated DNA-phenotype relations, which usually involve a disease or other medical disorder, such as cystic fibrosis or PKU, often turn out to involve a variety of possible variations in DNA, and for various other reasons it is misleading to call these particular changes ‘genes-for’ the diseases in question (Dupré 2012: 109-110, 137, 249-250; Moss 2001). The wider point is that, even if there are statistically one-to-one cases of correlation between genotype and phenotype differences, the dependence of the development of any trait on multiple layers of mediation between DNA and biotic and abiotic ‘environment’ means that we can’t see the whole process of that trait’s development as simply dictated by the genomic element in this system (see also Oyama 2000a [1985]: 50-51; Lewontin 2000b: viii-x).

³⁸ E.g. through DNA methylation, mentioned above. There are two ways of interpreting this: as an external structure added *to* the underlying 4-letter DNA sequence, or as a modification *of* that sequence. When a cytosine base is methylated, for example, its hydrogen atom is replaced with a methyl group of one carbon and three hydrogen atoms, turning it into 5-methylcytosine (e.g. Severin *et al* 2011). This doesn’t affect its bond with guanine, so it is usually said that the DNA sequence remains the ‘same’. Nonetheless, 5-methylcytosine is a different chemical structure to cytosine, with different mechanical properties, that affect DNA transcription in different ways (Severin *et al* 2011). The interpretation that sees methylation as merely an external addition requires abstracting away these details, such that we label both cytosine and its methylated variant as ‘C’ when representing genome structure (Dupré 2012: 123). This is just one example of how a more fine-grained description of chemical composition would affect the extent to which we see genomic diversity between cells of common zygotic descent (Dupré 2012: 123; Barnes & Dupré 2008: 84-87).

protein functionality, which is also flexible – proteins can play multiple roles depending on how they interact with each other and their wider material context.³⁹ And this picture repeats with increasing complexity as we go up the levels of organisation towards the organism itself, as a functionally integrated whole that interacts with a yet wider environment.⁴⁰

Each level is ‘blind’, as Denis Noble puts it, to what it does at higher levels, which is determined not simply by the properties of the structure in question but by its relations at those higher levels.⁴¹ DNA doesn’t dictate how it should be translated into proteins, nor what those proteins should do, proteins don’t tell the cell what to do, and cells don’t instruct organ functionality, and so on.

The organism itself ‘downwardly’ influences the ongoing interplay across all these lower levels.⁴² It does this through its capacities for sensitive coordinated response to context, open-ended exploratory developmental processes, and even positive modification of external environments (known as ‘niche construction’), which in turn shape the conditions of its own continued development and activity.⁴³ The organism is therefore a participant in the process of its own development; it actively and flexibly mediates the relations between various aspects of the causal nexus through which it continuously comes into in the world. These capacities are increasingly being recognised as central to a proper understanding of both

³⁹ Noble 2006: 36-37; Sterelny & Griffiths 1999: 92; Dupré 2012: 133-134, 140.

⁴⁰ See Dupré (2012: 124-126, 151-153, 220-222) for an account of the multicellular organism as a functionally and metabolically integrated whole that interacts with its surroundings (also Nicholson 2014a). Such wholes need not be genetically homogeneous, for reasons such as those mentioned above in footnotes 16 (microbiome, mosaicism etc.) and 38 (ways of interpreting methylation).

⁴¹ Noble 2006: 34. See also Dupré 2012: Ch 8, in which he notes that the capacities of biological entities do not simply inhere in their intrinsic material structure, because “aspects of what they *are* depend on the context with which they interact, a context *always extending beyond any predetermined boundaries*” (142 (my italics)).

⁴² On the phenomenon of ‘downward causation’ from whole to parts, which applies at all levels of organisation including where the whole is the whole organism, see Dupré 2012: Ch 8, 287-289; Noble 2006: Ch 4.

⁴³ On the mediation of development by the organism’s *sensitive responses* to environment, see e.g. Barker 2015: 47, 53-62; Laland *et al* 2015: 3-5; West-Eberhard 2005b; Moczek 2012; 2015. On the open-ended and *exploratory* character of much developmental coordination, both internal and external, see e.g. Laland *et al* 2015: 5-6; Gerhart & Kirschner 2007; Moczek 2012; 2015. On the mediation of the organism’s development by its own action *on/modification of* the environment, part of what is studied in the growing field of niche construction theory, see e.g. Oyama, Griffiths & Gray 2001: 4, Barker 2015: 53, 62; Nicholson 2014a: 350; Moczek 2012: 115-116; 2015 (on niche construction theory in general, which focuses mostly on the significance of organism-environment co-construction for *evolutionary* process, see e.g. Laland, Odling-Smee & Feldman 2001).

development and evolution, due to their potential to enable novel structural and behavioural forms, and adaptive innovation in response to novel situations.⁴⁴

As a whole, this expanded picture of ontogeny reveals a plasticity of form and functionality, and dynamic complexity, for which the notion of the genetic ‘programme’ or ‘blueprint’ seems woefully inadequate, as I shall now elaborate.⁴⁵

1.3. Deflating the genetic essence: the ‘parity thesis’ and the inadequacy of dualistic interactionism

One way that this picture gives the lie to the programme concept is that it implies the breakdown of the dualistic version of the ‘interactionist consensus’, for which the organism is simply the product of interface between two separate channels of influence, ‘genetic information’ and ‘environment’. The idea that DNA is special in providing the ‘programme’ for ontogeny, whilst everything else is simply external conditioning, significant only for its affecting the more or less perfect realisation of that programme, becomes inadequate to reality.

This is because, for any ‘developmental resource’ within the ‘developmental system’ through which the organism becomes,⁴⁶ the phenotypic ‘meanings’ it provides – what it does, what differences it makes, what roles it plays – are not *inherent* within it, but depend on its

⁴⁴ Another way to put this is that prior selection on genetic differences underdetermines the possibilities for phenotypic response to the environment; developmental plasticity enables novelty because it is a responsive capacity of the whole organism with various degrees of open-endedness, rather than just a pre-defined set of alternatives encoded in genotype (see more below, towards the end of 1.3). See variously Laland *et al* 2015: 3-6; Linquist *et al* 2011: 444-445; Gerhart & Kirschner 2007; West-Eberhard 2005b; Barker 2015: Ch 5; Dupré 2012: Ch 14; Oyama 2000a [1985]: 169-172; Gilbert, Bosch & Ledón-Rettig 2015; Moczek 2012.

⁴⁵ Although much of the discussion so far has focused specifically on the idea of *DNA* as a programme for development, the recognition of constructive dynamic interaction across many levels, and across developmental time, implies the same deflationary conclusions for various other more liberal construals of the innate programme idea, e.g. that a ‘developmental programme’ is distributed across the fertilised zygote as a whole, not just localised in the chromosomes. For a good summary of the reasons that this expanded idea, although better in some regards, does not overcome the fundamental flaws of the DNA-localised genetic programme, see Nicholson 2014b: 167-168; also Oyama 2006: 281-283.

⁴⁶ To use the language of developmental systems theory, in which constructivism is central (see e.g. Oyama, Griffiths & Gray 2001; Oyama 2000a [1985]: Ch 7). The term ‘system’ here is used somewhat broadly to refer to the nexus of heterogeneous interactants involved in any process of ontogeny, however tightly or loosely connected, persistent or transient across time, ‘typical’ or ‘atypical’, etc. (Oyama 2000a [1985]: 141, 202-203).

relations with other elements, the ontogenetic history of those relations, and the possibilities for ongoing interaction within that relational context. This applies as much to the genome as to any other element in this dynamic nexus, from epigenetic cellular mechanisms to the wider physical and social environment.

This implies what is sometimes called the ‘parity thesis’: that there is a fundamental *ontological parity* across the various aspects of a developmental system, with respect to their roles in ontogeny.⁴⁷ All sources of influence on ontogeny are on a par insofar as they are dependent on interaction with other elements, their effects are context-sensitive, and given the right circumstances they are all capable of making the difference between one outcome and another – of ‘specifying’ particular form, if you like. What counts as ‘specifying’ an outcome and what counts as ‘background condition’ depends on what we are interested in, on where we start from and what we take for granted in our investigation of a process.⁴⁸ There are no grounds for sectioning off any particular element of the developmental nexus as the special source of phenotypic prescription or teleological directionality.

This presents us with a dilemma: either we allow that any sense in which genomes can be said to ‘inform’ or ‘instruct’ ontogeny – i.e. as context-sensitive structural or causal interactants – can be said equally well of any other source of influence in the developmental system; or we simply reject ‘information’ language altogether, as a misleading metaphor that sends us astray by suggesting ontologically privileged components that prescribe form to the

⁴⁷ On the parity thesis (explicit and implicit), see Oyama, Griffiths & Gray 2001: 3, 5; Griffiths and Knight 1998: 254-255; Griffiths 2001: 396; Griffiths & Gray 1994: 277, 284; Oyama 2000a [1985]: 16-18, 35-36, 39-40, 43, 68, 132, 200-202; Oyama 2000b: 2-3; 2006: 275; Dupré 2012: 134-135, 254-255; Moss 2001: 89-91; Godfrey-Smith 2007: 107; Sterelny & Griffiths 1999: 95, 100-101, 106-107.

⁴⁸ Oyama 2000a [1985]: 39-40, 79-80, 93, 130-133, 161-162; Moss 2001: 91; Dupré 2012: 286.

rest of the system.⁴⁹ Whichever horn of this dilemma we choose, it deflates the special status given to the genome in genetic essentialism.⁵⁰

⁴⁹ This dilemma is implicit in e.g. Sterelny & Griffiths 1999: 100-101; Oyama 2000a [1985]: 195-198, 200-202. The sense of ‘information’ posited for the first horn of the dilemma would explicitly deny any semantic, intentional, or teleological character. Often appealed to is a technical concept derived from communications theory in which an event carries information about another event to the extent that it is systematically correlated with that event (Griffiths & Gray 1994: 281; Griffiths 2001: 396-397; Sterelny & Griffiths 1999: 101-102). Importantly, in this concept what counts as ‘sender’ and what as ‘channel conditions’ is always reversible. For example, we might understand genes as the sender that transmits information about phenotype under the channel conditions of some other necessary environmental factors. But we can just as easily view the same situation as one in which these non-genetic factors contain information about the phenotype developed, with the genes involved providing channel conditions. A related proposal would be to align ‘information’, ‘instruction’ or ‘specification’ simply with a *causal* notion, whereby ‘the cause’ of some effect is the difference-maker in a causal nexus, when the rest of the causal nexus is assumed as background conditions (see also Dupré 2012: 286). Neither definition is able to justify the dualism of gene-information/environment-condition, because both require ontological parity between all inputs that can affect phenotypic state; every such input is a potential source of developmental ‘information’ on these definitions. For more detail on this debate see Griffiths & Gray 1994: 281-283; Griffiths 2001; Godfrey-Smith 2007; Sterelny & Griffiths 1999: 100-105; Oyama, Griffiths & Gray 2001: 5; Dupré 2012: 134-135, 254-255; Oyama 2000a [1985]: 74-81; 2009: §3.2.2; Barnes & Dupré 2008: 77-78.

⁵⁰ I personally favour the second horn, for the reason that the language of ‘information’, ‘instruction’, and so on, always gives the misleading suggestion of semantic/intentional content and teleological direction. Some have attempted to embrace these connotations by ‘naturalising’ (as in ‘making compatible with natural science’) the idea that genetic information has such a content, thanks to the ‘designing’ agency of natural selection (e.g. Maynard Smith 2000; Shea 2013). I am very sceptical of the possibility (and value) of doing so, for reasons similar to those of Griffiths 2001; Godfrey-Smith 2007; Sterelny & Griffiths 1999: 104-105; Oyama 2009; and for reasons more specifically to do with the validity of deriving intentional content from natural selection as an agent of ‘design’ (see footnote 115 at end of V:4). More to the point, as the arguments in this section should make clear, I don’t think there is a *need* to attempt the ‘naturalisation’ of a semantic notion of genetic information.

I will briefly expand on these points in relation to the theory of Shea (2013). Shea has recently defended the use of semantic concepts of genetic information. As best as I can understand him, he argues as follows. Firstly he notes, uncontroversially, that particular genotypic differences correlate with particular phenotypic differences. In this sense it can be said, again uncontroversially, that the former contain ‘correlational information’ about the latter (they can be used to make predictions about the latter – in the same way we could say, I think, that a sunrise contains the information that the air temperature will soon increase) (2013: 2). Connected with this (it seems) is the claim that genotypes also contain correlational information about the likely environment in which the organism will develop, in particular *that* it is likely to be conducive to the phenotype that is correlated with the genotype in question (based on the assumption that the environment is more likely to be similar than dissimilar to that in which that genotype has been reproductively successful in the past) (4-7). The next step in the argument is to attribute to natural selection the power of designating proper function to the objects of selection. On this basis, insofar as a genotype has been ‘selected’ in the past, it can then be said that that genotype has the proper (‘adaptive’) function of making the particular difference which made that selective difference in the past (see also IV:3 on this notion of function). The conclusion is apparently that: “[previously selected] zygotic DNA transmitted down the generations has semantic content. It indicates that environmental conditions are conducive to the phenotype, production of which caused that genotype to be selected. [This theory] will also attribute imperative contents to zygotic DNA in the same cases: the instruction to produce the corresponding phenotype” (7). In other words, selectively-favoured genotypes come to contain ‘representations’

The parity thesis doesn't claim that all developmental resources play the *same* role, or are all equally important in every case of developmental process; when looking at a particular phenomenon different factors will have different explanatory significances. What it does assert, to quote Oyama *et al*, is that "such differences do not justify building theories of development and evolution around a distinction between what genes do and what every other causal factor does".⁵¹ If we accept this – a key step in the turn to developmental constructivism – then the ontological divide set up by what I've called dualistic interactionism is overrun by the heterogeneous system of interacting elements through which

of the likely developmental environment (but, rather oddly, not representations of the likely phenotypic outcome, it seems – although Shea is ambiguous on this); and they contain 'instructions' with content like 'produce phenotype P (the one that was the reason for this genotype being selectively-favoured in the past)'. The mechanisms of development successfully 'read' this information (and, presumably, 'follow' this instruction) if they respond to it by producing the phenotype in question (11). Shea claims that this perspective has more explanatory power than one that sees this simply in terms of causal patterns (without added semantic concepts) (14-17). I have a number of things to say in response to this perspective, with respect to its significance here. Firstly, it is not clear how it is explanatorily more powerful to explain development of P by saying that development follows the instruction 'make P' than by reference to the particular causal interactions between the genetic structures in question and their environment that lead to that outcome. No doubt, the development of phenotypes that are conducive to success in the environment they find themselves in is, in part, to be explained by the accumulation of well-adapted developmental resources over phylogenetic time, including exquisitely refined DNA structures. But if this is all that Shea means, then it adds nothing to frame this fact in terms of specific intentional content 'carried' by these structures. However, even if it does help with explanation in some way that I have not been able to grasp, the question for us here is not just one of explanation, but whether this interpretive perspective is metaphysically justified. Central to its apparent justification is the idea that natural selection is something that can imbue its objects with intentional content. A key problem with this is that it treats natural selection as a unitary 'force' or 'agency' that acts on particular objects, analogous to an intelligent designer or maker of an artefact. This is misleading: natural selection is not itself a force, but, as Lewens puts it, a population-level statistical phenomenon (2004: Chs 1-2). What it *means* for some trait to be 'selected' is for it to contribute to the relative reproductive fitness of its bearers within a population – something is not adaptive *because* nature has selected it. This, I think, undermines the grounds for treating 'selectively-favoured' developmental resources as special (in the sense of containing indicative or imperative content) in distinction from any other aspect of the developmental nexus, whether the former are bits of DNA, epigenetic states, features of the maternal environment, or whatever (see also English *et al* 2015 for an 'informational' treatment of some such extra-genetic factors; although I note that in this paper the authors (of whom Shea is one) do not claim anything beyond 'correlational information' for these features). Another way to put this is that the parity thesis is not overcome by making natural selection part of the history of the developmental resource we are interested in. A fuller treatment of these issues would have to consider the nature of natural selection, and its different possible interpretations, in more detail (something I decided not to do in this thesis). One final caveat: my overall purpose in this part of the thesis is to consider the implications for thinking flourishing of embracing the constructivist perspective, given that there are, I think, some very good independent reasons to do so. I do not purport to have negated *all* possible reasons for adopting an opposing perspective – a task which would require a more systematic treatment and much more space.

⁵¹ Oyama, Griffiths & Gray 2001: 3; see also Griffiths & Knight 1998: 254.

life emerges. The parity thesis, at the very least, puts the *burden of conceptual justification* onto those who would wish to maintain this dualism.⁵²

There are some ways one might attempt to lift this burden, and push back against the de-privileging of DNA. However, these also rest on shaky ground.

Firstly, it might yet be argued, isn't DNA special in that it is the conduit of biological 'inheritance'? This is a popular notion. Modern genetics grew out of the attempt to understand heredity, to understand how characteristics are 'passed on' from one generation to the next, to the extent that they are. In this context DNA took on the mantle of the 'hereditary material' – the entity that 'transmits' form from parents to offspring.⁵³ But the question of how the characteristics of one generation are 'passed on' to the next (to the extent that they are) is the question of how form arises in one generation in a similar way as it did in previous generations (to the extent that it does).⁵⁴ This, as should now be apparent, depends on a whole host of internal and external developmental resources and influences being reliably reproduced across generations, including but not limited to the genome.⁵⁵ The more reliably they are reassembled, they more 'innate' or 'inherited' the corresponding phenotypic patterns seem.⁵⁶ So, if by 'conduits of inheritance' we understand the means by which developmental resources are passed on to offspring from previous generations, then it is well established that DNA is not unique in this regard.⁵⁷

It's also not true that DNA is, so to speak, the 'first cause' of the developmental system, the thing 'there at the start' from which all else is derived.⁵⁸ The smallest 'bottleneck' in the

⁵² Oyama 2000a [1985]: 200-202.

⁵³ Meloni 2016: Ch 2, 138-139; Barnes & Dupré 2008: Chs 1-2.

⁵⁴ See e.g. Oyama 2000a [1985]: 43, 138-139, 174-180; Sterelny & Griffiths 1999: 97.

⁵⁵ See e.g. Oyama 2000a [1985]: 38-39, 46-48, 138-139, 141-148, 174-180.

⁵⁶ Oyama 2000a [1985]: 52, 142, 144, 174-176.

⁵⁷ See Oyama, Griffiths & Gray 2001: 3-4; Oyama 2000a [1985]: 43, 49-50, 138-139, 141-148; Griffiths & Gray 1994: 283-285; Griffiths 2001: 399-403; Dupré 2012: 2, 136, 157-159, 252, 254-258, 279-285; Noble 2006: 41; Gilbert & Epel 2009: Ch 2; Sterelny & Griffiths 1999: 95-97.

⁵⁸ Dupré 2012: 136. I would add, even if the earliest stage of an organism was simply a chunk of DNA, why limit 'inheritance' to what is there at the beginning, if the layers of context 'added' to it are just as crucial for the direction of ontogeny?

reproductive cycle of multicellular organisms is the single-cell zygote, and even at this level parents bequeath much more than just DNA. They ‘pass on’, indeed, the whole organised cell, complete with a range of chemicals and molecular mechanisms integral in various ways to cell and genome functioning, such as histone proteins, DNA methylation patterns, organelles such as mitochondria, ribosomes, cytoplasmic chemical gradients, the cell membrane, and many other resources.⁵⁹ The original cell is not assembled *by* the zygotic genome, and the latter can do nothing outside of this initial, already complex, context.⁶⁰ Furthermore, embryos inherit much of importance from the internal maternal environment, such as nutrition, warmth, and in many cases symbiotic microbes.⁶¹ Many organisms also inherit physical and social environments shaped by previous generations, from termite mounds and beaver dams to the highly complex technological and cultural structures of the human world, with its hospitals, houses, schools, legal systems, economic practices, etc.⁶² The trans-generational shaping of external environments, and its significance for both development and evolution, is studied under the rubric of ‘niche construction’.⁶³ Recognition of the full gamut of ‘extended inheritance’, as this has come to be called, is motivating an expanded understanding of evolution as driven by change in the composition of developmental systems, rather than simply changes in genes.⁶⁴

Whatever our understanding of inheritance, one might still attempt to protect DNA privilege by appealing to what is often called the ‘central dogma’. In the broad sense that has become

⁵⁹ See variously Oyama, Griffiths & Gray 2001: 3-4; Griffiths 2001: 400; Dupré 2012: 136, 158, 279-280; Noble 2006: 41; Sterelny & Griffiths 1999: 96; Oyama 2000a [1985]: 145-146. Furthermore, there is growing recognition that particular changes in many of these cellular structures can be inherited via the germ line across generations (see also Jablonka and Lamb 2005: Ch 4; Meloni 2016: Ch 7).

⁶⁰ Dupré 2012: 136; Noble 2006: 41; Oyama 2000a [1985]: 39-40. This fact helps to dispel another potential source of genetic privilege: the notion that DNA is unique in being ‘self-replicating’. Firstly, no DNA replication can occur without a range of other cytoplasmic mechanisms necessary to perform it, and secondly, there are many other cellular structures that, in interaction with other resources, similarly ‘replicate themselves’ in the course of ontogeny: again, we find parity here (see Dupré 2012: 254; Griffiths & Gray 1994: 299; Sterelny & Griffiths 1999: 106-107; Lewontin 2000b: xii-xiii).

⁶¹ On microbial inheritance in the womb see e.g. Funkhouser & Bordenstein 2013.

⁶² Dupré 2012: 255, 258, 280-282; Oyama, Griffiths & Gray 2001: 3-4; Barker 2015: 63-66.

⁶³ In general see e.g. Laland, Odling-Smee & Feldman 2001.

⁶⁴ See Laland *et al* 2015; Oyama, Griffiths & Gray 2001: 6; Oyama 2000a [1985]: 27, 44, 138-139, 141-148, 174-180; Dupré 2012: 2, 254-258, 279-285; Sterelny & Griffiths 1999: 95, 100.

attached to this term, it is the thesis that ‘information flow’ is one-way, from genome to organism but not vice-versa.⁶⁵ This suggests a fundamental asymmetry (non-parity) between the role of the genome in ontogeny and the role of any other sources of influence. The genetic programme transmits instructions to the organism, but is independent of and unaffected by the processes going on outside of it – as Mayr puts it, “the genetic program itself remains unchanged while it sends out its instructions to the body” – whereas any other factors can presumably be shaped by context.⁶⁶ In the previous chapter I referred to this idea in describing the genetic programme as ‘transcendent’ of ontogeny (V:2.2, 3.3-3.4).

What justification is there for this? One way it gains apparent plausibility is by association with the more specific thesis that Crick originally labelled the ‘central dogma’ of molecular biology: that, roughly, there is no ‘reverse translation’ from proteins to DNA.⁶⁷ However, this specific thesis, even if true,⁶⁸ does not justify the broader doctrine that renders the genetic programme transcendent of ontogeny. We have already seen that there are many ways in which the genome is dynamically integrated with other parts of the developmental system. The modification of DNA by methylation, for example, literally affects its base structure, if we describe this phenomenon in a way that is fine-grained enough (see footnote 38 above). Even if we instead insist that methylation is an external structure added *to* an underlying base sequence that remains the same, this and many other contextual factors nonetheless shape genome functionality; they co-determine the specific *uses to which the genome is and can be put* within organic processes. We don’t need reverse translation from amino acid sequence to DNA, nor modification of DNA sequence of any sort, in order for the developmental

⁶⁵ See Meloni 2016: 194-195; Dupré 2012: 135, 251. See also V:2.2.

⁶⁶ Mayr 1982: 56. See also e.g. Jacob 1993 [1970]: 3; Delbrück 1971: 54-55; Dawkins 1989 [1976]: 23.

⁶⁷ Crick 1958: 153; 1970; see also Meloni 2016: 138-139, 194-195.

⁶⁸ It probably is true, at least insofar as there is no evidence of *amino acid* sequence being used to specify either RNA or DNA synthesis (i.e. reverse *translation*) (Meloni 2016: 195). However, there is such a thing as reverse *transcription* of RNA to DNA, e.g. where the appropriately named enzyme reverse transcriptase is used to specify DNA from an RNA template (see Baltimore 1970; Temin & Mizutani 1970). I will not weigh in on the question of whether or not this transgresses the original meaning of the central dogma (but see e.g. ‘Central dogma reversed’ 1970 (non-authored *Nature* editorial); and Crick 1970).

significance of genomic resources to be determined by two-way interaction with context, and, in this sense, for the broad sense of the central dogma to be undermined.⁶⁹

This is a microcosm of the wider point that, a) if we want to talk meaningfully about the genome ‘informing’ development, we must recognise that the ‘content’ or ‘meaning’ of a genetic input is the functional and causal roles that it plays within the organism; and b) these ‘meanings’ are not simply inherent within its intrinsic structure, but are a function of the way it is *brought into relation* with multiple layers of biotic and abiotic context.⁷⁰ In short, if there is a sense in which a genomic resource (or any other influence) imparts information to ontogeny, that information does not exist prior to the integration of that resource into a developmental system; the ‘information’ is *itself constructed through this process*.⁷¹ The “elementary fallacy”, as Ingold helpfully summarises this point, “is to suppose that organic form pre-exists the processes that give rise to it”.⁷²

This again places the genome on a par with other, indisputably context-sensitive developmental resources, which are not ashamed of their context-sensitivity. Whether the genetic *eidōs* is seen as a set of instructions for guiding developmental processes and/or representations of proper phenotypic outcomes, the dynamic embeddedness of the genome in ontogeny undermines the border-walls set up to protect its independence. As I said in V:2.2, the transcendence of the genetic *eidōs* is essential to it as an idea – it’s not much of an essence if its content is determined by the process of its expression. Now we see that this is in fact the case, or, more precisely, the language of pre-existing ‘content’ and a subsequent

⁶⁹ For similar arguments see Meloni 2016: 194-195; Dupré 2012: 81-82, 108, 124, 135-136, 158, 251-252.

⁷⁰ I like to think of this as a ‘Wittgensteinian’ reading of the notion of genetic ‘information’. The meaning of a symbol is its *use in a context*; it does not contain that meaning intrinsically (Wittgenstein 1974 [1953]). Although the structure of genomic resources no doubt places limits on the kinds of organic use to which they can be put, they do not prescribe their own ‘proper’ developmental meaning. The neo-preformationist perspective sees DNA ‘symbols’ either as determining their own proper use independently of context, or as somehow containing within them descriptions of different possible contexts connected inherently to different phenotypic implications (I’ll consider the latter idea again in a moment). See similar arguments in Noble 2006: 21, 34, 38-39; and Oyama (next footnote).

⁷¹ This idea is what Oyama calls the ‘ontogeny of information’, as in the title of her seminal work in the constructivist tradition (2000a [1985]: see e.g. 3-4, 15-16, 23-27, 35, 37-38, 56-57, 68, 76, 80, 130-132, 137, 156-157, 161-164; see also Lewontin 2000b: xiii-xv; Rehmann-Sutter 2008: 42-43; 2010: 20-24).

⁷² Ingold 2011: 8. The context is discussion of developmental constructivism, especially Oyama’s work.

process of ‘expression’ no longer applies.⁷³ The developmental significance of genomic resources is constructed within the process of ontogeny; it is *immanent* from organismic becoming rather than *transcendent* of it. This idea, and the parity thesis that it supports, is central to the constructivist turn.

There is another strategy that attempts to skirt this argument and hang on to the essentialism of the genetic programme. This is to make the context-sensitivity of ontogeny *internal* to the instructions contained in the programme. This strategy is found in what is sometimes called the ‘disjunctive’ or ‘conditional branching’ concept of the genetic programme.⁷⁴ According to this, the genome contains instructions like ‘Develop phenotype P in environment A, and phenotype Q in environment B’. For example, we might understand the genome of the red-eared slider turtle to contain the instruction ‘Develop male phenotype at egg-incubation temperature range of 26-28°C, and female phenotype at 31°C’.⁷⁵ This provides a way to accommodate the growing recognition of the importance of developmental plasticity whilst subtly maintaining the fixity and transcendence of the genetic programme in the background. It achieves this by simply defining plasticity as a delineated set of alternatives encoded in the genome, rather than an open-ended responsive capacity *of* the concrete organism.⁷⁶ By this means, I will allow, any amount of context-sensitivity can in principle be accommodated

⁷³ As Coen (1999: 12-15) expresses this same idea, in the context of ontogeny there is no clear separation between ‘plan’ and ‘execution’. The very meaning of these terms breaks down, since they assume this separation. Similarly, Oyama says that a blueprint or plan “that truly reflects ontogenesis [...] is no longer a blueprint or plan” (2000a [1985]: 73, see also 135-136; Rehmann-Sutter 2008: 42). See also the same conclusions about developmental process in the context of complexity theory, interpreted in terms of the immanent/transcendent distinction, in Durie 2002: 363-369.

⁷⁴ See e.g. Tooby & Cosmides 1992: 38-40, 45-46; Williams 1996: 62; and for critical discussion of this and similar notions, Griffiths 2001: 397; Sterelny & Griffiths 1999: 104; Barker 2015: 49; Laland *et al* 2011: 444-445; Oyama 2000a [1985]: 66-67, 131.

⁷⁵ See Gilbert & Epel: 2009: 17 for relevant data. Since there is a descending ratio of male to female over the temperature range 28-31°C, the genome would presumably also have to contain instructions for gradually changing probabilistic outcomes at each point along this range.

⁷⁶ Pigliucci, for example, defines phenotypic plasticity as a *property of genotypes* (2001: 1). We might ask whether this wouldn’t be better named ‘genotypic plasticity’, since on this view the phenotype, or the organism as a whole, doesn’t itself exhibit any capacity for plastic response, rather its becoming is still merely a passive epiphenomenon of the unfolding of conditional genetic instructions. For an analysis of these two ways of interpreting developmental plasticity, which finds the reduction of plasticity to a property of genomes explanatorily insufficient, see Laland *et al* 2015: 3-5; also Moczek 2012; 2015.

within the programme concept, since we can extend the complexity of such posited instructions at will.

The first thing to say about this is that it rescues (a version of) the programme concept at the expense of much of the normative specificity that made it attractive to many in the first place. No longer does it affirm Jacob's idea that the zygote contains the "architectural plan" or blueprint for the organism's "entire future: the stages of its development, the shape and the properties of the living being which will emerge".⁷⁷ Instead of a single proper form, the genetic essence now contains a *plurality* of proper forms, many ways of 'getting with the programme', depending on the circumstances. This might be considered enough to undermine the notion of the genome as representing what I called in the previous chapter the *eidos* of the individual. Insofar as it no longer involves a *singular* essential form, this is true. Nonetheless, it still subtly conserves the essentialist status of the genome as a transcendent prescriptive element, something that remains separate from the rest of the developmental nexus, prescribes proper outcomes to the organism (relative to particular environments), and can be properly followed or not. In this way it still involves core elements of what I am calling the *poietic* metaphysics of becoming, something which instead, I argue, needs pulling up by the roots.

So, does this 'disjunctive' strategy help lift the burden of conceptual justification from the essentialist? No: it's easy to see that arguments from parity apply equally well to the disjunctive programme. At the level of protein synthesis, how would this view describe multiple splicing? Presumably, each molecular gene with multiple splice variants contains an instruction like 'Make protein 1 in cellular context A, make protein 2 in cellular context B', and so on, and the cell is simply following this instruction when it transcribes the gene and splices the corresponding mRNA in a particular way. But, why see things this way, rather than seeing the DNA sequence as simply a material resource that can be used in flexible ways, and the particular outcome as 'instructed' by the contextually-embedded machinery that performs the splicing process? There seems no principled reason to prefer the former over the latter. Similarly, to return to the reptile sex-determination example, instead of saying that the genomes contain disjunctive instructions related to incubation temperatures, we could equally say that a particular environmental condition, such as an incubation temperature of

⁷⁷ Jacob 1993 [1970]: 1-2.

28°C, ‘contains the disjunctive instruction’ ‘Develop male phenotype in the presence of the genome of the red-eared slider turtle, and female phenotype in the presence of the genome of the alligator snapping turtle’.⁷⁸ These alternative descriptions are equally adequate, or rather, equally *inadequate*, in that they both neglect the rest of the developmental system that would be involved in the ‘following’ of either sort of instruction.

Furthermore, how far can the disjunctive genetic programme be pushed? Does it contain instructions for what to do in *all* possible environments? What about environments that are evolutionarily novel (the rapidly changing human world presents many possible examples)? If it does include all possible contingencies, then the programme becomes an essentially empty notion: it tells us everything and nothing about how the organism becomes the way it does.⁷⁹ If not – and there seems little reason that novel environments would be represented in the genome – then adaptive organismic response to novel situations, and indeed novel response to existing situations, are always *unprogrammed*.⁸⁰ These sorts of developmental response must instead be understood in a different way – as constructed through coordinated sensitive interaction with context *without* being subject to the logic of success or failure in terms of transcendent instructions; i.e. as falling outside the normative logic of proper and defective essence-realisation. With this the constructivist has their foot in the door. If this picture makes sense for cases like this, why insist on its being simply a miraculous exception to the rule, fundamentally different to all other developmental processes – the ‘normal’ kind that result from following complex genetic instructions?⁸¹ I propose, with the constructivist, that we instead recognise situated, plastic, constructive interaction to provide a conceptually adequate, and indeed *simpler*, model of ontogenetic process in general.⁸²

⁷⁸ See again Gilbert & Epel 2009: 17, for relevant data.

⁷⁹ See also Oyama 2000a [1985]: 66-67, 131.

⁸⁰ On the phenomena of adaptive innovation and developmental novelty, see footnote 44 above.

⁸¹ See also Oyama 2000a [1985]: 196-197.

⁸² For similar reasons, McKinnon argues that the reason for rejecting the genetic programme concept is ultimately one of *parsimony* (2005: 114-115). Oyama points out that computer programmes contain complex pre-specified conditional rules for controlling the machine’s behaviour precisely *because* they don’t have the coordinated plastic responsiveness of an organism – computer programmes are “ways of telling an inflexible machine how to be flexible” (2000a [1985]: 71). By projecting this idea onto the genome we unnecessarily conjure up an endless pre-specified complexity lying behind the concrete processes of life, and end up getting things inside-out, as it were. Instead of reified ‘rules’ containing “descriptions of all the conditions, parameters, and interactions, internal and external to the organism, that constitute the developmental system in transition”,

As I've mentioned, a determined partisan of the programme concept could in principle accommodate any amount of plasticity and context-sensitivity into it, through conceptual gymnastics of the sort just considered. However, as Oyama notes, the more ways we can interpret a message, the "harder [it is] to consider the several meanings as inherent in the message", i.e. the weaker the idea of genetic preformation becomes.⁸³ Ultimately, the burden of explaining why this strategy provides us with a more adequate and coherent picture of ontogeny than the constructivist alternative lies with defenders of the genetic programme.⁸⁴ The strength of the constructivist perspective comes not just from recognition of any particular empirical fact, but from its ability to accommodate the variety and complexity of organismic becoming without assuming the dualism of gene-information/environment-condition, a dualism for which, as we've seen, there is scant principled ground. It explicitly rejects the programme concept, and the form of interactionism on which it rests,⁸⁵ in order to overcome these philosophical limitations and embrace the expanded view of living process I have indicated here.

2. Elements of the constructivist turn

Much of what is involved in the turn from neo-preformationism to constructivism has been outlined by means of the preceding arguments, but I shall now make explicit some of the key elements, particularly those that are pertinent to the wider argument of this thesis.

what we have instead are emergent regularities from reciprocal interaction across multiple levels, constructed and stabilised across time; "rather than assuming that ontogenetic processes fit our notion of programs, we should be asking [...] whether our notions of programs do justice to ontogenetic processes" (2000a [1985]: 71-73).

⁸³ Oyama 2000a [1985]: 23, see also 58.

⁸⁴ See also Dupré 2012: 254-255 on this "burden of argument".

⁸⁵ Developmental constructivism is often called 'constructivist interactionism' in order to distinguish it from what I've called dualistic interactionism (e.g. Oyama, Griffiths & Gray 2001: 4; Oyama 2000a [1985]: xvii, xx, *passim*; Oyama 2000b: Introduction, *passim*; 2006: 273). Dupré calls the constructivist approach "proper interactionism" for the same reasons (2012: 278).

2.1. Genome as resource not programme

Firstly, it clearly involves a shift in understanding of what kind of thing the genome is, in the context of ontogeny. Rather than a unit of coded information and instructions, carried in or represented by nucleotide sequence, it is first and foremost a material entity, one that provides a *resource* for the organism's becoming. It doesn't transmit an ideal form or set of commands, but is a material tool that can be used in flexible ways.⁸⁶ It is, no doubt, important, and exquisitely well-suited to particular organic processes, yet it is one developmental resource among many others, and does not stand apart from or above the rest of the developmental nexus in a fundamental way, as per the arguments of the previous section.

2.2. Immanent construction of form and functionality

How, and what, the organism becomes, the particular way in which it produces, maintains, and transforms itself as a more or less coherent whole of structural and functional relations, is *uniquely constructed within the process of becoming*. The particular organisation of each being's way of living is not *revealed* through the teleological unfolding of a pre-given order, but emerges from a continual process of constructive interaction across multiple levels.⁸⁷ This doesn't mean that 'anything is possible', but nor is the *proper* shape of the life prescribed in advance. More specifically, the possibilities for viable, coherent functional organisation are not unlimited, but constraints on possibility are *themselves* contingent and changing products of the relationality that emerges within the particular set of developmental conditions.⁸⁸ This means that judgements about functionality and malfunctionality, beneficial and detrimental conditions and changes, and similar normative dimensions, must refer to the particular organism within the context of its environment and ontogenetic history; they cannot be

⁸⁶ See e.g. Oyama, Griffiths & Gray 2001: 5; Griffiths & Stotz 2013: 223; Laland *et al* 2015: 7; Barnes & Dupré 2008. For a slightly different but complementary view, of the genome as an element in the developmental system that can respond in flexible ways to its environment, see Keller 2014; 2015.

⁸⁷ See e.g. Oyama 2000a [1985]: 137-139, 158-162, 169.

⁸⁸ Oyama 2000a [1985]: 125-126, 132, 137, 139-140, 169; 2007: 8-9; Dupré 2012: 259.

deduced simply from ideas about what is species-typical, or assumptions about correspondence (or lack thereof) with a genotypic blueprint.⁸⁹

This is also not to say that form miraculously arises from nothing. Each life begins from a set of initial materials, structures and conditions which can combine and interact with each other in particular ways. This initial set of conditions, from the particular properties of the zygotic milieu to the ecologically and historically specific states of the physical and social environment, is in each case unique in its particular combination. This unique nexus represents a range of developmental resources, from which the organism emerges through a gradual process of interaction and integration. Ontogenetic process, as Oyama puts it, is not “special creation from nothingness, but always from the conditional transformation of prior structure”.⁹⁰ As organismic structure is transformed through interaction with existing conditions it creates the new conditions under which continued existence and transformation takes place. The interactive and developmental possibilities (and limits) at any point are dependent on the current state of the developmental nexus, which is a product of the particular history of interactivity, within the organism and between organism and environment, up until that point.⁹¹ Different possible developmental trajectories represent different ways the organism can integrate and transform the resources at its disposal over the course of its becoming.

Thus, ontogeny is not the imposition of a pre-arranged order onto inert and structureless matter,⁹² but neither is it a totally spontaneous generation from the ether. Rather, it is the gradual and ongoing construction of a contingent functional order from a definite set of material structures and circumstances, dynamically integrated. A way of living is not (transcendently) given to the process of becoming as an end for it to produce, but emerges (immanently) within it, as this process goes along. In this sense ontogeny is most coherently

⁸⁹ See also Oyama 2000a [1985]: 65-66, 137-138, 148-149, 186-187.

⁹⁰ Oyama 2000a [1985]: 4, see also 26-27, 29-30; 2010: 403-407.

⁹¹ Oyama 2000a [1985]: 26-27, 37, 92, 132-133, 135-136, 161-162, 169; Oyama, Griffiths & Gray 2001: 4; Rehmann-Sutter 2008: 42-45.

⁹² The materials of life, internal and external, are not inert, amorphous, or chaotic, lacking any ‘order’, but are structured in various ways and have particular reactive properties, etc. (Oyama 2000a [1985]: 26, 38, 40-41, 158-159; 2009: §3.3.2; 2010: 403-407; Noble 2006: 29-37; Dupré 2012: 113-114).

understood not as reflecting the transcendent teleology of *poiesis*, but the immanent ‘self-creativity’ of *praxis*, as described in II:3 and III:1.⁹³ I return to this below, 3.1.

2.3. Organismic becoming is continual

As this suggests, the notion of a final state of ‘completion’, of essence-realisation or being-at-*telos*, after which the rest of life is either stasis or degeneration, misrepresents the becoming of the organism as a whole.⁹⁴ Organismic becoming is the ongoing construction and reconstruction of a living organisation throughout its temporal persistence. Oyama again: “The dance [of ontogeny] continues throughout the life cycle,⁹⁵ and everything that occurs in that

⁹³ There is a theoretical elephant in the room that cannot be ignored any longer. This is the theory of biological ‘autopoiesis’, originally introduced by Maturana & Varela (see 1980 [1972]: 78-84; the idea has become central to the enactivist school of philosophy of mind – see e.g. Thompson 2007: 91-107). The term is used to refer to systems of interdependent processes which collectively constitute and continually maintain the whole system, organisms and cells being archetypal examples in this literature. They are called ‘auto-poietic’ because they are seen as making themselves. That is, we might say, they are ‘self-creative’. Yet, surely this notion is fundamentally opposed to the kind of self-creativity I am talking about because, given the terminology, the logic of these systems is *poietic*? Actually, I think much of so-called autopoiesis theory is thoroughly compatible with a constructivist theory of development, and that they are in many ways making similar points (see also Oyama 2007: 10-12). The only thing I have reason to take issue with here is the *word*. It suggests – at least given the way I have specified the meaning of *poiesis* here – a pre-formed but latent ‘self’ that engages in a teleological process of production by which it *makes itself actual*, by which it generates a concrete instantiation of itself in the world. This is in fact very close to the conception of development we get from neo-preformationism. But it is precisely *not* what exponents of autopoiesis theory mean by the term. Maturana & Varela explicitly deny that the organic systems they are referring to are guided by a “purposeful driving component that [attains] expression through the realization of [its form]”, or possess “an integral project or program represented and realized in and through [...] structural organisation” (1980 [1972]: 74, 85). For this reason they argue that teleology, in the sense of process guided by fore-sight of an end (see also Mayr’s ‘teleonomy’, V:2.4) can be eliminated from what *they* call ‘autopoietic’ systems (1980 [1972]: xix, 85). In all these respects constructivism is in agreement. For this reason, I suggest only that the *term* ‘autopoiesis’ has been somewhat inappropriate from its inception.

⁹⁴ See also Rehmann-Sutter 2006: 320.

⁹⁵ Constructivists often talk of the organism as having a ‘life cycle’ (see also e.g. Oyama, Griffiths & Gray 2001: 1-4), or even *being* a life cycle (e.g. Dupré & Nicholson 2018: 25). This locution is derived, and I think somewhat misappropriated, from a related point about organic lineages. The point is that a lineage is not merely a series of *static mature forms*, but a series of overlapping *whole temporal trajectories*, i.e. the careers of members of that lineage (and evolution is change in the average patterns of these trajectories, not merely change in the typical structure of mature form). The individual temporal parts of this series are connected by acts of reproduction, and from this we can *abstract* the notion of a ‘reproductive cycle’ that begins and ends at these points. (That this is typically what is being thought of here is revealed by the fact that descriptions of ‘the life cycle’ of some species usually stop, or rather begin again, at the point of reproduction – see again Dupré & Nicholson 2018: 25, for example). This is helpful for understanding evolution, but I think it can be misleading to say that the *organism* has or is a life cycle. The individual organism has a beginning and an end, temporally speaking, and can be identified with the career in between. Through reproduction it can play a role in continuing

cycle, from the first moments to the moment of death, from the most permanent structure to the most evanescent, from the most typical feature to the most divergent, is constructed from [interaction between developmental resources]”; the organism “does not have a final form, encoded before its starting point and realized at maturity. It has, if one focuses finely enough, as many forms as time has segments”.⁹⁶

The ongoing-ness of ontogeny does not mean that the organism is constantly undergoing radical transformation in structure; it is also evident in how life sustains more or less persistent structures. The point is that stability in living form is not achieved by crystallising a static structure; it is itself actively maintained or constituted by ongoing process. The most basic illustration of this is metabolism, the processes by which an organism constantly exchanges energy and matter with its surroundings (e.g. eating, digesting, defecating) in order to maintain a steady state of low entropy. If this ceases for long enough, the organism collapses into thermodynamic equilibrium with its environment, which entails the disintegration of structural and functional organisation altogether (i.e. death).⁹⁷ Metabolism enables organisms to hold off this disintegration by constantly renewing and replacing their constituent material parts. This occurs whether the part in question is also undergoing structural change or not. What this means is that, unlike man-made machines, which tend to have a stable arrangement of parts undergoing the gradual linear process of entropy increase (manifested as decay, corrosion, etc.), but which otherwise maintain a fixed structure without *doing* anything, living beings must be continually *acting* in order to exist.⁹⁸ The stability of a

the reproductive ‘cycle’ of the lineage, but it is not itself cyclical (it’s hard even to imagine what this could mean – perhaps the so-called immortal jellyfish (*Turritopsis dohrnii*) is an example of an organism that can itself constitute a repeating life cycle). I would probably replace the term ‘life cycle’ in quotes like the present one with ‘life course’. This is clearly what Oyama has in mind here – that which continues “from the first moments to the moment of death”.

⁹⁶ Oyama 2000a [1985]: 26-27. There is an important point suggested here about the relation between life and *time*. The neo-preformationist idea that we can simply ‘compute’ the organism from its genetic essence (see V:2.6) abstracts the organism from temporality in a certain way. It makes the temporal process of becoming *accidental* to the organism’s being, merely a function of the teleological unfolding of the essence into reality. On the constructivist view this is wrong; the organism’s particular history of becoming, and therefore its real temporal duration, is essential to its identity at a fundamental level (see also Oyama 2007: 6-7). There is a connection here with the philosophy of Henri Bergson (e.g. 1944 [1911]) that I would like to explore in future work (see e.g. Durie 2002 on this and a number of similar connections with Bergson).

⁹⁷ See e.g. Dupré & Nicholson 2018: 22-24; Dupré 2012: 223-224.

⁹⁸ See e.g. Dupré & Nicholson 2018: 22; Dupré 2012: 71, 141-142. To put this difference another way, the relation between structural organisation and activity is one of reciprocal dependence in an organism, whereas it

multicellular organism as a whole “derives from the continuous regeneration of its tissues, which are themselves maintained by the incessant renewal of their cells, which are in turn stabilized by the ongoing replenishment of their molecular constituents”, etc.⁹⁹ For living things both change *and* stability are dynamic in this sense, constituted by process.¹⁰⁰ To put this another way, their *being* is inseparable from their *doing*.¹⁰¹ And this doing is a continual becoming and re-becoming, construction and re-construction, that endures from start to end.¹⁰²

2.4. Participation of the organism in its own becoming

As we've seen, the flip-side of the deflation of genetic hegemony is the re-distribution of developmental significance across the heterogeneous nexus of interacting elements and processes through which the organism emerges. Importantly this includes the organism itself, as a functionally integrated whole, and a sensing, acting being. In neo-preformationist thinking, the organism effectively drops out of view as something of distinct interest in explaining and understanding ontogeny, it becomes merely a passive epiphenomenon of the unfolding of the programme in interface with the everything else of ‘the environment’.¹⁰³ Once we take the constructivist turn we can see that the organism as a whole participates, in various ways, in its own becoming.¹⁰⁴

is linear in a man-made machine: the activity of a car, for example, depends on its structure, but its structure does not depend on its continual activity.

⁹⁹ Dupré & Nicholson 2018: 22-23.

¹⁰⁰ Oyama 2000a [1985]: 37. See also the related importance of plasticity and sensitivity in the maintenance of robust stability of form, e.g. Barker 2015: 58-59, Ch 5; Oyama 2000a [1985]: Ch 2, 151, 182-183.

¹⁰¹ See also Rehmann-Sutter 2006: 321-323, 328-329; Jonas 2001 [1966]: 76 (fn 13).

¹⁰² The image of someone treading water comes to mind here. When you tread water you keep yourself in a steady state of being-at-the-surface *by* constantly swimming upwards towards the surface. Your condition is rather one of continual becoming-at-the-surface, we might say.

¹⁰³ See Oyama 2000a [1985]: 162.

¹⁰⁴ See also Nicholson 2014a on the twentieth century ‘eclipse’, and current ‘return’, of the organism as a distinct component of the ontology of biology, due in part to the emerging turn to constructivism.

Organisms shape their own developmental trajectory through their various capacities to interact with and alter internal and external states.¹⁰⁵ Both by constituting an organised whole through which sub-systems and components are functionally integrated and continuously re-constructed, and by interacting plastically with the external environment, e.g. sensitively responding to varying conditions, exploring and experimenting with different environmental relations, and positively modifying external conditions (see ‘niche construction’),¹⁰⁶ the developing organism, say Oyama *et al*, “functions as a resource for its own further development. [It] helps determine which other resources will contribute to that development, as well as the impact they will have”.¹⁰⁷

In other words, what an organism can do, how it can live, and the way in which states of the world and states of itself are *significant* to it in this regard, is shaped by its own history of interaction with and mediation between developmental resources. Thus, at a fundamental level, organismic becoming is characterised by a certain reflexivity in which activity, possibility, and the organism’s ‘parameters of significance’ are inter-related. This power of the organism to shape its way of life in these respects is not a fixed quantity or simple on/off property. The different sensory, cognitive, and physical capacities of the particular organism, and the different conditions in which it lives, affect the *ways* in which, and the *degree* to which, the organism can actively ‘participate’ in the process of its own becoming. I return to this in relation to the notion of ‘self-creative freedom’ below (3.3).

2.5. Beyond traditional dichotomies

What we can now see is that the phenomenon of life as such represents a concrete denial of the dualisms of essence/appearance, plan/execution, instruction/condition, type/token, etc. Before elaborating on the philosophical significance of this further, it is worth noting a number of other popular and inter-related conceptual oppositions that also break down once we take the constructivist turn. In particular, ‘nature’ vs ‘nurture’, the ‘innate’/‘inherited’ vs

¹⁰⁵ To paraphrase the description of ‘constructive development’ in Laland *et al* 2015: 6.

¹⁰⁶ See also footnotes 42-44 above (downward causation, active plasticity/niche construction, adaptive novelty, etc.)

¹⁰⁷ Oyama, Griffiths & Gray 2001: 5; see also Oyama 2007.

the ‘acquired’, and the metaphors of ‘hard-wiring’ and ‘blank slate’. The constructivist turn is not merely a swing from the first term to the second in each of these, from the view that everything is essentially innate or hard-wired prior to development to the view that the organism is essentially a formless lump of wax that can be sculpted in any way by environmental forces. And neither is it merely a middle-ground or ‘bit of both’ solution to these oppositions – this is what we get from the standard gene/environment version of interactionism discussed earlier. Rather than merely perpetuating the oppositions in one of these ways, it presents an overcoming of them altogether, by undermining their shared assumptions.¹⁰⁸

What both sides of these traditional dichotomies tend to assume is a picture of the organism as inert matter passively moulded *by* some separately identifiable forces or agencies, whether genetic information, environmental conditioning, or some combination of the two. Instead, for the constructivist, the organism creates itself through the active integration of a multiplicity of developmental resources, resources which gain particular phenotypic significance *through* this process. In this way, traits are neither innately pre-formed nor simply ‘acquired’ from outside, nor a bit of both, but rather *constructed* through ontogeny.¹⁰⁹

The denial of ‘nature’ as hard-wiring or programming does not entail the converse image of a blank slate open to anything ‘nurture’ (or culture) wants to imprint on it.¹¹⁰ Both ideas see plasticity as simply the extent to which the organism can be passively shaped by external influences, at one extreme more or less denying it, at the other extending it indefinitely. Rather, plasticity is the capacity of the organism to interact with and respond to its context, shaping itself and its environment in flexible but contingently constrained ways. To paraphrase Gillian Barker, what is wrong with the ‘blank slate’ idea is not that it posits openness where there is none, but that it misrepresents this openness as mere passive

¹⁰⁸ On the overcoming of these oppositions through constructivism, see variously Oyama, Griffiths & Gray 2001: 2; Oyama 2000a [1985]: 5, 16, 43, 52, 93, 103, 125-126, 128, 132, 138, 141-145, 148, 158-159, 174-179; Dupré 2012: 259-260, 278, 285.

¹⁰⁹ On the innate/acquired distinction in particular, see Oyama, Griffiths & Gray 2001: 2; Oyama 2000a [1985]: 5, 16, 43, 52, 138, 141-145, 159, 174-179. In the sense just described, we could say that *all traits are acquired* in ontogeny, but this would involve quite a different sense of ‘acquired’ to that usually opposed to ‘inherited’, i.e. ‘given from outside’ rather than from ‘inside’ (see Oyama 2000a [1985]: 141, 144-145).

¹¹⁰ As is often suggested by evolutionary psychologists who employ ideas of genetic programming, e.g. Pinker 2002.

malleability – susceptibility to external impression – rather than coordinated sensitive responsiveness; and what is wrong with the converse notion of ‘hard-wiring’ is not that it posits stability where there is none, but that it misrepresents this stability as fixed and rigid rather than robustly maintained through continual re-construction and adaptivity.¹¹¹

Oyama proposes a re-definition of the terms ‘nature’ and ‘nurture’.¹¹² Instead of opposing each other as essential form and external conditioning, or two alternative channels of phenotypic determination, they become related to each other as product and process. An organism’s ‘nature’ is its particular form and functional organisation, characteristics and capacities. This is the product of an ongoing process of ‘nurture’, i.e. constructive development, and is thus temporally emergent and subject to change: “Never static, a nature emerges in time and space, [...]. *Nature* thus has no existence prior to or separate from the concrete living organism in its concrete, often living, surroundings: no Platonic ideals here, no underlying reality more basic than the being itself”.¹¹³ And, as we’ve seen, this relationship is reflexive. An organism’s nature at any one time is the product of its nurture up until that point, but also constitutes part of the nexus through which nurture continues: it functions as a resource for subsequent interactive possibilities as well as the context within which other resources gain significance.¹¹⁴ One way to understand the shift in thinking involved in the constructivist turn is that it treats ‘being’ and ‘becoming’ in a similar way: in the context of life, rather than ‘becoming’ denoting the process by which a pre-given being (proper form) becomes manifest, the organism’s being is that which continually emerges within its becoming, within its ongoing, reflexive, self-creativity. This is not simply a privileging of process over product, but a radical shift of view that turns on the way in which the process in question (organismic becoming) is itself conceived. In particular, I argue, it involves a movement from the metaphysics of *poiesis* to that of *praxis*.

¹¹¹ Barker 2015: 62, see also 39-40, 45. For more detail on Barker’s attempt to overcome this dichotomy, and on how certain tensions which remain in her view could be dissolved by a more explicit embrace of the constructivist perspective, see my review essay ‘The changing space between politics and biology’ (Griffiths 2017).

¹¹² See Oyama 2000a [1985]: 125, 128, 141, 148; 2000b: 48-49; 2002: 163-164; 2010: 406-407.

¹¹³ Oyama 2002: 164.

¹¹⁴ Given this ongoing reflexivity, the term ‘product’ can be misleading insofar as it suggests the *poietic* notion of a process completed in the production of an end separable from its performance. This is of course not what is meant here.

3. Life without essence: re-framing becoming, re-thinking flourishing

There are three elements of the argument of Part 2 of this thesis remaining to be made explicit. Firstly, just indicated, that the constructivist turn is more than just critique of a particular set of metaphors in modern biology; it requires a more fundamental and general shift in our apprehension of living phenomena, one that dissolves the view of becoming as *poiesis* altogether and replaces it with one of becoming as *praxis*. Secondly, to wrap up the sub-narrative of these final two chapters, that this turn provides an internal critique of modern biology that completes the Darwinian revolution against Platonic essentialism, by bringing the metaphysics of organismic becoming into line with that of historical evolutionary process. Thirdly, that this shift in thinking about development can also be harnessed to look outward from biology toward the basic evaluative categories through which we understand ourselves, and to motivate the kind of shift between concepts of flourishing proposed in Chapter III. These are the respective subjects of the remaining three sub-sections.

3.1. *Poiesis* to *praxis*: transforming the logic of life

Developmental constructivism, at least as I have presented it here, emerges from critique of genetic essentialism or neo-preformationism. But it is more than simply the negation of this particular tendency in modern biology. Rather, it undermines the *poietic* framing of life in general, whether based on ideas about programmes in DNA, membership of a natural ‘type’ that prescribes a model for life, teleological vital forces, or whatever. This is because it reveals the conceptual structures of the *poietic* view to be inadequate to the reality of organismic becoming. It achieves this in part by providing an alternative general picture of ontogeny, one which is able to accommodate its dynamic complexity more fully. This picture invokes a fundamentally different conceptual framing, which, as suggested at the end of 2.5, can be understood in terms of the logic of *praxis*. I shall now summarise this way of understanding the nature and philosophical significance of the constructivist turn in contemporary biology.

In II:3 I divided the concepts of *poiesis* and *praxis* into two different dimensions, with respect to which they contrast with each other (dimension 1: productive vs performative; dimension 2: planned vs improvisational – taken here in reverse order). Firstly, regarding the relation

between the process and the ‘form’ of its product, we have seen the *praxic* overcoming of the *poietic* in the context of biological theory at many points in this chapter. The notion of the innate genetic programme that sends out instructions to the body whilst sequestered from outside influence, and the corresponding logical separation between transcendent ‘plan’ and concrete ‘execution’, becomes inadequate to organic reality. This picture is replaced with the developmental construction of the organism’s form and functionality through a process of contingent interactivity across many levels, an immanent process of ‘self-creativity’ (summarised in 2.2). This is well captured by Oyama’s re-definition of ‘nature’ and ‘nurture’, and my corresponding articulation of the being/becoming distinction, as at the end of 2.5.¹¹⁵

Life creates itself through interaction with particular resources and circumstances, and its possibilities are contingently constrained by the ways in which these can be integrated, but it does so without the prescription of a proper form laid out in advance, from which it ought not to deviate. Life is in this sense *improvisational*.¹¹⁶ It figures itself out as it goes along, each step building on and re-integrating the product of the last. Becoming is this process of *finding a way* in the world. Re-orienting our thinking in this way doesn’t just undermine the *genetic* essence, it dissolves the whole *poietic* conceptuality that connects it – or any other version of the transcendent *eidos* – with the concrete phenomena of life. The essentialist mystique around DNA, and the scientific language that buttresses it, is simply the most up-to-date, apparently hi-tech, version of this way of interpreting the living world. Different versions of the same idea, none of which do justice to this world, says Oyama, will reconstruct themselves “as long as *coming into being* is understood as the *instantiation of pre-existing form*”.¹¹⁷ I quite agree. By revealing ontogeny to reflect the logic of *praxis*, constructivism disrupts the conceptual assumptions on which any version of this idea rests.

Secondly, regarding the relation between the process and its ‘end’, the dimension of the *poiesis/praxis* distinction derived more directly from Aristotle’s use of this language, we can see how the constructivist turn also takes us beyond the *poietic* to the *praxic*. We have seen in this chapter (summarised in 2.3) that the notion of development as a limited process of

¹¹⁵ It is also well captured by Coen’s analysis of ontogeny by analogy with artistic creativity (1999: Ch 1).

¹¹⁶ Scully (2006: 363 (fn 6)) also suggests the analogy of musical improvisation for the constructivist understanding of development.

¹¹⁷ Oyama 2000a [1985]: 159-160 (my italics).

‘unfolding’ that lies between start point and completion of a finished phenotype, also becomes inadequate to the reality of the *ongoing* and *active* persistence of organic being through interaction across many levels, from basic metabolic exchange, to the responsive adaptivity of immune and nervous systems, to sensitive interaction with an external niche, and so on. “Far from being confined to the transitive intervals between genotype and phenotype”, says Ingold, “life *carries on* in the unfolding of the relational matrices wherein organic forms are generated and held in place”,¹¹⁸ it does not merely “connect a point of origin with a final destination, but rather [...] keeps on going, *finding a way* through the myriad of things that form, persist and break up in its currents”.¹¹⁹

Thus, instead of the *separation* of process and ‘end’ that characterises *poiesis* – process completed in an end-product beyond the process – we begin from a view of becoming as the continual, reflexive, and active *constitution* of living existence, and this as something that carries on as long the temporal duration of the life in question. In this sense becoming is not to be seen as merely ‘for the sake of’ something external to itself, like building a house is. Rather, like a musical performance, its activity is inseparable from that which it produces. In a certain sense it is therefore undergone ‘for the sake of’ itself; its own fulfilment, or ‘end’, lies in creating and sustaining the living existence from which it is itself inseparable. The sense of this is difficult to articulate because the language of ‘ends’, and what a process is ‘for’, is constantly tempting us back into the *poietic* view by conjuring up the fore-sight of the *eidōs*.

Christophe Rehmann-Sutter, the only other that I know of to explicitly interpret the turn from neo-preformationism to constructivism in terms of *poiesis* and *praxis*, focuses on this process/end dimension of the distinction, and attempts to articulate something similar. He also observes that living existence is constituted by its ongoing activity, making it fundamentally different to the given, passive being of an inanimate object. Living existence is what he calls “active presence”, being in the world that is *performed*, rather than simply

¹¹⁸ Ingold 2011: 8-9 (my italics).

¹¹⁹ Ingold 2011: 4 (my italics). Ingold does not put the issue in terms of the *poiesis/praxis* distinction, but there are many similarities. His work over several decades “has been driven by an ambition to [...] replace the end-directed or teleonomic conception of the life-process with a recognition of life’s capacity continually to overtake the destinations that are thrown up in its course”, to replace what I am calling the *poietic* view of living with one of living as a process of, as he says here, “finding a way” in the world (2011: 3-4).

produced.¹²⁰ Given this, he argues, we can view developmental processes not merely as means to the formation of finished end-products, but as “act[s] of being”,¹²¹ acts which *constitute* “the being’s continuous presence in the world”.¹²² In this sense, “in each moment of their developmental processes [organisms] remain present as the intrinsic ends of these processes”.¹²³ And this means that there is no particular stage in life that is ontologically privileged as reflecting the organism’s essence or as completed phenotype: “The development of an organism is nothing less than a continuous and changing presence in the world”.¹²⁴ For Rehmann-Sutter this is a conception of becoming as “organic praxis”.¹²⁵

This is not to deny that certain organic processes can be abstracted so as to resemble acts of *poiesis* in this sense, processes completed in end-products that exist beyond their production. The generation of protein molecules, cells, organs, and so on, or the transformations in bodily structure that many organisms undergo at regular stages of life, can be viewed in such a way. However, the crux of the *praxic* perspective is precisely that this *is* an artificially limited view of things. A fuller understanding places such entities and structures, and the processes by which they are made, in a wider context, in which they become subordinate aspects of the ongoing *praxis* of the organism. As soon as they are ‘finished’ – if ever there is some such identifiable point – they are re-incorporated into processes of metabolism, systemic interactivity, functional regulation, and so on, and these productions are therefore merely constitutive moments in the continuing ‘active presence’ of the organism as an integrated whole. Likewise, this is not to deny that organisms engage in similarly abstractable *poietic* processes in the world around them. Humans in particular live in a world constituted by objects, structures, and institutions made for that world, entities which exist beyond the

¹²⁰ Rehmann-Sutter 2006: 322-323, see also 328-329.

¹²¹ Rehmann-Sutter 2006: 318.

¹²² Rehmann-Sutter 2006: 314, 320.

¹²³ Rehmann-Sutter 2006: 320; see also 2008: 44-45, 48.

¹²⁴ Rehmann-Sutter 2006: 320.

¹²⁵ Rehmann-Sutter 2006: 313. Rehmann-Sutter focuses on what I called in II:3 ‘dimension 1’ of the *poiesis/praxis* distinction, but he also implicitly brings in dimension 2 when he, e.g., bolsters his concept of development as ‘active presence’ by appealing to the constructivist argument that no pre-established plan is needed for the emergence of developmental trajectory, contra the notion of the genetic programme (2006: 321-322, 325-327). In this way he also invokes the improvisational ‘immanent creativity’ aspect of becoming-as-*praxis*.

particular processes of their being contrived and fabricated. However, the point is again to recognise the subordination of such phenomena to a wider context of *praxis*: these acts of *poiesis* and the world they create do not stand apart from human life simply as its ‘outcomes’. Rather, they are conditions of, and through their use and modification are continually folded back into, the ongoing *praxis* of human life.¹²⁶

3.2. Completing the Darwinian revolution?

I shall now wrap up a key sub-narrative of these final two chapters. As argued in Chapter V, modern neo-Darwinian biology provides us with a somewhat schizophrenic view of the living world. On the one hand, it proclaims a revolution against ‘Platonic essentialism’, citing the continuous and unplanned historical transformation of life as evidence against the metaphysics of fixed transcendent ‘types’, of which individuals are mere token appearances, and more or less perfect manifestations. On the other hand, as soon as we switch from talking about evolutionary process to developmental process, precisely this metaphysics is re-instated through the dominant concepts of genetic programme, information ‘expression’, phenotypic instruction, and so on.¹²⁷ I argue that the shift in thinking at the heart of the constructivist turn, as described over the previous few pages, represents the overcoming of this equivocal view, and thus the completion of the anti-essentialist revolution of post-Darwinian biology. (At least, since I cannot foresee where this unfolding of thought will take us next, I would settle for the claim that it constitutes a necessary dialectical step in the articulation of this revolution.)

The reasons for this can be presented in terms of the *poiesis/praxis* analysis outlined just now. In the standard picture of evolutionary process we start from a population of individuals characterised by a certain scope for variability.¹²⁸ This variability enables different ways of coping with and responding to environmental conditions, and through differential reproduction the population maintains its existence as well as transforming itself across trans-

¹²⁶ See a similar analysis of the ontological priority of ‘growing’ over ‘making’ in Ingold & Hallam 2014: 3-6.

¹²⁷ See similar claims in Lewontin 2000a [1998]: 6-10; 2000c: 66-68; Oyama 2000a [1985]: 137, 159; Rehmann-Sutter 2006: 323-327.

¹²⁸ See e.g. Mayr’s ‘populationist’ evolutionary theory (1959; 1982; 1992; 1995).

generational time. This process is unplanned and has no ideal form as an end point – it is not the *poietic* unfolding of a pre-given design. On the contrary, it proceeds, as we might now say, in a markedly *praxic* manner – continuously responding to existing contingencies through a gradual and *improvisational* process, figuring itself out as it goes along, within a flexible space of interactive possibilities.

Oyama notes this idea in Jacob’s description of evolution as “tinkering, or “bricolage”. Rather than working from a “preconceived plan” as an engineer would, it improvises and makes do, in a “series of contingent events””.¹²⁹ She points out how this is also a fitting description of constructive development, and thus instead of *distinguishing* evolution from development on these grounds, as does Jacob, we should recognise “that *both processes show the contingent quality of tinkering*, in the sense not of randomness or disorder but rather of subtle and opportunistic dependence on particular conditions and materials. [...] Rather than the directedness of planned activity, it is such inspired tinkering that characterizes life processes, the marvelous results notwithstanding”.¹³⁰

The internal tensions of the neo-Darwinian view arise, at least in part, from the fact that for evolutionary process it rejects the logic of *poiesis*, and embraces that of *praxis*, whilst maintaining the opposite metaphysics at the developmental level. Through the constructivist turn these two realms of living process are instead brought into a certain metaphysical alignment with one another, as forms of immanent *praxis* at different scales.¹³¹ Embracing this shift in conception of ontogeny therefore ought *not* to be seen as an heretical reaction *against* Darwinian biology, but rather as a continuation of its unfinished revolution against what I have labelled the *poietic* metaphysics of life, with its transcendent *eidoi*, dualism of essence/appearance, typological interpretation of variation, and view of becoming as teleological ‘revelation’. Constructivism opens up the conceptual space of modern biology in a way that allows it to purge these lingering *poietic* tropes, and render its thinking more coherent with its self-image.

¹²⁹ Oyama 2000a [1985]: 46 (internal quotes from Jacob 1982: 33-37).

¹³⁰ Oyama 2000a [1985]: 46 (my italics); see also 2006: 273-274.

¹³¹ Although, no doubt, there remain important differences, and they are not perfect analogies. I will not pursue this issue further here.

The main argument *for* developmental constructivism remains that given in Section 1 of this chapter, regarding the inadequacy of genetic essentialism/dualistic interactionism, and the need for a perspective that accommodates the plasticity and dynamicity of ontogeny more adequately. However, we can add to this the virtue of greater intellectual coherence that comes from bringing developmental and evolutionary thinking into line with each other in the way just described. Although, it must be admitted, this argument operates at a more rhetorical level, by appealing to the irony of a neo-Darwinian position that preaches the death of ‘Platonism’ but subtly resurrects its core elements when theorising development.

3.3. Re-thinking ‘flourishing’ as an organic concept of the good

At this point the reader is invited to turn back to the start of Chapter III, and see how what was introduced at that point as a *proposal* – to explore the potential for a way of thinking ‘flourishing’ grounded on becoming as *praxis* rather than as *poiesis* – can now be read as a move that is also motivated by embracing the implications of the constructivist turn in biological theory. In this way, the discussion of the last two chapters regarding the nature of ontogeny provides an intellectual resource for our attempt to consider ‘flourishing’ as an ‘organic concept of the good’ – as a way of structuring normative thinking about ourselves through the affirmation of human ‘organic facticity’, the fact of our being living beings. It provides a resource both for the task of interrogating the metaphysical assumptions of the neo-Aristotelian properness concept, and for thinking our way out of this view from the ground up, as it were. I shall now outline the key aspects of this argument.

The first key point to make explicit is the negative implications for the properness perspective. As we saw in Chapter II, the neo-Aristotelian concept of flourishing as properness, at least as expressed by Foot/Thompson and Nussbaum, is taken to be a logical consequence of the fact that the relevant objects of evaluation are living things. The normative logic of properness is understood to be *presupposed* by this fact. The upshot of the analysis throughout this thesis is that this normative logic is not simply *given* by the phenomena of life as such, but arises from viewing these phenomena in a particular way, one that, as I have argued, centres on the interpretive lens of *poiesis*. The assumption of a necessary and natural link between living phenomena and this particular normative logic relies on, and is validated by, a *poietic* metaphysics of life. The upshot of the present chapter in this regard is the *disruption* of this metaphysical validation. The view of organismic

becoming invoked by the properness concept, we see now, is inadequate to its subject-matter. The constructivist turn undermines the *poietic* metaphysics assumed by this neo-Aristotelian position, and thus *severs the assumed logical link* between living as an object of evaluation and the structure of the properness perspective. Therefore, regardless of whether critics are correct to present particular neo-Aristotelians as deriving the *content* of their conceptions of the good from claims about biology – recall that in Chapter IV I allowed to the neo-Aristotelian the response that they are not correct to do so – the *form* of the concept of flourishing that underlies this view, which *does* rely on assumptions about living nature as such, is itself undermined by biological considerations.

Secondly, at the same time as doing this negative work, the constructivist turn provides us with an alternative metaphysics of becoming, centred on the interpretive lens of *praxis*. This opens up the possibility for a positive re-thinking of flourishing as an organic concept of the good. That is, it enables us to *remain* within the general philosophical space occupied by the standard neo-Aristotelian approach – that constituted by the conceptual interplay between the apprehension of living phenomena as such and the basic normative structures brought to bear in relation to them – but at the same time it motivates us to organise this space in a very different way. In particular, I argue that it provides ground for the perspective on flourishing that I have attached to the label ‘self-creativity’.

I will not repeat the work of Chapter III here, but ought to make explicit some connections with aspects of the constructivist perspective as presented in this chapter.

Firstly, as discussed above (e.g. 2.2, 2.5), in the constructivist view the particular ‘nature’ or ‘being’ of the living individual is not given to it as a proper form to manifest, whether through genetic programmes (neo-Darwinism/preformationism), an ‘inner design’ borne in virtue of membership of a natural type (Thompson), or some innate teleological ‘basic capabilities’ (Nussbaum). Rather it is uniquely constructed within the organism’s unique history of becoming. The individual’s particular way of existing in the world is the ongoing achievement of a continual process of constructive improvisation and negotiation, both internally in terms of the way its parts ‘fit together’ to form a functional whole, and in terms of how it creates and maintains itself through relations with the wider environment. What this means is that the normative dimensions relevant to evaluation of the organism’s conditions, relations, capacities, and processes of change in itself and in the world around it, are contingent on its particular history and context. The way in which different things *matter* for

that particular living subject cannot simply be assumed or inferred from an idea of a proper form given by, e.g., membership of a ‘type’, or even something like an individualistic ‘true self’. Its particular ‘parameters of significance’ emerge *with* the ongoing becoming of the being itself, and must be understood in this context. In this way, the constructivist turn entails the structure of the self-creative concept of ‘being-well’ outlined in Chapter III. What was presented there as a general way of framing this concept, and thus of approaching normative issues from health and disability to the expression of individuality, is now given a specific underpinning through our understanding of biological ontogeny.

To reiterate some relevant points about the status of this idea: This is not primarily a claim about *which* particular norms will be part of any being’s ‘good’, but a claim about the genesis of those norms. It also does not mean that what matters must be unique to the particular individual – beings that emerge in interaction with similar conditions and developmental resources (e.g. members of the same biological lineage or species, or the same culture, etc.) can, all else equal, be expected to develop similar parameters of significance. In this way, generalisations (e.g. about how humans usually live) can play a legitimate role in certain kinds of normative and even political reasoning. The point is to recognise that the legitimacy of any such generalisations, when they are legitimate, is *contingent* on the particularities of the individuals they refer to. They cannot be transformed into facts about what is *necessarily* part of an individual’s being-well given their inclusion in some group about which these generalisations are being made.

Secondly, whereas the properness view (reflecting the logic of *poiesis*) understands becoming simply as the process whereby a proper form is manifested, and thus as evaluable for the sake of that end-state, the logic of *praxis* opens up another dimension of life-evaluation, through which we can understand the concept of ‘becoming-well’ in a particular way. In this dimension we consider becoming as intrinsically evaluable, in terms of the performance of the process itself rather than simply its outcomes; as evaluable in some sense ‘for its own sake’. This is specifically motivated within the constructivist view of ontogeny by the way that it recognises organismic becoming to be the ongoing and active *constitution* of being, rather than simply the means by which a separable end-product is made (see above, 2.3, 3.1). Constructivism reveals a fundamental reflexivity between living being and living becoming: life is something in which ‘product’ and ‘process’ are continually folding into one another. In the ‘self-creativity’ of this process the ‘self’ that is created does not stand apart from the process of creativity, but is emergent from and continually re-incorporated into it. Therefore,

insofar as ‘life’ is what we are interested in evaluating through the concept of ‘flourishing’, we ought to understand the processes through which one’s way of being is created and maintained not as merely *precursory* to life, but as *integral* to it, and as intrinsically significant regarding what it is to live *well*.¹³²

In short, if we view life through the lens of *praxis*, as motivated by the constructivist conception of ontogeny, then we will see becoming as the immanent process of figuring out a coherent way in the world, as life goes along. Starting from this basis, and applying it to our way of thinking ‘life as a whole’, we ought to re-think flourishing in the following way. At one level of analysis, we will see the norms relevant to a being’s existence as contingent on the particular history of becoming through which that being has emerged. And at another level of analysis we will also be concerned to articulate some way of evaluating the individual’s ongoing process of becoming *itself*. The latter is what I hope to have provided via the concept of ‘self-creative freedom’ outlined in Chapter III. I said there that the conditions and capacities of a being’s existence affect the power that it has to explore and interact with the world, and to thereby actively engage in its own continual process of finding a way in life. This seems to me like the best way to approach the question of how life *qua* becoming-as-*praxis* might, in itself, be gone about *well* or *badly*. That is, not in the sense of something that ought to be gone about in some particular way, but as something that can be gone about to various degrees richly, openly, and autonomously, or in contrast narrowly and restrictively. In this way we will see the extent of this kind of freedom as itself a parameter of what it is to flourish, and as something in relation to which we can understand changes in life-conditions to be beneficial or detrimental.

This idea can be connected with the notion of the ‘participation’ of the organism in its own becoming that arises from constructivist theory (above, 2.4). At the most basic level this refers to the fact that the organism as a functional whole forms part of its own developmental nexus by providing the context in which other resources gain developmental significance. This quickly gains complexity when we investigate the ways in which development can be

¹³² Which is more important, being-well or becoming-well? Due to their fundamental interrelatedness, I’m not sure that this question admits of a general answer. One of the epigraphs to this thesis captures the sentiment of this well: “If it is better to travel than to arrive, it is because travelling is a constant arriving, while arrival that precludes further travelling is most easily attained by going to sleep or dying” (Dewey 1922: 82).

shaped by how the organism senses, responds to, and interacts with its environment, including the ways it can act *on* its surroundings so as to shape the context within which it lives. Different such capacities, as well as different conditions in the world through which these capacities are used, entail different degrees of what I call self-creative freedom – the openness and autonomy through which a living being improvises its way through life.

The most complex and powerful self-creative capacities that exist in the living world (that we are aware of) no doubt reside in the human realm. Through our cognitive powers of deliberation, planning, and judgement (or practical reasoning), our artistic and technological capabilities, and ability to construct our own environment in a multitude of ways – physically, culturally, institutionally – we are (to make a generalisation about statistical normality, not to identify an essence) capable of participating in our own becoming to a very great degree. With this comes a higher degree of what I have called ‘normative autonomy’ – the extent to which one’s parameters of significance ‘come from oneself’, rather than being imposed from outside. In this way, we can understand autonomy not as something that arises uniquely with a special quality of human mind that divides us from the contingency of the organic world, but as grounded in and continuous with the character of life as such, although manifested to varying degrees and in various ways across the living world.¹³³ These ‘human’ capacities for greater self-creative freedom are not good (for us) because they make our lives *properly human*. Rather, they constitute a greater ‘fullness of life’ itself, a greater degree of active openness to the world. They are not a requirement for realising our essence, but are, as J. S. Mill suggested, a “privilege”.¹³⁴

¹³³ See similar comments about human autonomy in the context of the active and constructive capacities of life in Dupré 2012: Ch 16. See also similar comments on ‘control’ by Oyama, for whom control is not a way of standing outside of the world but is the degree to which you can sensitively re-arrange it and yourself through interaction, to meet particular ends. It emerges not from *independence*, but *interdependence*. And, the “special talent” that evolved in humans is to “spin webs of interrelatedness unprecedented in their variation, complexity, and ramification” through, e.g., our greater cognitive and technological abilities (Oyama 2000a [1985]: 188-189). See also Coen’s comment that seeing ontogeny as a constructive process enables us to see human creativity “from a new perspective; not as an isolated feature of human activity, but as something that is itself grounded in the way we develop” (1999: 14).

¹³⁴ Mill 1991 [1859]: 64.

Conclusion

The main conclusions and central claims of this thesis have just been elaborated, in the final section of Chapter VI, so here I shall just say a little about the limitations of the overall argument, and indicate some ways in which I hope its main philosophical contributions can be developed further.

There are certain limitations to the reach of my argument in this thesis. Firstly, I am not claiming that developmental constructivism, simply as a theoretical approach to biology, *requires* us to adopt my ‘self-creative’ perspective on the human good. One might accept the main claims of this conception of ontogeny and yet, for example, reject the notion that our being as living beings has any relevance at all to the question of the good, perhaps because the reality this question addresses is strictly transcendent of the world of ‘mere nature’. I do not pretend to have a knock-down response to this. All I care to do is re-iterate that, as stated in the Introduction (0:3.1), this thesis begins from the assumption that human existence is fundamentally embedded in the world of living nature, and that ‘what it means to be human’, and what it means to live well as one, are issues deeply intertwined with what it means for humans to be living organisms, as opposed to rocks, or computers, or gods. This thesis is specifically an exploration of the possibilities for normative understanding of ourselves *given* the assumption of this intertwining. This is why I am, a) drawn to an interrogation of the neo-Aristotelian attempt to think flourishing as an organic concept of the good; and b) motivated to articulate an alternative way of doing so, given that the picture of life inherent in this approach breaks down in the face of the reality of organismic becoming. In this respect I hope to have shown a way of throwing out the bathwater (of transcendent normativity) without discarding the baby (of our being as living beings).

Secondly, and in a similar vein, even given this orientation I am not claiming that any particular empirical facts can, by themselves, do for us the kind of normative work I have presented here. What I have been exploring are the implications of different ways of *interpreting* empirical reality, and the ways in which different modes of interpretation can bring with them certain normative structures. However, this does not cast us utterly adrift from the world we are endeavouring to understand. As I have argued, in Chapter VI in particular, the choice between different modes of interpretation, or metaphysical frameworks, is not simply arbitrary in relation to the phenomena we are interpreting. In the debate between

neo-preformationism and constructivism, we see a complex dialectic between observation and interpretation, through which one set of concepts and metaphors shows up as inadequate to the reality we encounter, and gives way to a different lens for bringing that reality into view. Furthermore (as outlined in 0:3.2-3.3), I do not take this level of analysis to be merely an ‘added extra’ to the *real* work of science, which simply states the facts as they are, via some kind of ‘view from nowhere’. To view the world is always to apprehend it from *somewhere*, and to grasp it intellectually is to bring to bear some conceptual framing, by means of which we attempt to *make sense* of reality. And this is not a *problem*, it is *part* of what it is to experience, observe, explain, and gain understanding. So, I do not purport to have achieved some simple deduction from brute empirical fact to normative assertion. This thesis self-consciously dwells within a space of interpretation in which the way we observe the world is not artificially separated from the way in which we categorise and conceptualise the entities with which we are dealing. And this space of interpretation can, especially when the objects of understanding are ourselves, bring with it certain ways of structuring the kind of evaluative thinking we take to be appropriate.

A work such as this, which sits in the in-between space where disparate fields meet, inevitably touches on a variety of issues and points in a number of directions. The most direct contribution I hope to have made is to show a new way of negotiating the relation between the philosophy of flourishing and the understanding of biology. I hope to have shown that articulating ‘the good’ in terms of the form of one’s living, the going-well or doing-well of *life*, contains a number of interpretive possibilities. In particular, beginning from this general perspective need not tie us down to the – admittedly tempting – logic whereby we raise an image of ‘nature’ as an agency independent of ourselves that prescribes a model *to* life. Whether this picture emerges by abstracting a species-general ‘life-form’ and turning it back on individuals as a transcendent standard, by invoking the existence of ‘innate potentials’ aimed at specific realisations, or by imagining the process of organic development as the revelation of an ‘inner design’ (whatever its material vehicle), it is a picture demanded more by our metaphysical prejudices than by the world of living nature in which we find ourselves. And it is the dynamicity, contingency, and creativity of this world that shows us why denying this picture need not send us into nihilism. By rejecting the logic of pre-given proper form we lose the existential comfort of a world in which there is some way one is ‘meant to be’, but we gain the solidarity of a world in which all life is engaged in the process of finding its way, a process within which meaning is created, rather than merely uncovered. It is a

groundlessness that comes with a certain vertigo, but, when seen in this way, can also be emancipatory. Reference to the 'biological' comes into play not as an insinuation of fatalism or essentialism, but an affirmation of the ground of freedom and creativity.

I see this re-orientation towards our organic facticity as having value beyond just the debate about neo-Aristotelian meta-ethics and its reliance-or-not upon certain assumptions about biology. Although the implications for social and political thinking have remained largely in the background here, I hope to have laid the groundwork for a new approach to issues such as the nature and value of freedom, and the question of how social structures can enhance or impinge upon it; and the basis of respect for individuality and diversity in society. Taking the kind of perspective advocated here demands that we withhold judgement about the intrinsic value of particular ways of being, insofar as we lack awareness of the context of becoming and the relations with the world through which that way of being exists. It encourages a mindfulness of the diversity of ways in which particular things can matter across lives that might otherwise look quite similar. This is a lesson to be held in mind when dealing with issues as various as the needs of those differently (or ostensibly dis-)abled; the variety of practices and meanings through which different cultures organise themselves; and also the fact that membership of a culture, just as of a species, does not mean normative subordination of the individual to its standards. At the same time as ensuring a respectful space for particularity, the ongoing and improvisational nature of becoming recognised in this view will remind us that what matters can change, and can change in ways that are not entirely transparent to, or under the control of, the individual themselves. So respect for particularity ought not to simply imply quietism about the good. Instead, we will recognise the imperative to expand horizons of possibility wherever we can, so as to enable individuals to find their own way in life as openly and richly as possible.

As well as developing these connections further in future work, I also hope to explore how the conception of organismic becoming as *praxis* ought to shape our understanding of life beyond the human realm, and our action upon it. Although not discussed at all in this thesis, the realm of the ecological/environmental has remained in my peripheral vision. I think that taking up this view could provide a fruitful way of combatting the excesses of our modern instrumental attitude to nature, our vision of the living world and its materials as simply a resource for our exploitation. The *praxic* view sees life as such as a fount of self-creative power, the 'active presence' of which ought to be respected as having intrinsic significance, as a locus of meaning-unto-itself.

Bibliography

- Andreou, C. (2006) 'Getting On in a Varied World'. *Social Theory and Practice*, Vol. 32 (No. 1), pp. 61-73
- Anscombe, G. E. M. (1958) 'Modern Moral Philosophy'. *Philosophy*, Vol. 33 (No. 124), pp. 1-19
- Anscombe, G. E. M. (1981) 'You Can Have Sex Without Children', in *The Collected Philosophical Papers of G. E. M. Anscombe, Volume Three: Ethics, Religion and Politics* (Oxford: Basil Blackwell), pp. 82-96
- Antony, L. (2000) 'Natures and Norms'. *Ethics*, Vol. 111 (No. 1), pp. 8-36
- Arendt, H. (1998 [1958]) *The Human Condition* (2nd ed.) (Chicago: University of Chicago Press)
- Ariew, A. (2002) 'Platonic and Aristotelian Roots of Teleological Arguments', in Ariew, A., Cummins, R. & Perlman, M. (eds.) *Functions: New Essays in the Philosophy of Psychology and Biology* (Oxford: Oxford University Press), pp. 7-32
- Aristotle (2009 [c. 350 BC]) *Politics*, trans. Jowett, B. (Cambridge: Cambridge University Press)
- Aristotle (1906 [c. 340 BC]) *Nicomachean Ethics*, trans. Peters, F. H. (London: Kegan Paul, Trench, Trübner & Co.)
- Aristotle (1934 [c. 340 BC]) *Nicomachean Ethics*, trans. Rackham, H. (Harvard: Loeb Classical Library, Harvard University Press)
- Aristotle (2009 [c. 340 BC]) *Nicomachean Ethics*, trans. Ross, W. D. (Oxford: Oxford University Press)
- Aristotle (1935) *Magna Moralia*, trans. Rackham, H. (Harvard: Loeb Classical Library, Harvard University Press)
- Arneson, R. J. (2000) 'Perfectionism and Politics'. *Ethics*, Vol. 111 (No. 1), pp. 37-63

- Atran, S., Estiot, P., Coley, J. & Medin, D. (1997) 'Generic species and basic levels: Essence and appearance in folk biology'. *Journal of Ethnobiology*, Vol. 17 (No. 1), pp. 17-43
- Baltimore, D. (1970) 'RNA-dependent DNA polymerase in virions of RNA tumour viruses'. *Nature*, Vol. 226, pp. 1209-1211
- Barker, G. (2015) *Beyond Biofatalism: Human Nature for an Evolving World* (New York: Columbia University Press)
- Barnes, B. & Dupré, J. (2008) *Genomes and What to Make of Them* (Chicago: University of Chicago Press)
- Begon, J. (2015) 'What are Adaptive Preferences? Exclusion and Disability in the Capability Approach'. *Journal of Applied Philosophy*, Vol. 32 (No. 3), pp. 241-257
- Begon, J. (2017) 'Capabilities for All? From Capabilities to Function, to Capabilities to Control'. *Social Theory and Practice*, Vol. 43 (No. 1), pp. 154-179
- Begon, J. (2018) 'Disability, Rationality, and Justice: Disambiguating Adaptive Preferences', in Wasserman, D. T. & Cureton, A. (eds.) *The Oxford Handbook of Philosophy and Disability* (Oxford: Oxford University Press)
- Bendik-Keymer, J. D. (2014) 'From humans to all of life: Nussbaum's transformation of dignity', in Comim, F. & Nussbaum, M. C. (eds.) *Capabilities, Gender, Equality: Towards Fundamental Entitlements* (Cambridge: Cambridge University Press), pp. 175-191
- Bendik-Keymer, J. D. (2017) 'The Reasonableness of Wonder', *Journal of Human Development and Capabilities*, Vol. 18 (No. 3), pp. 337-355
- Bergson, H. (1944 [1911]) *Creative Evolution*, trans. Mitchell, A. (New York: The Modern Library)
- Bergson, H. (1992 [1930]) 'The Possible and the Real', in Bergson, H., *The Creative Mind: An Introduction to Metaphysics* (New York: Carol Publishing Group), pp. 91-106
- Berlin, I. (1969 [1958]) 'Two Concepts of Liberty', in *Four Essays on Liberty* (Oxford: Oxford University Press), pp. 118-172

- Bernasconi, R. (1986) 'The Fate of the Distinction Between *Praxis* and *Poiesis*'. *Heidegger Studies*, Vol. 2, pp. 111-139
- Bollinger, R. R., Barbas, A. S., Bush, E. L., Lin, S. S. & Parker, W. (2007) 'Biofilms in the large bowel suggest an apparent function of the human vermiform appendix'. *Journal of Theoretical Biology*, Vol. 249, pp. 826-831
- Boorse, C. (2002) 'A Rebuttal on Functions', in Ariew, A., Cummins, R. & Perlman, M. (eds.) *Functions: New Essays in the Philosophy of Psychology and Biology* (Oxford: Oxford University Press), pp. 63-112
- Bostrom, N. (2003) 'Human Genetic Enhancements: A Transhumanist Perspective', *Journal of Value Inquiry*. Vol. 37, pp. 493-506
- Broadie, S. (1991) *Ethics with Aristotle* (Oxford: Oxford University Press)
- Buzaglo, J. (2003) 'Capabilities: From Spinoza to Sen and Beyond. Part I: Spinoza's Theory of Capabilities'. *Post-autistic Economics Review*, No. 20, article 6. Available at URL: <http://www.paecon.net/PAERreview/issue20/Buzaglo20.htm>. Accessed: 25/04/2015
- Caballero, P., Morán, P. & Marco-Rius, F. (2013) 'A Review of the Genetic and Ecological Basis of Phenotypic Plasticity in Brown Trout', in Polakof, S. & Moon, T. W. (eds.) *Trout: From Physiology to Conservation* (New York: Nova Science), pp. 9-26
- Canovan, M (1983) 'A Case of Distorted Communication: A Note on Habermas and Arendt'. *Political Theory*, Vol. 11 (No. 1), pp. 105-116
- Charles, D. (1984) *Aristotle's Philosophy of Action* (London: Duckworth)
- Charles, D. (1986) 'Aristotle: Ontology and Moral Reasoning', in Woods, M. & Annas, J. (eds.) *Oxford Studies in Ancient Philosophy: Volume 4* (Oxford: Clarendon Press), pp. 119-144
- Clark, D. A. (2002) *Visions of Development: A Study of Human Values* (Cheltenham: Edward Elgar)

- Clark, D. A. (2013) 'Creating Capabilities, Lists and Thresholds: Whose Voices, Intuitions and Value Judgements Count?'. *Journal of Human Development and Capabilities*, Vol. 14 (No. 1), pp. 172-184
- Clinton, B. (2000) Remarks made at the White House on the Completion of the First Survey of the Entire Human Genome Project. Available at URL: <https://www.genome.gov/10001356/june-2000-white-house-event/>. Accessed: 19/01/2017
- Coen, E. (1999) *The Art of Genes: How Organisms Make Themselves* (Oxford: Oxford University Press)
- Collins, F. (2000) Remarks made at the White House on the Completion of the First Survey of the Entire Human Genome Project. Available at URL: <https://www.genome.gov/10001356/june-2000-white-house-event/>. Accessed: 19/01/2017
- Collins, F. (2007) *The Language of God: A Scientist Presents Evidence for Belief* (London: Pocket Books)
- Cooper, J. M. (1975) *Reason and Human Good in Aristotle* (Cambridge, Mass.: Harvard University Press)
- Cooper, R. (2007) 'Can It Be a Good Thing to Be Deaf?'. *Journal of Medicine and Philosophy*, Vol. 32 (No. 6), pp. 563-583
- Copp, D. & Sobel, D. (2004) 'Morality and Virtue: An Assessment of Some Recent Work in Virtue Ethics'. *Ethics*, Vol. 114 (No. 3), pp. 514-554
- Crick, F. H. C. (1958) 'On Protein Synthesis', in Sanders, F. K. (ed.) *Symposia of the Society for Experimental Biology, Number XII: The Biological Replication of Macromolecules* (Cambridge: Cambridge University Press), pp. 138-163
- Crick, F. H. C. (1970) 'Central Dogma of Molecular Biology'. *Nature*, Vol. 227, pp. 561-563
- Dar-Nimrod, I. Heine, S. J. (2011) 'Genetic Essentialism: On the Deceptive Determinism of DNA'. *Psychological Bulletin*, Vol. 137 (No. 5), pp. 800-818

- Darwin, C. (2010 [1871]) *The Descent of Man* (Mineola, NY: Dover Publications Inc.)
- Dawkins, R. (1989 [1976]) *The Selfish Gene* (Oxford: Oxford University Press)
- Dawkins, R. (1995) *River Out of Eden: A Darwinian View of Life* (London: Weidenfeld & Nicolson)
- Dela Cruz Bernabe, R. (2006) *An Investigation on the Aristotelian Foundations of Martha Nussbaum's Capabilities Approach and the Disability Issue Utilizing Nussbaum's Earlier Works on Aristotle – A Master's Thesis in Applied Ethics* (Centre for Applied Ethics, Linköpings Universitet). Available at URL: <http://liu.diva-portal.org/smash/get/diva2:22106/FULLTEXT01>. Accessed: 11/06/2016
- Delbrück, M. (1971) 'Aristotle-totle-totle', in Monod, J. & Borek, E. (eds.) *Of Microbes and Life* (New York: Columbia University Press), pp. 50-55
- Deleuze, G. (1983 [1962]) *Nietzsche and Philosophy*, trans. Tomlinson, H. (London: Continuum)
- Deleuze, G. (1981) 'Lecture transcripts on Spinoza's concept of affect', trans. Deleuze, E. & Deleuze, J. Available at URL: <http://www.webdeleuze.com/php/sommaire.html> / https://www.gold.ac.uk/media/deleuze_spinoza_affect.pdf. Accessed: 21/04/2015
- Deleuze, G. (2001) *Pure Immanence: Essays on A Life*, trans. Boyman, A. (New York: Zone Books)
- DeLisi, C. (1988) 'The Human Genome Project: The ambitious proposal to map and decipher the complete sequence of human DNA'. *American Scientist*, Vol. 76 (No. 5), pp. 488-493
- Dewey, J. (1910) *The Influence of Darwin on Philosophy; And Other Essays in Contemporary Thought* (New York: Henry Holt & Co.)
- Dewey, J. (1917) 'The Need for a Recovery of Philosophy', in Dewey, J. (ed.) *Creative Intelligence: Essays in the Pragmatic Attitude* (New York: Henry Holt & Co.), pp. 3-69
- Dewey, J. (1922) *Human Nature and Conduct* (New York: Henry Holt & Co.)
- Dewey, J. (1929 [1925]) *Experience and Nature* (London: George Allen & Unwin Ltd.)

- Downie, R. S. (1966) 'Mill on Pleasure and Self-Development'. *The Philosophical Quarterly*, Vol. 16 (No. 62), pp. 69-71
- Dupré, J. (1981) 'Natural Kinds and Biological Taxa'. *The Philosophical Review*, Vol. 90 (No. 1), pp. 66-90
- Dupré, J. (1986) 'Sex, Gender, and Essence'. *Midwest Studies in Philosophy*, Vol. 11, pp. 441-457
- Dupré, J. (1998) 'Normal People'. *Social Research*, Vol. 65, No. 2, pp. 221-248
- Dupré, J. (2012) *Processes of Life: Essays in the Philosophy of Biology* (Oxford: Oxford University Press)
- Dupré, J. & Nicholson, D. J. (2018) 'Towards a Processual Philosophy of Biology', in Nicholson, D. J. & Dupré, J. (eds.) *Everything Flows: Towards a Processual Philosophy of Biology* (Oxford: Oxford University Press), pp. 7-59
- Durie, R. (2002) 'Creativity and Life'. *The Review of Metaphysics*, Vol. 56 (No. 2), pp. 357-383
- English, S., Pen, I., Shea, N. & Uller, T. (2015) 'The Information Value of Non-Genetic Inheritance in Plants and Animals'. *PLOS One*
- FitzPatrick, W. (2000) *Teleology and the Norms of Nature* (New York: Garland Publishing Inc.)
- Foot, P. (2001) *Natural Goodness* (Oxford: Oxford University Press)
- Funkhouser, L. J. & Bordenstein, S. R. (2013) 'Mom Knows Best: The Universality of Maternal Microbial Transmission'. *PLOS Biology*, Vol. 11 (No. 8)
- Gadamer, H. (1993 [1960]) *Truth and Method*, trans. Weinsheimer, J. & Marshall, D. G. (London: Sheed & Ward)
- Garson, J. (2011) 'Function and Teleology', in Sarkar, S. & Plutynski, A. (eds.) *A Companion to the Philosophy of Biology* (Chichester: Wiley-Blackwell), pp. 525-549

- Gelman, S. A (2003) *The Essential Child: Origins of Essentialism in Everyday Thought* (Oxford: Oxford University Press)
- Gelman, S. A. & Hirschfeld, L. A. (1999) ‘How Biological Is Essentialism?’, in Medin, D. L. & Atran, S. (eds.) *Folkbiology* (Cambridge, Mass.: MIT Press), pp. 403-445
- Gerhart, J. & Kirschner, M. (2007) ‘The theory of facilitated variation’. *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 104 (suppl. 1), pp. 8582–8589
- Gilbert, S. F. & Epel, D. (2009) *Ecological Developmental Biology: Integrating Epigenetics, Medicine, and Evolution* (Sunderland, MA.: Sinauer Associates Inc.)
- Gilbert, S. F., Bosch, T. C. G. & Ledón-Rettig, C. (2015) ‘Eco-Evo-Devo: developmental symbiosis and developmental plasticity as evolutionary agents’. *Nature Reviews Genetics*, Vol. 16, pp. 611-622
- Gilbert, W. (1992), ‘A Vision of the Grail’, in Kevles, D. J. & Hood, L. (eds.) *The Code of Codes: Scientific and Social Issues in the Human Genome Project* (Cambridge, Mass.: Harvard University Press), pp. 83-97
- Glackin, S. (2016) ‘Three Aristotelian Accounts of Disease and Disability’. *Journal of Applied Philosophy*, Vol. 33 (No. 3), pp. 311-326
- Godfrey-Smith, P. (1994) ‘A Modern History Theory of Functions’. *Noûs*, Vol. 28 (No. 3), pp. 344-362
- Godfrey-Smith, P. (2007) ‘Information in Biology’, in Hull, D. L. & Ruse, M. (eds.) *The Cambridge Companion to Philosophy of Biology* (Cambridge University Press), pp. 103-119
- Gray, J. (1996 [1983]) *Mill On Liberty: A Defence* (2nd Ed.) (London: Routledge)
- Griffin, J. (1988) *Well-Being: Its Meaning, Measurement and Moral Importance* (Oxford: Oxford University Press)
- Griffiths, J. O. (2017) ‘The changing space between politics and biology’. *Contemporary Political Theory*, Vol. 16 (No. 4), pp. 541-548

- Griffiths, P. E. (1993) 'Functional Analysis and Proper Functions'. *The British Journal for the Philosophy of Science*, Vol. 44 (No. 3), pp. 409-422
- Griffiths, P. E. (2001) 'Genetic Information: A Metaphor in Search of a Theory'. *Philosophy of Science*, Vol. 68 (No. 3), pp. 394-412
- Griffiths, P. E. & Gray, R. D. (1994) 'Developmental Systems and Evolutionary Explanation'. *The Journal of Philosophy*, Vol. 91 (No. 6), pp. 277-304
- Griffiths, P. E. & Knight, R. D. (1998) 'What is the Developmentalist Challenge?'. *Philosophy of Science*, Vol. 65 (No. 2), pp. 253-258
- Griffiths, P. E. & Stotz, K. (2013) *Genetics and Philosophy: An Introduction* (Cambridge: Cambridge University Press)
- Grondin, J. (1994) *Introduction to Philosophical Hermeneutics*, trans. Weinsheimer, J. (New Haven: Yale University Press)
- Grondin, J. (2002) 'Gadamer's Basic Understanding of Understanding', in Dostal, R. J. (ed.) *The Cambridge Companion to Gadamer* (Cambridge: Cambridge University Press), pp. 36-51
- Habermas, J. (2003) *The Future of Human Nature* (Cambridge: Polity Press)
- Hacker-Wright, J. (2009) 'What is Natural about Foot's Ethical Naturalism?'. *Ratio*, Vol. 22, pp. 308–321
- Hanson, N. R. (1965 [1958]) *Patterns of Discovery* (Cambridge: Cambridge University Press)
- Harris, J. (2007) *Enhancing Evolution: The Ethical Case for Making Better People* (Princeton, N. J.: Princeton University Press)
- Heidegger, M. (1999 [1923]) *Ontology – The Hermeneutics of Facticity*, trans. van Buren, J. (Indiana: Indiana University Press)
- Heidegger, M. (2009 [1924]) *Basic Concepts of Aristotelian Philosophy*, trans. Metcalf, R. D. & Tanzer, M. B. (Bloomington, In.: Indiana University Press)

- Heidegger, M. (2010 [1927]) *Being and Time*, trans. Stambaugh, J. (New York: State University of New York Press)
- Hinchman, L. P. (1990) 'The Idea of Individuality: Origins, Meaning, and Political Significance'. *Journal of Politics*, Vol. 52 (No. 3), pp. 759-781
- Houlgate, S. (2005 [1991]) *An Introduction to Hegel: Freedom, Truth and History* (2nd edition) (Oxford: Blackwell Publishing)
- Hubbard, R. (1990) 'The Political Nature of "Human Nature"', in Rhode, D. L. (ed.) *Theoretical Perspectives on Sexual Difference* (New Haven: Yale University Press), pp. 63-73
- Hull, D. L. (1986) 'On Human Nature'. *Proceedings of the Biennial Meeting of the Philosophy of Science Association*, Vol. 2, pp. 3-13
- Hurka, T. (1993) *Perfectionism* (Oxford: Oxford University Press)
- Hursthouse, R. (1999) *On Virtue Ethics* (Oxford: Oxford University Press)
- Ingold, T. (2011) *Being Alive: Essays on movement, knowledge and description* (London: Routledge)
- Ingold, T. (2013) *Making: Anthropology, archaeology, art and architecture* (London: Routledge)
- Ingold, T. (2015a) *The Life of Lines* (London: Routledge)
- Ingold, T. (2015b) Video: 'Abup talks - Tim Ingold – "The life of lines"' (Introduction to conference paper 'Humanifying in Practice: Looking, Listening and the Education of Attention', presented at the Third International Conference on Dialogical Practices: "'Listen to me!" Humanizing Human Practices', at University of Agder, Kristiansand, Norway, 23rd to 25th of September 2015). URL: https://www.youtube.com/watch?v=Xfvnt_wExbk. Accessed: 28/02/2018
- Ingold, T. & Hallam, E. (2014) 'Making and Growing: An Introduction', in Hallam, E. & Ingold, T. (eds.) *Making and Growing: Anthropological Studies of Organisms and Artefacts* (London: Routledge), pp. 1-24

- Jablonka, E. & Lamb, M. J. (2005) *Evolution in Four Dimensions: Genetic, Epigenetic, Behavioural, and Symbolic Variation in the History of Life* (Cambridge, Mass.: MIT Press)
- Jacob, F. (1993 [1970]) *The Logic of Life: A History of Heredity*, trans. Spillmann, B. E. (Princeton, NJ: Princeton University Press)
- Jacob, F. (1982) *The Possible and the Actual* (Seattle: University of Washington Press)
- Jacob, F. & Monod, J. (1961) 'Genetic Regulatory Mechanisms in the Synthesis of Proteins'. *Journal of Molecular Biology*, Vol. 3, pp. 318-356
- Jonas, H. (2001 [1966]) *The Phenomenon of Life* (Evanston: Northwestern University Press)
- Kass, L. (1998) 'The Wisdom of Repugnance: Why We Should Ban the Cloning of Humans', *Valparaiso University Law Review*, Vol. 32 (No. 2), pp. 679-705
- Kay, L. E. (2000) *Who Wrote the Book of Life? A History of the Genetic Code* (Stanford, CA.: Stanford University Press)
- Keller, E. F. (2000) *The Century of the Gene* (Cambridge, Mass.: Harvard University Press)
- Keller, E. F. (2002) *Making Sense of Life: Explaining Biological Development with Models, Metaphors, and Machines* (Harvard University Press)
- Keller, E. F. (2014) 'From gene action to reactive genomes'. *The Journal of Physiology*, Vol. 592 (No. 11), pp. 2423-2429
- Keller, E. F. (2015) 'The Postgenomic Genome', in Richardson, S. S. & Stevens, H. (eds.) *Postgenomics: Perspectives on Biology after the Genome* (Durham and London: Duke University Press), pp. 9-31
- Kitcher, P. (1999) 'Essence and Perfection'. *Ethics*, Vol. 110 (No. 1), pp. 59-83
- Konopka, A. K. (2002) 'Grand metaphors of biology in the genome era'. *Computers and Chemistry*, Vol. 26, pp. 397-401
- Kraut, R. (1989) *Aristotle on the Human Good* (Princeton, N. J.: Princeton University Press)

- Kraut, R. (2016) 'Aristotle's Ethics', in Zalta, E. N. (ed.) *The Stanford Encyclopedia of Philosophy* (Spring 2016 Edition). Available at URL: <http://plato.stanford.edu/archives/spr2016/entries/aristotle-ethics/>. Accessed: 11/10/2016
- Kripke, S. A. (1980 [1972]) *Naming and Necessity* (Cambridge, Mass.: Harvard University Press)
- Kronfeldner, M. (2016) 'The Politics of Human Nature', in Tibayrenc, M. & Ayala, F. J. (eds.) *On Human Nature* (Cambridge, Mass.: Academic Press), pp. 625-632
- Kuhn, T. S. (2012 [1962]) *The Structure of Scientific Revolutions* (Fourth Edition) (Chicago: University of Chicago Press)
- Lakoff, G. & Johnson, M. (1980) *Metaphors We Live By* (Chicago: University of Chicago Press)
- Laland, K. N., Odling-Smee, F. J. & Feldman, M. W. (2001) 'Niche Construction, Ecological Inheritance, and Cycles of Contingency in Evolution', in Oyama, S., Griffiths, P. E. & Gray, R. D. (eds.) *Cycles of Contingency: Developmental Systems and Evolution* (Cambridge, Mass.: MIT Press), pp. 117-126
- Laland K. N., Uller T., Feldman M.W., Sterelny K., Müller G.B., Moczek A., Jablonka E. & Odling-Smee J. (2015) 'The extended evolutionary synthesis: its structure, assumptions and predictions'. *Proceedings of the Royal Society B*, Vol. 282 (No. 1813), pp. 1-14
- Lenman, J. (2014) 'Moral Naturalism', in Zalta, E. N. (ed.) *The Stanford Encyclopedia of Philosophy* (Spring 2014 Edition). URL: <https://plato.stanford.edu/archives/spr2014/entries/naturalism-moral/>. Accessed: 04/11/2017
- Levins, R. & Lewontin, R. (1985) *The Dialectical Biologist* (Cambridge, Mass.: Harvard University Press)
- Lewens, T. (2004) *Organisms and Artifacts: Design in Nature and Elsewhere* (Cambridge, Mass.: The MIT Press)

- Lewens, T. (2012) 'Species, essence and explanation'. *Studies in History and Philosophy of Biological and Biomedical Sciences*, Vol. 43, pp. 751–757
- Lewens, T. (2015) *The Biological Foundations of Bioethics* (Oxford: Oxford University Press)
- Lewontin, R. (1991) *Biology as Ideology: The Doctrine of DNA* (New York: Harper Collins)
- Lewontin, R. (2000a [1998]) *The Triple Helix* (Cambridge, Mass.: Harvard University Press)
- Lewontin, R. C. (2000b) 'Foreword to Second Edition', in Oyama, S. (2000 [1985]) *The Ontogeny of Information: Developmental Systems and Evolution* (Second Edition) (Durham, NC.: Duke University Press), pp. vii-xv
- Lewontin, R. C. (2000c) *It Ain't Necessarily So: The Dream of the Human Genome and Other Illusions* (London: Granta Books)
- Lewontin, R. (2001) 'Gene, Organism and Environment', in Oyama, S., Griffiths, P. E. & Gray, R. D. (eds.) *Cycles of Contingency: Developmental Systems and Evolution* (Cambridge, Mass.: MIT Press), pp. 59-66
- Linguist, S., Machery, E., Griffiths, P. E. & Stotz, K (2011) 'Exploring the folkbiological conception of human nature'. *Philosophical Transactions of the Royal Society B*, Vol. 366, pp. 444-453
- Loewenstein, W. R. (1999) *The Touchstone of Life: Molecular Information, Cell Communication, and the Foundations of Life* (Oxford: Oxford University Press)
- Lott, M. (2012) 'Have Elephant Seals Refuted Aristotle? Nature, Function, and Moral Goodness'. *Journal of Moral Philosophy*, Vol. 9, p. 353–375
- Lovejoy, A. O. (1960 [1936]) *The Great Chain of Being: A Study of the History of an Idea* (New York: Harper & Row)
- MacIntyre, A. (2007 [1981]) *After Virtue* (London: Bloomsbury Academic)
- MacIntyre, A. (2009 [1999]) *Dependent Rational Animals* (London: Duckworth)

- MacIntyre, A. (2002) 'Virtues in Foot and Geach'. *The Philosophical Quarterly*, Vol. 52 (No. 209), pp. 621-631
- Maguire, E. A., Gadian, D. G., Johnsrude, I. S., Good, C. D., Ashburner, J., Frackowiak, R. S. J. & Frith, C. D. (2000) 'Navigation-Related Structural Change in the Hippocampi of Taxi Drivers'. *Proceedings of the National Academy of Sciences of the United States of America*. Vol. 97 (No. 8), pp. 4398-4403
- Maturana, H. & Varela, F. J. (1980 [1972]) *Autopoiesis and Cognition: The Realization of the Living* (Dordrecht: D. Reidel Publishing Co.)
- Mauron, A. (2001) 'Is the Genome the Secular Equivalent of the Soul?'. *Science*, Vol. 291 (No. 5505), pp. 831-832
- Mauron, A. (2002) 'Genomic Metaphysics'. *Journal of Molecular Biology*, Vol. 319 (No. 4), pp. 957-962
- Maynard Smith, J. (2000) 'The Concept of Information in Biology'. *Philosophy of Science*, Vol. 67 (No. 2), pp. 177-194
- Mayr, E. (1976 [1957]) 'Species Concepts and Definitions', in Mayr, E., *Evolution and the Diversity of Life: Selected Essays* (Cambridge, Mass.: Harvard University Press), pp. 493-508
- Mayr, E. (1959) 'Darwin and the Evolutionary Theory in Biology', in *Evolution and Anthropology: A Centennial Appraisal* (Washington, D. C.: The Anthropological Society of Washington), pp. 1-10
- Mayr, E. (1961) 'Cause and Effect in Biology'. *Science*, Vol. 134, pp. 1501-1506
- Mayr, E. (1982) *The Growth of Biological Thought: Diversity, Evolution, and Inheritance* (Cambridge, Mass.: Harvard University Press)
- Mayr, E. (1992) 'The Idea of Teleology'. *Journal of the History of Ideas*, Vol. 53 (No. 1), pp. 117-135
- Mayr, E. (1995) 'Darwin's Impact on Modern Thought'. *Proceedings of the American Philosophical Society*, Vol. 139 (No. 4), pp. 317-325

- Mayr, E. (1998) 'The Multiple Meanings of 'Teleological''. *History and Philosophy of the Life Sciences*, Vol. 20 (No. 1), pp. 35-40
- McKinnon, S. (2005) *Neo-Liberal Genetics: The Myths and Moral Tales of Evolutionary Psychology* (Chicago: Prickly Paradigm Press)
- McLaughlin, P. (2001) *What Functions Explain* (Cambridge: Cambridge University Press)
- Medin, D. & Ortony, A. (1989) 'Psychological Essentialism', in Vosniadou, S. & Ortony, A. (eds.) *Similarity and Analogical Reasoning* (Cambridge: Cambridge University Press), pp. 179-195
- Meloni, M. (2016) *Political Biology: Science and Social Values in Human Heredity from Eugenics to Epigenetics* (Basingstoke: Palgrave Macmillan)
- Mill, J. S. (1991 [1859]) *On Liberty*, in Gray, J. (ed.) *On Liberty and Other Essays* (Oxford: Oxford University Press), pp. 1-128
- Mill, J. S. (1976 [1879]) 'Chapters on Socialism', in Mill, J. S., *Essays on Economics and Society* (University of Toronto Press), pp. 703-753
- Millum, J. (2006) 'Natural Goodness and Natural Evil'. *Ratio*, Vol. 19, p. 199-213
- Mozcek, A. P. (2012) 'The Nature of Nurture and the Future of Evodevo: Toward a Theory of Developmental Evolution'. *Integrative and Comparative Biology*, Vol. 52 (No. 1), pp. 108-119
- Mozcek, A. P. (2015) 'Developmental plasticity and evolution - *quo vadis?*'. *Heredity*, Vol. 115 (No. 4), pp. 302-305
- Monod, J. (1971) *Chance and Necessity: An Essay on the Natural Philosophy of Modern Biology*, trans. Wainhouse, A. (New York: Vintage Books)
- Moss, L. (2001) 'Deconstructing the Gene and Reconstructing Molecular Developmental Systems', in Oyama, S., Griffiths, P. E. & Gray, R. D. (eds.) *Cycles of Contingency: Developmental Systems and Evolution* (Cambridge, Mass.: MIT Press), pp. 85-97
- Moss, L. (2003) *What Genes Can't Do* (Cambridge, Mass.: MIT Press)

- Moss, L. (2009) 'Detachment, Genomics and the Nature of Being Human', in Drenthen, M. et al. (eds.) *New Visions of Nature* (Dordrecht: Springer), pp. 103-115
- Moss, L. & Nicholson, D. J. (2012) 'On Nature and Normativity: Normativity, Teleology, and Mechanism in Biological Explanation'. *Studies in History and Philosophy of Biological and Biomedical Sciences*. Vol. 43 (No. 1), pp. 88-91
- Nagel, T. (1986) *The View From Nowhere* (Oxford: Oxford University Press)
- Nelkin, D. & Lindee, M. S. (1995) *The DNA Mystique: The Gene as a Cultural Icon* (New York: W. H. Freeman and Co.)
- Nicholson, D. J. (2013) 'Organisms ≠ Machines'. *Studies in History and Philosophy of Biological and Biomedical Sciences*, Vol. 44, pp. 669–678
- Nicholson, D. J. (2014a) 'The Return of the Organism as a Fundamental Explanatory Concept in Biology'. *Philosophy Compass*, Vol. 9 (No. 5), pp. 347–359
- Nicholson, D. J. (2014b) 'The machine conception of the organism in development and evolution: A critical analysis'. *Studies in History and Philosophy of Biological and Biomedical Sciences*, Vol. 48, pp. 162-174
- Nicholson, D. J. & Dupré, J. (eds.) (2018) *Everything Flows: Towards a Processual Philosophy of Biology* (Oxford: Oxford University Press)
- Noble, D. (2006) *The Music of Life* (Oxford: Oxford University Press)
- Nussbaum, M. C. (1988) 'Nature, Function, and Capability: Aristotle on Political Distribution', in Annas, J. & Grimm, R. H. (eds.) *Oxford Studies in Ancient Philosophy: Supplementary Volume* (Oxford: Oxford University Press), pp. 145-184
- Nussbaum, M. C. (1992) 'Human Functioning and Social Justice: In Defense of Aristotelian Essentialism'. *Political Theory*, Vol. 20 (No. 2), pp. 202–246
- Nussbaum, M. C. (1993) 'Non-Relative Virtues: An Aristotelian Approach', in Nussbaum, M. & Sen, A. (eds.) *The Quality of Life* (Oxford: Oxford University Press), pp. 242-269

- Nussbaum, M. C. (1995a) 'Aristotle on Human Nature and the Foundations of Ethics', in Altham, J. E. J. & Harrison, R. (eds.) *World, Mind, and Ethics: Essays on the Ethical Philosophy of Bernard Williams* (Cambridge: Cambridge University Press), pp. 86-131
- Nussbaum, M. C. (1995b) 'Human Capabilities, Female Human Beings', in Nussbaum, M. C. & Glover, J. (eds.) *Women, Culture, and Development: A Study of Human Capabilities* (Oxford: Oxford University Press), pp. 61-105
- Nussbaum, M. C. (1998) 'The Good as Discipline, the Good as Freedom', in Crocker, D. A. & Linden, T. (eds.) *The Ethics of Consumption: The Good Life, Justice, and Global Stewardship* (Lanham, Maryland: Rowman & Littlefield), pp. 312-341
- Nussbaum, M. C. (2000a) *Women and Human Development: The Capabilities Approach* (Cambridge: Cambridge University Press)
- Nussbaum, M. C. (2000b) 'Aristotle, Politics, and Human Capabilities: A Response to Antony, Arneson, Charlesworth, and Mulgan'. *Ethics*, Vol. 111 (No. 1), pp. 102-140
- Nussbaum, M. C. (2005a) 'Mill Between Aristotle and Bentham', in Bruni, L. & Porta, P. L. (eds.) *Economics and Happiness: Framing the Analysis* (Oxford: Oxford University Press), pp. 170-183
- Nussbaum, M. C. (2006) *Frontiers of Justice: Disability, Nationality, Species Membership* (Cambridge, Mass.: Harvard University Press)
- Nussbaum, M. C. (2011) *Creating Capabilities* (Cambridge, Mass.: Harvard University Press)
- Nussbaum, M. C. (2014) 'Perfectionist liberalism and political liberalism', in Comim, F. & Nussbaum, M. C. (eds.) *Capabilities, Gender, Equality: Towards Fundamental Entitlements* (Cambridge: Cambridge University Press), pp. 19-56
- Nussbaum, M. C. (2017) 'Human Capabilities and Animal Lives: Conflict, Wonder, Law: A Symposium', *Journal of Human Development and Capabilities*, Vol. 18 (No. 3), pp. 317-321
- Nussbaum, M. C. & Sen, A. (eds.) (1993) *The Quality of Life* (Oxford: Oxford University Press)

- Odenbaugh, J. (2017) 'Nothing in ethics makes sense except in the light of evolution? Natural goodness, normativity, and naturalism'. *Synthese*, Vol. 194, pp. 1031-1055
- Okin, S. (2003) 'Poverty, Well-Being, and Gender: What Counts, Who's Heard?'. *Philosophy & Public Affairs*, Vol. 31 (No. 3), pp. 280-316
- Orgogozo, V. Peluffo, A. E. & Morizot, B. (2016) 'The "Mendelian Gene" and the "Molecular Gene": Two Relevant Concepts of Genetic Units'. *Current Topics in Developmental Biology*, Vol. 119, pp. 1-26
- Oyama, S. (2000a [1985]) *The Ontogeny of Information: Developmental Systems and Evolution* (Second Edition) (Durham, NC.: Duke University Press)
- Oyama, S. (2000b) *Evolution's Eye: A Systems View of the Biology-Culture Divide* (Durham, NC.: Duke University Press)
- Oyama, S. (2002) 'The Nurturing of Natures', in Grunwald, A., Gutmann, M. & Neumann-Held, E. M. (eds.) *On Human Nature: Anthropological, Biological and Philosophical Foundations* (Berlin: Springer-Verlag), pp. 163-170
- Oyama, S. (2006) 'Boundaries and (Constructive) Interaction', in Neumann-Held, E. M. & Rehmann-Sutter, C. (eds.) *Genes in Development: Re-reading the Molecular Paradigm* (Durham, NC: Duke University Press), pp. 272-289
- Oyama, S. (2007) 'Development "Sin Techo, Sin Muros"'. *Journal of European Psychoanalysis* (No. 25). Available at URL: <http://www.psychomedia.it/jep/pages/number25.htm>. Accessed: 01/9/2015
- Oyama, S. (2009) 'Compromising Positions: The Minding of Matter', in Barberousse, A., Morange, M. & Pradeu, T. (eds.) *Mapping the future of biology: Evolving concepts and theories* (Springer), pp. 27-45
- Oyama, S. (2010) 'Biologists Behaving Badly: Vitalism and the Language of Language'. *History and Philosophy of the Life Sciences*, Vol. 32, pp. 401-424
- Oyama, S. (2011) 'Development and Evolution in a World Without Labels'. Lecture to the eSMCs Summer School 2011. Full video available at URL: <https://vimeo.com/28657483>. Accessed: 09/03/2015

- Oyama, S. (2016) 'The Lure of Immateriality in Accounts of Development and Evolution', in Pitts-Taylor, V. (ed.) *Mattering: Feminism, Science and Materialism* (New York: NYU Press), pp. 91-103
- Oyama, S., Griffiths, P. E. & Gray, R. D. (2001) (eds.) *Cycles of Contingency: Developmental Systems and Evolution* (Cambridge, Mass.: MIT Press)
- Oyama, S., Griffiths, P. E. & Gray, R. D. (2001) 'Introduction: What is Developmental Systems Theory', in Oyama, S., Griffiths, P. E. & Gray, R. D. (eds.) *Cycles of Contingency: Developmental Systems and Evolution* (Cambridge, Mass.: MIT Press), pp. 1-11
- Pan, Q., Shai, O., Lee, L. J., Frey, B. J. & Blencowe, B. J. (2008) 'Deep surveying of alternative splicing complexity in the human transcriptome by high-throughput sequencing'. *Nature Genetics*, Vol. 40 (No. 12)
- Peluffo, A. E. (2015) 'The "Genetic Program": Behind the Genesis of an Influential Metaphor'. *Genetics*, Vol. 200, pp. 685-696
- Pigliucci, M. (2001) *Phenotypic Plasticity: Beyond Nature and Nurture* (Baltimore: John Hopkins University Press)
- Pigliucci, M. & Müller, G. B. (2010) 'Elements of an Extended Evolutionary Synthesis', in Pigliucci, M. & Müller, G. B. (eds.) *Evolution: The Extended Synthesis* (Cambridge, Mass.: MIT Press), pp. 3-17
- Pinker, S. (1997) *How the Mind Works* (London: Penguin Books)
- Pinker, S. (2002) *The Blank Slate: The Modern Denial of Human Nature* (New York: Viking)
- Plato (1973 [c. 380 BC]) *Republic*, in *The Republic and Other Works*, trans. Jowett, B. (New York: Anchor Books), pp. 7-316
- Plato (1929 [c. 360 BC]) *Timaeus*, trans. Bury, R. G. (Harvard: Loeb Classical Library, Harvard University Press)
- Plato (1973 [c. 360 BC]) *Parmenides*, in *The Republic and Other Works*, trans. Jowett, B. (New York: Anchor Books), pp. 367-424

- Putnam, H. (1975) *Mind, Language and Reality: Philosophical Papers, Vol. 2* (Cambridge: Cambridge University Press)
- Qizilbash, M. (2006) 'Capability, Happiness and Adaptation in Sen and J. S. Mill'. *Utilitas*, Vol. 18 (No. 1), pp. 20-32
- Qizilbash, M. (2011) 'Sugden's Critique of the Capability Approach'. *Utilitas*, Vol. 23 (No. 1), pp. 25-51
- Rawls, J. (1971) *A Theory of Justice* (Cambridge, Mass.: Harvard University Press)
- Reeve, C. D. C. (2014) 'Beginning and Ending with Eudaimonia', in Polansky, R. (ed.) *The Cambridge Companion to Aristotle's Nicomachean Ethics* (Cambridge: Cambridge University Press), pp. 14-33
- Rehmann-Sutter, C. (2006) 'Poiesis and Praxis: Two Modes of Understanding Development', in Neumann-Held, E. M. & Rehmann-Sutter, C. (eds.) *Genes in Development: Re-reading the Molecular Paradigm* (Durham, NC: Duke University Press), pp. 313-334
- Rehmann-Sutter, C. (2008) 'Genetics, a Practical Anthropology', in Düwell, M., Rehmann-Sutter, C. & Mieth, D. (eds.) *The Contingent Nature of Life: Bioethics and the Limits of Human Existence* (Dordrecht: Springer Science+Business Media B. V.), pp. 37-52
- Rehmann-Sutter, C. (2010) 'Genes – Cells – Interpretations: What Hermeneutics Can Add to Genetics and to Bioethics', in Pfliegerer, G., Brahier, G., & Lindpaintner, K. (eds.) *GenEthics and Religion* (Basel: Karger), pp 12–27
- Reiss, J. O. (2009) *Not By Design: Retiring Darwin's Watchmaker* (Berkeley, CA: University of California Press)
- Richards, R. A. (2008) 'Species and Taxonomy', in Ruse, M. (ed.) *The Oxford Handbook of Philosophy of Biology* (Oxford: Oxford University Press), pp. 161-188
- Richardson, S. S. & Stevens, H. (eds.) (2015) *Postgenomics: Perspectives on Biology after the Genome* (Durham and London: Duke University Press)
- Robeyns, I. (2011) 'The Capability Approach', in Zalta, E. N. (ed.) *The Stanford Encyclopedia of Philosophy* (Summer 2011 Edition). Available at URL:

<http://plato.stanford.edu/archives/sum2011/entries/capability-approach/>. Accessed: 22/5/2014

- Robeyns, I. (2013) 'Capability Ethics', in LaFollette, H. & Persson, I. (eds.) *The Blackwell Guide to Ethical Theory (second edition)* (Oxford: Wiley Blackwell), pp. 412-432
- Sandel, M. (2007) *The Case Against Perfection: Ethics in the Age of Genetic Engineering* (Cambridge, Mass.: Harvard University Press)
- Schrödinger, E. (1992 [1944]) *What Is Life?*, in *What Is Life? with Mind and Matter and Autobiographical Sketches* (Cambridge: Cambridge University Press), pp. 1-90
- Scully, J. L. (2006) 'Nothing Like a Gene', in Neumann-Held, E. M. & Rehmann-Sutter, C. (eds.) *Genes in Development: Re-reading the Molecular Paradigm* (Durham, NC: Duke University Press), pp. 349-364
- Seligman, M. E. P. & Csikszentmihalyi, M. (2000) 'Positive Psychology: An Introduction'. *American Psychologist*, Vol. 55 (No. 1), pp. 5-14
- Sen, A. (1980 [1979]) 'Equality of What?', in McMurrin, S. (ed.) *The Tanner Lecture on Human Values, Vol. 1* (Cambridge: Cambridge University Press), pp. 195-220
- Sen, A. (1990) 'Development as Capability Expansion', in Griffin, K. & Knight, J. (eds.) *Human Development and the International Development Strategy for the 1990s* (London: MacMillan), pp. 41-58
- Sen, A. (1993) 'Capability and Well-Being', in Nussbaum, M. & Sen, A. (eds.) *The Quality of Life* (Oxford: Oxford University Press), pp. 30-53
- Sen, A. (1999) *Development as Freedom* (New York: Alfred A. Knopf Inc.)
- Sen, A. (2002) *Rationality and Freedom* (Cambridge, Mass.: The Belknap Press of Harvard University Press)
- Sen, A. (2005a) *The Argumentative Indian* (New York: Farrar, Straus and Giroux)
- Sen, A. (2005b) 'Human Rights and Capabilities'. *Journal of Human Development*, Vol. 6 (No. 2), pp. 151-166

- Sen, A. (2006) 'Reason, Freedom and Well-being'. *Utilitas*, Vol. 18 (No. 1), pp. 80-96
- Sen, A. (2009) *The Idea of Justice* (Cambridge, Mass.: Harvard University Press)
- Sen, A. (2016) 'On Specification and Measurement'. Lecture given at the HDCA annual conference, Hitotsubashi University, Tokyo, Japan, September 2016
- Severin, P. M. D., Zou, X., Gaub, H. E. & Schulten, K. (2011) 'Cytosine methylation alters DNA mechanical properties'. *Nucleic Acids Research*, Vol. 39 (No. 20), pp. 8740–8751
- Shea, N. (2013) 'Inherited Representations are Read in Development'. *British Journal for the Philosophy of Science*, Vol. 64, pp. 1-31
- Sherman, N. (1989) *The Fabric of Character: Aristotle's Theory of Virtue* (Oxford: Oxford University Press)
- Skidelsky, R. & Skidelsky, E. (2012) *How Much is Enough? The Love of Money and the Case for the Good Life* (London: Allen Lane)
- Smith, D. L. (2011) *Less Than Human: Why We Demean, Enslave, and Exterminate Others* (New York: St Martin's Press)
- Smith, D. L. (2016) 'Paradoxes of Dehumanization'. *Social Theory and Practice*, Vol. 42 (No. 2), pp. 416-443
- Sober, E. (1980) 'Evolution, Population Thinking, and Essentialism'. *Philosophy of Science*, Vol. 47 (No. 3), pp. 350-383
- Steinberg, J. (2013) 'Spinoza's Political Philosophy', in Zalta, E. N. (ed.) *The Stanford Encyclopedia of Philosophy* (Winter 2013 Edition). Available at URL: <http://plato.stanford.edu/archives/win2013/entries/spinoza-political/>. Accessed: 08/9/14
- Sterelny, K. & Griffiths, P. (1999) *Sex and Death: An Introduction to Philosophy of Biology* (Chicago: University of Chicago Press)
- Sugden, R. (2006) 'What We Desire, What We Have Reason to Desire, Whatever We Might Desire: Mill and Sen on the Value of Opportunity'. *Utilitas*, Vol. 18 (No. 1), pp. 33-51

- Temin H. M. & Mizutani, S. (1970) 'RNA-dependent DNA polymerase in virions of Rous sarcoma virus'. *Nature*, Vol. 226, pp. 1211-1213
- Thompson, E. (2007) *Mind in Life* (Cambridge, Mass.: Harvard University Press)
- Thompson, M. (1995) 'The Representation of Life', in Hursthouse, R., Lawrence, G. & Quinn, W. (eds.) *Virtues and Reasons* (Oxford: Clarendon Press), pp. 247-296
- Thompson, M. (2004) 'Apprehending Human Form'. *Royal Institute of Philosophy Supplement*, Vol. 54, pp. 47-74
- Thompson, M. (2008) *Life and Action* (Cambridge, Mass.: Harvard University Press)
- Tooby, J. Cosmides, L. (1992) 'The Psychological Foundations of Culture', in Barkow, J. H., Cosmides, L. & Tooby, J. (eds.) *The Adapted Mind: Evolutionary Psychology and the Generation of Culture* (Oxford: Oxford University Press), pp. 19-136
- Varela, F. J., Thompson, E. & Rosch, E. (1991) *The Embodied Mind* (Cambridge, Mass.: MIT Press)
- Villa, D. (1996) *Arendt and Heidegger: The Fate of the Political* (Princeton: Princeton University Press)
- Von Sydow, M. (2012) *From Darwinian Metaphysics towards Understanding the Evolution of Evolutionary Mechanisms* (Universitätsverlag Göttingen)
- Walsh, D. (2008) 'Teleology', in Ruse, M. (ed.) *The Oxford Handbook of Philosophy of Biology* (Oxford: Oxford University Press), pp. 113-137
- West-Eberhard, M. J. (2003) *Developmental Plasticity and Evolution* (Oxford: Oxford University Press)
- West-Eberhard, M. J. (2005a) 'Developmental plasticity and the origin of species differences'. *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 102 (No. suppl. 1), pp. 6543-6549
- West-Eberhard, M. J. (2005b) 'Phenotypic Accommodation: Adaptive Innovation Due to Developmental Plasticity'. *Journal of Experimental Zoology*, Vol. 304B (No. 6), pp. 610-618

- Wilkins, J. S. (2013) 'Essentialism in Biology', in Kampourakis, K. (ed.) *The Philosophy of Biology: A Companion for Educators* (Dordrecht: Springer), pp. 395-419
- Williams, G. C. (1996) *Plan and Purpose in Nature* (London: Weidenfeld & Nicolson)
- Wittgenstein, L. (1974 [1953]) *Philosophical Investigations*, trans. Anscombe, G. E. M. (Oxford: Blackwell)
- Wolf, S. (1995) 'Commentary on: Nussbaum, 'Human Capabilities, Female Human Beings'', in Nussbaum, M. C. & Glover, J. (eds.) *Women, Culture, and Development: A Study of Human Capabilities* (Oxford: Oxford University Press), pp. 105-115
- Woodcock, S. (2006) 'Philippa Foot's Virtue Ethics Has an Achilles' Heel'. *Dialogue*, Vol. 45, pp. 445-468
- Woodcock, S. (2015) 'Neo-Aristotelian Naturalism and the Indeterminacy Objection', *International Journal of Philosophical Studies*, Vol. 23 (No. 1), pp. 20-41
- Woodford, P. (2016) 'Neo-Darwinists and Neo-Aristotelians: how to talk about natural purpose'. *History and Philosophy of the Life Sciences*, Vol. 38 (No. 4), article 23, pp. 1-22
- Wright, L. (1973) 'Functions', *The Philosophical Review*, Vol. 82 (No. 2), pp. 139-168
- Yagisawa, T. (2014) 'Possible Objects', in Zalta, E. N. (ed.) *The Stanford Encyclopedia of Philosophy* (Fall 2014 Edition). Available at URL: <http://plato.stanford.edu/archives/fall2014/entries/possible-objects/>. Accessed: 24/8/2015
- Zuolo, F. (2004) 'Sen's Capability Theory: Spinoza Beyond Aristotle'. University of Pavia, Italy. Available at URL: http://www.researchgate.net/publication/268433701_SEN%27S_CAPABILITY_THEORY_SPINOZA_BEYOND_ARISTOTLE. Accessed: 08/5/2015
- Zwart, H. A. E. (2018) 'In the Beginning was the Genome; Genomics and the Bi-textuality of Human Existence'. *The New Bioethics*, Vol. 24 (No. 1), pp. 26-43

Non-authored sources

‘About asexuality’. Non-authored article on the Asexual Visibility and Education Network (AVEN) website: <https://www.asexuality.org/?q=overview.html>. Accessed 04/06/2018

‘Asperger syndrome: What is Asperger syndrome?’. Non-authored article on the UK National Autistic Society website: <http://www.autism.org.uk/about/what-is/asperger.aspx>. Accessed 04/06/2018

‘Central dogma reversed’ (1970). Non-authored editorial. *Nature*, Vol. 226, pp. 1198-1199

‘design’. Non-authored entry in the Online Etymology Dictionary: <https://www.etymonline.com/word/design>. Accessed 04/06/2018

‘development’. Non-authored entry in the Online Etymology Dictionary: <https://www.etymonline.com/word/development>. Accessed 04/06/2018

‘envelop’. Non-authored entry in the Online Etymology Dictionary: <https://www.etymonline.com/word/envelop>. Accessed 04/06/2018

Human Development and Capability Association (HDCA): <https://hd-ca.org/>. Accessed: 04/06/2018

‘International Consortium Completes Human Genome Project’ (2003). Non-authored article by the National Human Genome Research Institute (NHGRI). Available at URL: <https://www.genome.gov/11006929/2003-release-international-consortium-completes-hgp/>. Accessed: 03/06/2018

‘prescribe’. Non-authored entry in the Online Etymology Dictionary: <https://www.etymonline.com/word/prescribe>. Accessed 04/06/2018

‘You, in 130 volumes: entire human genome in printed form’. Non-authored article, University of Leicester online News and Events Archive. URL: <https://www2.le.ac.uk/news/blog/2012/december/you-in-130-volumes-entire-human-genome-printed-for-exhibition>. Accessed: 12/4/2018