

ABSTRACT

Is That My Heart? A Hylomorphic Account of Bodily Parthood

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This dissertation investigates the metaphysics of human body parts; particularly, the epistemic conditions under which something can be said to be a “body part of” some particular human being. In this dissertation I draw on the hylomorphism of Aristotle and John Duns Scotus to argue that a necessary and sufficient condition on human bodily parthood is an object’s functioning for the sake of the whole human being and the maintenance of her biological life. I argue that, on this view of bodily parthood, at least some prostheses or artificial organs (“artificial body parts”) are truly body parts of the human beings in whom they operate. I defend this view in reference to both Aristotelian and Scotistic hylomorphism, as well as answering objections raised by some contemporary views of bodily parthood as merely conventional. I argue that this has important implications for medical ethics, including potentially restricting medical interventions in end-of-life care and heightening the legal ramification of damage done to prostheses. I argue that investigation into the metaphysical questions surrounding body parts and their composition can illuminate hitherto underappreciated dimensions of ethical questions in medicine.

Is That My Heart? A Hylomorphic Account of Bodily Parthood

by

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DEDICATION

To my father, the first person I hoped to resemble; my husband, the first person I want to tell my ideas to; and Dr. Alex Pruss, the first teacher who showed me how to be a philosopher.

“Not that I have already obtained this or have already reached the goal; but I press on to make it my own, because Christ Jesus has made me his own.” – Philippians 3:12

CHAPTER ONE

Introduction

“I might say, ‘I’m going to put my eyes in’” – a prosthetic lens user, in personal correspondence

Perhaps the above statement sounds a bit jarring. Most of us think our eyes are fixed in their sockets. If we were to investigate the relevant anatomy, we would further learn that our eyes are typically held in their sockets by the medial and lateral rectus and the set of superior and inferior oblique and rectus muscles. On this basis, we might conclude, eyes can’t be “put in” or “taken out” in any ordinary sense of the terms.

But suppose that one is a prosthetic lens (or prosthetic eye) user: what exactly is such a user “putting in” or “taking out”? A simple answer: it is a tool or device that performs one or more biological functions of a typical eye, that cellularly composed object typically fixed in an eye socket. One might think that the prosthesis *acts as* the lens of the eye, communicating visual information to the brain, but it is not *actually* that user’s lens. The user’s actual lens is mal- or non-functioning, and the tool is meant to compensate.

Thinking of a similar kind of device, England et.al. (2007) write, “In philosophical terms, there are currently two obvious ways to try to understand ICDs [implantable cardioverter-defibrillators]¹. First, they may be considered a treatment,

¹ An ICD is a device used to regulate one’s heart rate. It tracks heart rate and, if it detects abnormal rhythms, can administer a shock to reregulate the heart.

comparable with other mechanical medical devices ... Second, they may be compared with biological transplants; *considered, in other words, as a part of the body.*² Medical ethics to date has tended to fix two poles: there are biological transplants at one end, which are almost universally accepted as becoming parts of the body into which they are transplanted, and medical devices, such as ventilators or dialysis machines, that are commonly viewed as *not* becoming body parts. But how should the prosthetic lens user view her lenses? They are not biological transplants; are they therefore akin to a ventilator? And what reasons do we have for thinking ventilators cannot be body parts?

Perhaps we can be helped by considering a few thought experiments:

1. **Partial Cells:** Due to a rare condition, the mitochondria in my cells are malfunctioning. Highly skilled cellular biologists and biochemists work to replace the malfunctioning mitochondria in my cells with the healthy mitochondria of my friend. After the treatment is complete, my cells have as a part the mitochondria from my friend. My friend argues that I cannot in turn donate my organs or blood without first obtaining his consent, because my organs include his mitochondria, and he only consented to their being used by me.
2. **Artificial Womb:** A woman is unable to bear children in her own uterus but is able to make use of an artificial womb, which is attached to the woman via external tubing (imagine the artificial womb makes use of the woman's blood for oxygenation and nutrition). While the child is developing, a passerby intentionally knocks the artificial womb over (no harm ultimately resulting to the child). The woman argues that this constitutes a case of assault because the artificial womb is her body part.
3. **Gradual Brain Transplant:** Suppose that my brain is slowly degenerating. Each time a section of my brain dies, doctors are able to replace it with a functionally identical and wholly artificial section. Eventually, my entire brain has been replaced in this fashion. A close friend argues that I no longer have a brain, and therefore according to the whole-brain death criterion, I have died. He holds a funeral for me.³

²Ruth England, Tim England, and John Coggon, "The Ethical and Legal Implications of Deactivating an Implantable Cardioverter-Defibrillator in a Patient with Terminal Cancer," *Journal of Medical Ethics* 33, no. 9 (September 1, 2007): 538–40, <https://doi.org/10.1136/jme.2006.017657>, emphasis mine.

³ There is discussion of these kinds of brain transplant cases across the philosophy of mind literature. Consider, for example, David J. Chalmers, "Absent Qualia, Fading Qualia, Dancing Qualia," in *Conscious Experience*, ed. Thomas Metzinger (Schoningh/Imprint Academic., 1995), 309–28, <http://cogprints.org/318/>.

Intuitions in these cases can be difficult. For example, in (3), it seems at first that small-scale replacement of some brain matter with artificial material is unproblematic. We could imagine that at first the replacement is the equivalent of a few key neural connections. This hardly seems to disqualify my brain from being my brain *or* being part of my body. But at some point, it seems there has been some shift, because a brain comprised entirely of noncellular material seems not to be a body part (not a “genuine” brain) but something more like a small, highly impressive computer. And it seems to many that a computer cannot be my brain.⁴ Thus we might ask, not whether we survive such a replacement (this will be debated), but whether upon surviving we are brainless, or have a (very differently composed) brain?

Similarly, variations of case (2) suggest confusion about the importance of something’s being “in” us, where “in” refers to within the boundary of our skin or within our musculo-skeletal structure. Imagine that at first, the artificial uterus is within the woman in the same position as a biological uterus. Then, imagine that the artificial uterus gradually moves outward, and in the middle case it is permanently adhered to her skin, but not positioned underneath her pelvic bones, etc. Finally, the artificial uterus is placed entirely outside her skin (perhaps in another room of her house or even in a hospital). Has the uterus’ change in location with respect to other disjoint parts of this person’s body changed its status as a body part? It might seem that being located “wholly outside” an individual’s body (perhaps understood by the boundaries of the skin) compromises its

⁴ Importantly here, I do not mean to suggest that we (in the sense of the person) could not survive gradual replacement of our brains with a computer. The relevant question is not our persistence, but the identity of the object in our head performing intellectual (and other) functions: *is that object* the brain of the individual in whom it functions?

parthood. But imagine that in a terrible swordfight I am wounded, and parts of my intestines protrude out of my body. The change in location of my intestines (or parts thereof) from within my body to without does not seem to make a difference as to whether those intestines are still my body parts. It would seem impossible to make a defense of trampling on them as I lie on the ground by claiming that “they aren’t part of her anymore, so it’s not assault!” Similarly, the skin itself, the nerve endings of teeth, and hair are all plausibly body parts that exist at or outside the skin boundary.

One reasonable response to these kinds of thought experiments is to deny that there *is* any fact of the matter about bodily parthood. Perhaps bodily parthood—if there even is such a relation—is a matter of context: what counts as my body part will depend on the situations in which such a question is relevant. Or one might argue that the more relevant ethical relation is ownership, our bodies functioning as (or in fact being) pieces of (plausibly very valuable) property. Legally, there is some precedent for treating body parts as property. In the precedent-setting case *Moore v. Regents of the University of California*, plaintiff Moore argued that cells and fluids his doctor had harvested without his consent and turned into a profitable cell line constituted stolen goods. The court in that case declined to extend tort conversion (that is, treatment of the cell line generated out of Moore’s progenitor cell as his property), claiming that “Moore did not have any ownership over his cells following their removal”.⁵ In a similar case, a Florida District

⁵ “Patent Rights in Biological Material,” *GEN - Genetic Engineering and Biotechnology News* (blog), October 1, 2006, <https://www.genengnews.com/magazine/57/patent-rights-in-biological-material/>. Interestingly, the view this dissertation ultimately defends will deny that cells removed from a person’s body are that person’s body parts, but is open to the possibility that the person retains a relationship *something like* ownership over them. Perhaps the property relation is not appropriate, but there is an analogous relation that should be respected.

Court ruled that it was permissible to patent a gene isolated from a patient's tissue, and that the patient in question did not have a property claim for the patent.⁶

But our ethics—legal indications of this notwithstanding—clearly hold that there is a non-trivial relationship between human beings and their body parts. There is real disagreement, for example, over whether or not the selling of organs is permissible; this seems to depend (at least partially) on how we think we ought to relate to our own and others' bodies. Additionally, our bodies are not treated generally as “very valuable property,” since we often argue that it is *impossible* to own or purchase another person's body (as this constitutes slavery⁷), no matter the price offered. And one can extend this argument to body parts (as some do in the case of organ sales): if one could sell body parts, then I could sell each of my cells individually, and eventually all parts of my body would be owned by one or more other persons. But it is impossible for my body to be owned by another person (slavery). So, it is impossible to sell body parts.

The above argument does not prove that organ sales are wrong; it does suggest that our ethics reflects a need for the bodily parthood relation, given how it can change the valence of our ethical decisions. More specifically, in medical ethics the question of whether something is a body part of a patient can (on some prominent views⁸) change the

⁶ Ibid.

⁷ One might think that ownership of the body is insufficient for slavery, since (at least on some views of the human person), owning one's body does not entail owning one's soul. So perhaps I still own my soul. But I take it that at least in most cases, we think that owning a person's body is connected at least in some meaningful way to commanding their actions or having the ability to force the individual to act in certain ways. Even if true slavery requires something like soul-ownership, I take it that we still think the ownership of one's body by another person is still wrong.

⁸ For a brief overview of ongoing discussion about active and passive euthanasia (and physician-assisted suicide), see the American Medical Association (AMA)'s *Code of Medical Ethics*, chapter 5, “Caring for Patients at the End of Life”.

nature of an action from “letting die” to “killing” (or vice-versa). For example, if a mechanical ventilator is *not* my body part, turning the ventilator off might be plausibly described as an action of “stopping medical treatment” rather than “killing” (even if the act of turning off a ventilator is the direct cause of my dying). However, if an artificial heart (or an artificial heart part, like a valve) *is* my body part, then turning off the device might be more properly described as killing me, as when a person stabs me in the heart.⁹

Consider, too, how many arguing in the medical ethics literature resort to *metaphysical* criteria for determining appropriate ethical treatment. Swetz et al. (2011) claim that in some cases a treatment “literally” becomes part of a patient’s body just in case it fulfills the criteria listed: the treatment or object “replaces a lost organ function, responds to physiologic changes, and is independent of external energy sources and the control of an expert (i.e., porcine heart valve).”¹⁰ Swetz’s list in fact gestures at a set of conditions for bodily parthood, but without defending the necessity or sufficiency (whether individual or joint) of the conditions.

Thus, while it might reasonably seem that there is no fact of the matter about bodily parthood, it also seems clear that an appeal to metaphysics is necessary to resolve some of these ethical disputes. When the woman in case (2) above argues that knocking over the artificial uterus constitutes assault because it is her body part, the justification of

⁹ This requires acceptance of a real distinction between killing and letting die, which is largely found in views on which passive euthanasia is acceptable but active euthanasia is not. The AMA, for example, holds such a view, but a philosopher like James Rachels, “Active and Passive Euthanasia,” *N Engl J Med* 292 (1975): 78–80. rejects this distinction and so might not think the metaphysical status of the ventilator is relevant to the question at hand.

¹⁰ Keith M. Swetz et al., “Palliative Care and End-of-Life Issues in Patients Treated with Left Ventricular Assist Devices as Destination Therapy,” *Current Heart Failure Reports* 8, no. 3 (September 1, 2011): 215, <https://doi.org/10.1007/s11897-011-0060-x>.

her claim turns in part on whether that object in fact stands in the bodily parthood relation to her. A host of other ethical questions turn on our understanding of how material objects can—and if they can—become our body parts.

Yet while many metaphysicians specializing in personal identity for human beings note the existence of a body, and perhaps whether or not that body is essential for survival, far fewer investigate the composition of that body and the conditions of something's being part of it. A notable exception is Peter van Inwagen, whose answer to the so-called "Special Composition Question" (when do some parts compose a whole) turns specifically on his understanding of a *life* and an *organism*.¹¹ van Inwagen thus takes up, by virtue of his definition of when a whole is composed, questions about the nature of organisms and to some extent the nature of bodies. However, van Inwagen's treatment of the body in particular is nonetheless largely incidental to his larger project on composition.

In debates concerning identity persistence, metaphysicians may take up questions of the body insofar as it does or does not indicate the persistence of the person in question. Thus a dualist might argue that a human being is soul and body (identity being tied to the soul only), or an animalist might argue that the human being "goes where the body goes" in certain brain transplant cases. However, these arguments do not develop robust accounts of what it is to be a body part of some particular human being.

It is this question that I aim to answer in this dissertation. For in order to know whether or not a prosthetic lens user is *in fact* putting in her eyes, or whether *in fact* a

¹¹ Peter van Inwagen, "The Proposed Answer," in *Material Beings* (Cornell University Press, 1990), <http://www.jstor.org/stable/10.7591/j.ctt1jkrm2.12>.

person with an artificial heart is “heartless,” we must know how the bodily parthood relation operates. What kinds of things can stand in this relation? When and why do they come to stand in it? By investigating these questions, I will argue, we can illuminate debates in medical ethics about end-of-life care, bodily integrity and personal injury, and others, albeit without fully settling these debates.

I have limited the scope of my investigation to one theory of personal identity, namely, hylomorphism. I take the most basic tenet of an Aristotelian-inspired hylomorphism to be that a human being is a compound of form and matter (called in the case of living things, soul and body). In Aristotelian hylomorphism, essential facts about the body are fixed by other metaphysical facts about the soul, given that the soul is the substantial form of the body. What makes the body be what it is—a human being’s body rather than a heap of matter—is the soul’s configuring activity (though this is variously defined). To the question “What is a human being’s body part?” a hylomorphist replies at the most general level: “that matter which is informed by the human soul.” It is then up to the hylomorphist to give a defensible account of what matter can be so informed, and the conditions under which it is.

Of course, hylomorphism isn’t the only view of the human person which seems to call for a realist account of bodily parthood. Many non-hylomorphic animalists—including a number of materialist animalists¹²—will also want to have an account of what counts as a body part of an animal (or not), and perhaps some substance dualists will also seek such an account.¹³ But Aristotelian metaphysics is perhaps, of all the most common

¹² See Allison Thornton (2016), “Varieties of Animalism,” (*Philosophy Compass* 11.9: 515-526).

¹³ Should a substance dualist deny that the human being is partially composed of the body—arguing that the human being is essentially a soul—then something’s being a body part of me will not entail

metaphysical systems, the one that treats life as particularly special and distinct. The Aristotelian is the most likely, we might say, to deny that prosthetics or artificial organs of any kind could be body parts, given the emphasis such metaphysics places on the difference between “living” and “nonliving” things. But if I can show, as I hope to do, that an Aristotelian can consistently accept at least some prosthetic or artificial body parts as real body parts, there is good reason to think other metaphysical systems can do the same.

In Chapter Two of this project, I argue for a restricted view of bodily parthood in two ways. First, I argue against one view (prominent among some medical ethicists and theorists) that bodily parthood is subjectively defined, either by an individual or by a community. Second, I argue against what is often termed the “Extended Mind” view (a thesis originally outlined by Clark and Chalmers¹⁴ that *any* object taken up as an aid to a human task becomes part of an extended cognitive system and thus a part of the human being (and therefore of his or her body). I then briefly outline my core thesis: bodily parthood is defined by the performance of functions that aid in the sustainment of a human being’s biological life and is restricted additionally by the need for body parts to be integrated and interdependent on one another.

In Chapter Three, I argue that my thesis is compatible with two distinct hylomorphic views in the history of philosophy. First, my thesis is compatible with—and perhaps the best interpretation of—Aristotle’s own treatment of body parts, particularly

that it is a part of me simpliciter. The same will apply to accounts of the human person on which persons are a set of psychologically continuous states.

¹⁴ Andy Clark and David Chalmers, “The Extended Mind,” *Analysis* 58, no. 1 (1998): 7–19.

in his biological works. Second, my thesis accords with the hylomorphism of John Duns Scotus, whose view of body parts was outlined in response to problems he identified in the rival accounts of Thomas Aquinas and others.

Having outlined these two historical views, and demonstrated my own thesis's compatibility with them, I argue in Chapter Four that in fact both these views could accept prosthetics and so-called artificial body parts as true body parts of the human being in whom they operate. Contemporary hylomorphists have argued more explicitly against the acceptance of prosthetic body parts, so I take up their complaints in this chapter.

In Chapters Five and Six, I turn from the core defense of my functionality thesis (having argued that at least some artificial parts are indeed body parts) to related epistemological and ethical concerns. In chapter five, I argue that my account depends primarily on biological evidence of function, rather than on a user's experience of an object as "connected to" or "one with" her body. I argue that while this experiential and testimonial evidence provides some *pro tanto* justification for thinking something is (or is not) a body part, this evidence is defeasible. In chapter six I take up some specific problems in medical ethics related to body parts: end-of-life care (including turning off devices that interact with the body in more or less direct ways); personal harm and property damage; and human enhancement. While my thesis may not resolve every problem completely, it will resolve some of the most pressing ethical dilemmas. Because my dissertation will shed light on these problems, it will also reveal the importance that metaphysics has for ethics, particularly medical ethics. Better understanding of the

human being, especially in its details, will provide more informed reasoning about issues that continue to become ever more important in contemporary medical settings.

CHAPTER TWO

Arguments for Restrictions on Bodily Parthood: Function over Convention or “Extended Minds”

Introduction

There *is* a fact of the matter, I will argue, about bodily parthood. Some objects do stand in the bodily parthood relation, and others do not. In this chapter I turn to the question whether, and if so, how, bodily parthood should be restricted. I then offer an initial defense of my hylomorphic thesis about bodily parthood: namely, that function is the determinant of bodily parthood.

First, I will argue that bodily parthood is not determined by either personal or social convention. That is, the metaphysical facts at issue in this dissertation are not facts about our personal or social constructions. I will consider two related views in this section. On the first view, bodily parthood is determined by the individual’s own attitude about the candidate body part (call this the Personal Attitude, or PA, view). On the second, bodily parthood is determined by intersubjective agreement about what counts as a body part (call this the Social Convention, or SC, view). On SC, the relevant perspective is not only my own but also includes the perspective of the culture and community in which I reside. Thus, while proponents of SC could reject PA, they would also reject a view on which these facts are determined outside of any particular perspective. In this section, I’ll argue against both views. If bodily parthood is not a socially or personally constructed relation, then it will depend on facts besides personal or social attitudes. These facts will be the focus of the account I develop in later chapters.

Section One: Resisting Conventional Views of Parthood

At first, rejecting the PA and SC views might seem trivial. Most of us do not have occurrent, conscious attitudes towards those objects that seem paradigm cases of body parts, and perhaps have never had or considered having such attitudes. Similarly, broader social attitudes about bodies do not tend to make explicit claims as to the status of hearts, livers or kidneys as body parts. Why would it matter, metaphysically, whether I (or we) think my pancreas is my body part or not?

First, however, such views need not require particular, occurrent, conscious attitudes towards the body parts in question in order for them to be parts. One could argue instead that what is necessary is a counterfactual: *were* I (we) to consider some material object X, I (we) *would* form the attitude “this is my body part” and that is sufficient for the object to count as part of my body. Or one could argue that our conscious attitudes set conditions for bodily parthood, but we do not also determine what satisfies such conditions. So if a person says that everything within the boundary of her skin (including her skin itself) is a body part, then her kidneys will satisfy these conditions even if she was unaware that she has kidneys. Both of these possibilities maintain the core commitment to parthood being subjectively determined while explaining those paradigm body part cases where the person forms no *particular* attitude, but we still take the object, for example a liver, to be that person’s body part.

Considering views under which bodily parthood is subjective is particularly relevant for the medical ethics cases that motivate this project. For example, Paola and Walker argue that in the borderline “biofixture” cases like the LVAD or artificial heart,

we should use the patient's own attitude in order to determine the device's status.¹⁵ What is unclear is whether their view is committed to the metaphysical claim that the artificial heart will be or not be a body part based on the patient's attitude, or the weaker ethical claim that we should treat the artificial heart *like* the patient's other body parts based on patient attitudes. This second, weaker claim may be perfectly compatible with the denial of the metaphysical claim. Here I only argue with respect to the metaphysical claim.

The Personal Attitude View

What is the personal attitude (PA) view? Paola and Walker argue that the question of whether a patient's ICD (internal cardiac defibrillator) is his body part depends on, at least in part, how the patient understands the device. They use an analogy from fixtures law¹⁶ which itself "depends on the intention of the 'annexor'"¹⁷. While Paola and Walker restrict their ontological claim to only those devices about which there is disagreement, we might express their view in the following (simplified) form:

Material object X is a body part of some human being Y if Y views X as her body part.

As mentioned above, we ought to nuance this view slightly, given that (probably) none of us has the requisite occurrent attitudes towards body parts that such a strong reading would require. Thus we might employ the counterfactual condition:

Material object X is a body part of human being Y if Y's attitude, were Y to consider X, would be one of viewing X as her body part.

¹⁵ Frederick A. Paola and Robert M. Walker, "Deactivating the Implantable Cardioverter-Defibrillator: A Biofixture Analysis.," *Southern Medical Journal* 93, no. 1 (January 2000): 20.

¹⁶ 22.

¹⁷ 22.

While I have rendered their argument in terms of whether a human *views* something *as* a body part, Paola and Walker reference the “intentions” of the patient (analogous to how the intentions of the annexor matter to decisions in property law cases). It is not entirely clear on either a strong or weak reading of this view what it would mean for a human being to have an intention towards a material object being her body part. Does the intention refer to the object performing a particular type of function (I intend that machine to breathe for me, I intend that hook to grasp doorknobs and car doors)? Does it refer to a type of integration the agent wants the object to have with the rest of her body (suppose that I intend that a hook be attached to my wrist, or a machine to my trachea)?

The intention (or whatever mental posture implicit in a PA view) has to be more specific than either of these candidates. We intend all kinds of tools to perform functions for us, even functions that we might otherwise perform with a body part (think of a calculator doing an addition problem for you rather than you working it out on paper), without thereby intending those tools to become our body parts even temporarily. Similarly, it seems like we can intend something to be integrated with our body without intending that it be our body part. For example, suppose that I want to better understand my digestive system, and so I intentionally have a tiny camera installed in my body. My intention is that the camera be integrated with my body, to take data and report it back to me, but I don't thereby intend that the camera be my body part.

But this is not insurmountable. Perhaps all the holder of PA needs to show is that it is possible to have a specific intention for something to be a body part, which may or

may not include some combination of function-performing, integration or colocation with other body parts.

But consider the following *reductio*. Assuming that PA is true, my viewing something as a part of my body is sufficient to make it the case that it is my body part. Now suppose that I view the Moon as my body part. Surely that does not make the case that the Moon is my body part. If it were my body part, then I would need to give my consent to allow NASA to take a sample of rock from the Moon for testing (just as I consent to my blood being drawn). But surely that is absurd; NASA does not need to ask my permission to take a rock sample from the Moon.

Or consider another case. Suppose a slave owner claims that the bodies of his slaves are “part” of him, which in part gives him permission to treat them in a particularly cruel way (something like autonomy over his own body would be used as the relevant moral principle). Surely that person’s attitude towards the slaves does not make it the case that their bodies are parts of his.

One could worry that I have characterized the PA view too strongly in terms of intentions. Rather, one might suggest that what the PA view is trying to capture is that bodily parthood is a matter of phenomenology, the *experience as of* some object being one’s body part. So rather than focus on conscious attitudes or intentions, one should focus instead on a person’s experience of their body and its boundaries.

But consider body illusion cases. Body illusion cases are generated when testers set up illusions such that the participants are induced to feel as though a material object (including another person’s body part or whole body) is their body part that, plausibly, isn’t. As Frédérique de Vignemont observes, “participants report feeling as if a body part

belonged to them while judging that this is not their own body part.”¹⁸ In illusions like the Rubber Hand, patients claim that the rubber hand is their own after having their own hand hidden and both their hand and the rubber hand simultaneously stimulated. Petkova and Ehrsson (2008) report successful experiments in which healthy volunteers “can indeed experience other people’s bodies, as well as artificial bodies, as being their own.”¹⁹ Is it the case that these volunteers gained additional bodies in the experiments?

Similarly, in syndromes of bodily alienation, patients report feeling as if their own limb did not belong to them while also judging that it is in fact their limb. That we have (and demonstrate) a capacity to distinguish between a phenomenology or experience of something’s belonging to us *qua* body part and a judgment of that thing *as being* a body part is some reason to think that the phenomenology should not be treated as a sufficient criterion for determining bodily parthood.

If our phenomenal experiences determine our body parts—if my feeling that the rubber hand is my very hand—then it seems as though I have undergone a metaphysical change in the Rubber Hand experiment: I now have an additional hand. What, then, explains the disagreement within the patient’s attitude between *feeling as though* the rubber hand were her own and *judging* that it is not? Perhaps one could say that bodily parthood is constituted by a phenomenal experience that is not contradicted by a judgment. But again, we can imagine cases where a person has a phenomenal experience

¹⁸ Frédérique de Vignemont, “Bodily Awareness,” in *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta, Spring 2018 (Metaphysics Research Lab, Stanford University, 2018), <https://plato.stanford.edu/archives/spr2018/entries/bodily-awareness/>.

¹⁹ Valeria I. Petkova and H. Henrik Ehrsson, “If I Were You: Perceptual Illusion of Body Swapping,” ed. Justin Harris, *PLoS ONE* 3, no. 12 (December 3, 2008): 1, <https://doi.org/10.1371/journal.pone.0003832>.

of the moon being her body part, and judging that it is the case, but we nonetheless want to deny that either her phenomenal experience or judgment are veridical.

Some proponents of a PA-like view restrict the class of possible body parts to avoid easy counterexamples. For example, Daniel Sulmasy argues that there are two guiding principles that determine what kinds of biotechnical devices could be body parts: (1) that interventions that are regulative are never “self” and (2) some, but not all, constitutive therapies are distinct from the self.²⁰ On this view, some material objects are excluded from being body parts regardless of the attitude I form about them. One could argue that, for example, something can only be a body part if it performs certain functions for the whole human being, suitably defined, and only within this class of function-performing objects does my phenomenal experience become relevant. This might eliminate the illusions where someone describes feeling as though some material object is their body part when we would judge that it is not (either because we judge it is someone else’s or it is not a body part at all). But it does not seem to solve the worry of rejecting as alien things which seem to be body parts. The insufficiency of my phenomenal experience seems to run both ways: I can mistakenly exclude things that are properly my parts, and I can include things that are not. Moreover, if restricted in the right way, phenomenal attitudes start to seem superfluous to the question of body parts altogether, the more relevant question being why the class of potential body parts is restricted in such-and-such a way and evaluating whether the “right” objects are within the class.

²⁰ Daniel P. Sulmasy, “Within You / Without You: Biotechnology, Ontology, and Ethics,” *Journal of General Internal Medicine* 23, no. S1 (January 2008): 71, <https://doi.org/10.1007/s11606-007-0326-x>.

Paola and Walker restrict the scope of the personal attitude criterion to cases of reasonable disagreement over whether some object is a body part. “We believe that, in cases where reasonable persons could disagree over the ontologic status of a medical device, the patient or surrogate should be permitted to determine its status as a bio fixture...”²¹ But if personal attitudes are irrelevant in the non-controversial cases, why think that they suddenly gain metaphysical import in the controversial ones? Suppose that one has a society in which it is controversial (in the Paola and Walker sense – there is reasonable²² disagreement) whether slaves are parts of the body of their master. One could imagine a situation in which a master, suffering from heart failure, continues to live through the manual labor of the slaves pumping blood through his body. In such a case, on the Paola and Walker view, the personal attitude of the master *would* matter to whether the slaves were *actually* his body parts, because we would be in a context of reasonable disagreement. But this seems clearly problematic: it should not make a difference in this kind of case whether the master thinks that the slaves are his body parts, even if there is reasonable disagreement in the society.

Or consider this case: I have on the table in front of me an allogeneic human heart (on ice, awaiting transplant) and an artificial heart. There is (at least in the literature to date) much less disagreement about the allogeneic transplant being my body part after transplant than there is about the artificial heart. Most of the discussion about bodily parthood, in fact, occurs in the context of considering artificial devices rather than

²¹ Paola and Walker, “Deactivating the Implantable Cardioverter-Defibrillator: A Biofixture Analysis.,” 22.

²² In such a case, presumably, the criterion for reasonableness would come from within the society, since we tend to think now that there cannot be *reasonable* disagreement about whether slaves are body parts—or parts in any sense—of their masters.

traditional biological transplants. But when the two objects are in front of me, neither are my heart *right now* (assumedly, I still have a heart when I am looking at them). In that respect, they are similar.

If Paola and Walker are correct, then my attitude toward these material objects makes a difference in only one case - the artificial heart. But why should this be? Why should my rejection of the artificial heart be sufficient to make it a mere medical device, while my rejection of the allogeneic heart would not make the same difference? Perhaps one could argue that my attitude is only relevant in the case where the object's composition or matter is substantially different from the matter of which I am composed. While I cannot reject something made of human cells (as the allogeneic heart is), the argument might go, I can reject or accept something made of a non-traditional material. This does not help in the slavery case outlined above, however, since the slave is made of the same kind of matter of which the master is composed. So it seems that the attempt to restrict personal attitude to making a difference in only some cases falls short.

PA has the advantage that it follows a common intuition that medical devices should be treated according to the patient's attitude. But consider the allogeneic transplant again. Suppose a patient rejects the transplant, demanding that the doctor take the heart out and give it to someone else, and argues that because it isn't his body part, the doctor isn't killing him, merely letting him die. Most who hold the intuition about patient attitudes towards mechanical devices, I imagine, will reject the idea that a doctor is justified in cutting an allogeneic heart back out of a patient, even if the patient claims that the heart is not part of his body. But if patient attitude really does make a substantial difference, then why the disanalogy between the two cases? What more likely accounts

for our thinking that patient attitudes make a difference, I think, is that patients sometimes describe feelings of alienation from prostheses or artificial organs. And this is evidence of their experience of their body as their own. But, as I argue in Chapter Five, the metaphysics of bodily parthood is not reducible to the experience of embodiment.

Felicitas Kraemer nuances the PA view along phenomenological lines. She argues that what is *important* in the debate about left ventricular assistance devices (LVADs) and other types of technological intervention is whether that device “is phenomenologically experienced as part of the body proper.”²³ But of course, we could imagine a young child—say, 1 year old—who has such a device. The child has no phenomenological attitudes about the device, and it seems unlikely that there is a counterfactual fact about the attitudes the child *would* have, and certainly not one that could play any kind of role in the ethical decision-making.²⁴ So perhaps it is better to say that, when making ethical decisions, we make use of all available information. That information may or may not include phenomenal experiences related to embodiment. But that information, while helpful, is not necessary *at least* for making ontological determinations, and perhaps also for making some ethical ones.

I will take up the question of what difference our ontology might make to the ethics of these devices in chapter six. For now, it suffices to note how Kraemer’s points

²³ Felicitas Kraemer, “ONTOLOGY OR PHENOMENOLOGY? HOW THE LVAD CHALLENGES THE EUTHANASIA DEBATE: Ontology or Phenomenology?,” *Bioethics* 27, no. 3 (March 2013): 141, <https://doi.org/10.1111/j.1467-8519.2011.01900.x>.

²⁴ A personal note: my son Jackson received a tracheostomy tube at 3 weeks old. I think it reasonable to say that, in my observation of him over the past 4 years, Jackson has no weighty phenomenological views about his trach. He does have reactions to the manipulation of the tube (when changing it, or if another child pulls at it) that seem to mirror how he responds to the unwanted manipulation of other parts of his body. But I think these reactions do not determine whether or not the trach tube is his body part.

are compatible with there being a “fact of the matter” about human body parts. One can accommodate Kraemer’s point about the importance of phenomenology (such as de Vignemont and others’ notion of bodily awareness) for *ethics*, while still maintaining that the ontology here is not reducible to phenomenology. An attitude or experience of some X as a body part is neither necessary nor sufficient for that X to be so, ontologically speaking.²⁵

The Social Convention View

One might accept that a personal subjectivity is insufficient to determine bodily parthood without concluding that parthood is a wholly objective matter. On what I call the Social Convention (SC) view, bodily parenthood is a matter of intersubjective agreement. What things are or are not our body parts, on this view, depends not on some individual’s notion of what is or is not her body part, but on what we (a community or society, presumably) collectively *agree* counts as a body part.²⁶ While my viewing my prosthetic leg as a part of me would not determine its parthood, a more general social consensus that (a) prosthetic limbs were body parts would.

The idea that the body is a social construction is not new. Consider Anthony Synnott (1992)’s comments on the Oxford English Dictionary’s definition of the body:

²⁵ Especially worth observing, perhaps, is that we lack bodily awareness for many of our organs—had we not been told, none of us would know that we had kidneys, let alone have any felt awareness of them! Our bodily awareness, it seems, is strongest for sensory organs, manipulative ones, or organs whose functions are felt (breathing, heartbeat, etc.). I’m grateful to Dr. Alexander Pruss for making this observation to me.

²⁶ The identity of the community on this view will or could presumably vary. It might be as large as the global society or as small as a family. Lynn Jansen (2006), whose view is the one I take up most prominently here, does not specify who constitutes the “we” to which she refers.

Yet even this [OED] spare definition raises questions. What constitutes, and who defines ‘the whole’? Opinions differ. Some would include hair and nail-clippings, spilled blood and feces, defining them as the body in another place, and some include the shadow; others would not.²⁷

In “The Social Construction of Medicine and the Body,” Deborah Lupton notes that at one end of the social construction spectrum is the idea that “it is impossible to extricate physical bodily experiences from their sociocultural contexts...”²⁸ However, she claims that even this most extreme view is “not to argue that the material world or ‘real’ phenomena such as pain, disease or death do not exist. Rather,” she claims, “it is to contend that we can only ever know, think about, and experience these realities through our specific location in society and culture.”²⁹

I return to this claim—that our epistemic access to the body is social and cultural—in chapter five. Sufficient for my purposes here is to dispute the ontological question. There is a significant distinction to be made between something’s being a body (or a body part) in virtue of its being socially recognized as such on the level of ontology, and another thing for something to be *understood* to be a body part, or *viewed as* a body part (on an epistemological and perhaps psychological level). Here, I want to argue that bodily parthood does not depend on personal or social attitudes, even if our treatment of those same material things does.

²⁷ Anthony Synnott, “Tomb, Temple, Machine and Self - the Social Construction of the Body,” *British Journal of Sociology* 43, no. 1 (March 1, 1992): 80.

²⁸ Deborah Lupton “The Social Construction of Medicine and the Body,” in Gary L. Albrecht, Ray Fitzpatrick, and Susan C. Scrimshaw, *The Handbook of Social Studies in Health and Medicine* (SAGE, 2003), 50.

²⁹ Albrecht, Fitzpatrick, and Scrimshaw, 50.

Lynn Jansen appears to hold the stronger, ontological view that our bodies are determined by our social conventions. She expressly rejects the PA view—“a person cannot make just anything a part of herself just by identifying with it”³⁰—and agrees that a person “can be mistaken about the boundaries of their own selves.” Instead, Jansen posits that the self is fixed by “our concepts and conventions.”³¹ So while, to use her example, a person cannot make a hospital bed a part of herself merely by identifying with it, the reason for this is intersubjective: *our* current conception of a self does not permit this. If we had a different concept, then, she says, “we would draw the boundaries of the self differently than we do.” She concludes that “beyond this level of intersubjective agreement, there is no deeper fact of the matter as to what it [sic] is a part of and what is external to the self.”³² Given this, she argues that the concept of the self at issue is subject to vagueness and that in many cases we might lack a determinate answer to whether some material object is part of a person’s self.³³

Such a robust version of a conventional view (whether personal or social) seems only compatible with dualism. For unless we hold a view of human persons whereby they are *not* identifiable with their bodies, we could not identify the convention-makers without identifying some of their body parts (brains, mouths, etc.)³⁴. This is true, for example, on a strong dualism where a person is identified *with* her soul, or perhaps on a

³⁰ Lynn A. Jansen, “HASTENING DEATH AND THE BOUNDARIES OF THE SELF,” *Bioethics* 20, no. 2 (April 2006): 109, <https://doi.org/10.1111/j.1467-8519.2006.00481.x>.

³¹ Jansen, 109.

³² Jansen, 109.

³³ See Jansen, 110.

³⁴ Again, I am grateful to Dr. Pruss for pressing this point.

dualism where the soul defines the identity of the body-soul composite, without need to reference any details of the body. On such views, the bodily parts can be conventional without any threat to personal identity. But this conventional approach is, it seems, incompatible with views of the human person such as more traditional hylomorphism, on which we are body-soul composites (but where the bodily parts are needed to partially explain personal identity), or animalism, on which we are (presumably) embodied animals.

Notwithstanding this note about the relationship of the SC view to personal identity view more generally, there are several problems worth noting with respect to Jansen's view and the SC view. First, there is no way to determine *which* community is relevant for the determination of bodily parthood. Suppose that I am a member of two distinct communities, one of which fully accepts that prosthetic limbs are body parts and one of which denies it. Suppose that I have a prosthetic leg. If bodily parthood is a matter of intersubjective agreement, then it seems that my prosthesis will undergo metaphysical change as I travel from one community to the other. But, similarly to the PA case described above, we generally think that a substantial change (like going from being to not being a body part) is accompanied by a marker of that change. But nothing about my prosthesis will have changed besides its geographic location.

Second, just as personal attitudes are not infallible with respect to bodily parthood judgments (as seen in Body Illusion and Body-Swapping cases), neither are collective attitudes. Consider the following *reductio*. If SC is true, then provided sufficient social agreement on the moon being my body part, it will be. But it seems that no matter how much social agreement there might be about this claim, the moon will not as a result be

my body part. Or consider the case of slavery again: it is easy to imagine a social context in which a small number of slaves were considered “parts” of their owners. But it seems clear that no amount of social agreement will make that the case.

Thus far I have argued that both views of the body that rely on either personal or collective construction to provide the sufficiency criterion for bodily parthood face serious problems. There is good reason to think that human attitudes are insufficient either to exclude something from being a body part or make it one.

This does not prevent either personal or social attitudes from being relevant to the *ethical* considerations at stake, however. It might turn out to be the case, for example, that a prosthetic limb is not a body part, strictly speaking, but is treated as such because of our social conventions or pressing ethical concerns. Giving an account of bodily parthood that denies a constructionist view need not imply that there is nothing relevant to our treatment of bodies that depends on social attitudes. It will not be social conventions, for example, that determine if the hospital bed is a body part of a given individual. Rather, I will argue, it is facts about the human form and the matter that can constitute a human being that will make that determination ontologically. But perhaps, even after that is established, it turns out to be important to treat the hospital bed *in the same way* that we treat the patient’s own body, and this does not turn on the metaphysics.³⁵

³⁵ I should make an important note here – my objections to both the constructionist accounts discussed above rely on the assumption that the moon is obviously not a body part of any human being. I ground this assumption in part in denying mereological universalism (there is no object composed of me and the moon). Interestingly, if one accepts mereological universalism, one might more easily accept a social or personal construction account of bodies. This is because on mereological universalism, there is an object for each human being that is “that human being’s body plus the moon”. So there is a Hilarybody+moon. It is compatible with either the personal attitude view or the social construction view to claim *that* object is my body, and not my body minus the moon. Conjoining the constructionist account with mereological universalism would make the question of what constitutes a body (or whether some other

Section Two: The Extended Mind: Can Anything be a Body Part?

Having argued that bodily parthood is *not* determined by either personal or social attitudes, I come to a non-restrictive view proffered by Andy Clark and David Chalmers, often known as the “Extended Mind” view. In their joint paper, “The Extended Mind,” Clark and Chalmers suggest that human organisms can be linked with external entities in a “coupled system that can be seen as a cognitive system in its own right.”³⁶ They argue that this system counts *equally well* as a cognitive system, despite some components of that system residing outside the skin barrier. In this section, I address whether bodily parthood can be restricted *at all*: is there a principled way to deny that pencils, calculators or rakes become body parts when I pick them up, while leaving open the question of artificial organs or prostheses?

Clark and Chalmers make a distinction between the “biological organism” and the “external resources” that comprise the extended system of their test case, Otto.³⁷ In the specific case they offer, Otto is composed of his biological organism and his notebook (which functionally replaces his memory). Clark and Chalmers argue that this extended system is *Otto* but maintain a distinction between the biological organism and the notebook. So one interpretation could be that Otto the *person* is made up of multiple parts: his biological organism and the external resources like the notebook. But the question on the table for this dissertation is whether an artificial organ would be part of

object is or is not a body part) a matter of “picking out” which material object among the various candidates “counts” as the person’s body (and perhaps “counts” in the sense of being the object of our ethical concern). It would be something like me (or my society) saying, “That one, with the moon” or “that one, without the brain” is my body.

³⁶ Andy Clark and David Chalmers, “The Extended Mind,” 8.

³⁷ Andy Clark and David Chalmers, 18.

the biological organism, standing in the same relation to the body as an organic part.

Thus it is not perfectly clear whether Clark and Chalmers, in this paper at least, would take artificial parts to be literal body parts.

In a separate paper, Clark clarifies that he is open to a view on which *any* external resource, when employed by a human being, specifically becomes part of the body. He writes, “In the case of the arm versus the spade, it seems right to notice that both the functional and the phenomenological lines between a well- fitted constantly available tool (more like a prosthesis, or Otto's notebook, than a patchily available spade) and a biological limb must be fuzzy at best.”³⁸ Clark’s suggestion a few lines later is that the lines become blurred when we move from a domain of temporary tools to “permanent or semi-permanent assistive devices” (prostheses, brain-controlled wheelchairs, etc.). Thus the Extended Mind thesis seems perhaps an *extension* of the view that biology and technology can be integrated such that the technology is a literal body part of the person. The EM thesis contends that this kind of integration is also true of cognitive agents integrated with tools in their environment.

Is there a principled way to restrict bodily parthood so as to avoid the conclusion that every pencil or piece of paper we pick up to use in composing a sonnet is our body part? Yes. Many of the medical ethicists referenced thus far make use of the concept of integration *between* body parts or of a part *within* the rest of the body. This is not strictly meaning that something is “within” the skin (though that has sometimes been used), but

³⁸ Andy Clark, “Intrinsic Content, Active Memory and the Extended Mind,” *Analysis* 65, no. 285 (January 2005): 8.

something more like interdependence or interaction. Body parts interact: they form larger systems and they are influenced (and influence) each other's functionality.

This is different, importantly, from a view about the *permanence* of a part. In her argument against the Clark and Chalmers' view, Lynne Rudder Baker writes, "Although I suppose that we may be partly or even wholly nonbiological, I do not suppose that every time we pick up a pencil, we are constituted by a body with a new part. Unlike Clark, I would distinguish prostheses that are relatively permanent from tools that are used on occasion."³⁹ And this "permanence" criterion is not without some support (at least intuitively) in the medical ethics literature. Medical practitioners often distinguish between "bridge" and "destination" therapies when thinking about organ replacement. For example, an LVAD might be considered a "bridge" therapy if the patient is on the waiting list for a heart transplant, but a destination therapy in a patient who is ineligible for a heart transplant. Daniel Sulmasy argues that only destination therapies should be considered as body parts of the individuals into whom they are placed.⁴⁰ But does this criterion of permanence track metaphysical truths?

Here is one reason to think it does not. Imagine that I have a heart transplant for one day. The next day, that heart is replaced with another one, and that this continues ad infinitum. It does not seem to be the case that we would consider me to have been without a heart for any day of my life. So the temporality of the part does not determine

³⁹ Lynne Rudder Baker, "Technology and the Future of Persons," *The Monist* 96, no. 1, (2013): 50.

⁴⁰ One could object that an umbilical cord is only a bridge therapy for a fetus, since it is by design a temporary system for the fetus to receive nutrition and oxygenation. But it seems that the umbilical cord is a part of the fetus. This suggests that the distinction between bridge and destination therapies is ill-suited to track the relevant distinctions.

whether it is a body part or not. Relative permanence is both a vague concept and an irrelevant one.

Clark seems open to this kind of view, arguing that neuroscience evidence supports that “a tool, even when temporarily in use, is rapidly assimilated into brain's body maps and is treated (temporarily) just like a somewhat sensitive part of the body. When a macaque used a rake for just seconds, visual receptive fields became elongated as if the rake were part of the arm, with the monkey's fingers extended along the tines of the rake (this work is reported in Iriki et al. 1996).”⁴¹ I agree with Clark that temporality does not determine parthood, though perhaps it helps to clarify it. Unlike Clark, however, I would argue that tools of the type he describes, such as garden spades or calculators, are not body parts.

Here Baker's later comments prove helpful. She writes, “Bodies with neural implants are *stable*; they are not shifting coalitions. A person's body is *connected and functionally integrated*. So, I would take a neural implant (but not a pencil and paper) to become part of a person's body—part of what constitutes the single individual person” (emphasis mine).⁴² This reasoning suggests that a body is not functionally integrated with a pencil and paper in the right way for those objects to be body parts. To put it in Aristotelian terms, while a soul could inform a prosthetic limb, it does not inform a pencil and paper, even when those objects are used for the sake of some of the soul's quintessential activities (like thinking). Why might this be so?

⁴¹ Clark, “Intrinsic Content, Active Memory and the Extended Mind,” 8.

⁴² Lynne Rudder Baker, “Technology and the Future of Persons,” 50.

While it's true that the pencil and paper are used by the person for the sake of some end, say, solving a math problem, the interaction between pencil/paper and the rest of the body (beyond the hand) is insubstantial. And this condition, as I will argue later in this chapter, is necessary for bodily parthood. It distinguishes the body as a whole, interactive, dynamic system of parts from the various items in the environment that can be used to accomplish other purposes a particular person might have.

Here one could object that I have a bias towards "familiar" body parts. That is, one could argue that I am attempting to distinguish prosthetic arms from pencils or garden rakes merely because we are familiar with arms as body parts, but not pencils or rakes. A relevant question, then, and one which I will explicitly address in chapter six, is whether we can, through the model of parthood I offer in this dissertation, come to have *new* (that is, not already coded in our DNA) body parts. If we can, then my assertions about rakes or pencils may need reevaluation.

Section Three: Hylomorphism and Conventional Accounts of the Body

Having argued directly against the view that bodily parthood is either personally or socially constructed and argued against a completely *unrestricted* view of bodily parthood such as that of Clark and Chalmers' Extended Mind, I now turn to a more specifically hylomorphic reason to deny subjectivism about the body. Particularly, on most hylomorphic accounts, body parts cannot be subjectively defined, because a human being is a *substance* as opposed to an *artifact*. If this is true, then the parts of the human being are intrinsically, rather than extrinsically, defined.⁴³ At its most basic, what this

⁴³ It is important to note that not all views argue that artifacts aren't substances. While Aristotle's hylomorphism view does, and Peter van Inwagen's (typically) does, most views on which artifacts are real things will argue that they are substances. I am agnostic on whether artifacts are substances; if they are, I

means is that the parts of a human being are defined by the *kind of thing a human being is* while the parts of an artifact, like an axe or a paper airplane, are defined by the agents who make use of them for various purposes.

Christopher Brown defends a view of *artifacts* that relies on human agents and communities for fixing its boundaries.⁴⁴ But, Brown notes explicitly, human beings are not artifacts but substances, and so must be intrinsically defined. He writes, “When Aquinas does speak about the positive nature of artefacts, he often says that an artefact has an accidental form and not a substantial form functioning as its form of the whole.”⁴⁵ He extends Aquinas’s account in the following way: “An artefact’s artefact-configuring form is also a function of the artefact’s matter (a substance or aggregate of substances) being thought about in a certain way by a community of rational agents—a community which often enough, but need not, include the object’s original maker(s).”⁴⁶ Thus for Brown, while human agents can (and do) fix the boundaries of a hospital bed, we cannot do so with respect to the human being, and, derivatively, the human being’s body.⁴⁷

would argue that either (a) they are of a sufficiently different kind to think that the rules governing their parts differ from the rules in the case of living organisms, or (b) that their identities are independent of human attitudes or conventions. For literature relevant to the problem of picking out human parts, see Zimmerman (2010), “From Property Dualism to Substance Dualism” (Aristotelian Society Supplementary Volume, 84: 119-150), and Peter Unger’s (1979) “I Do Not Exist,” (in: Macdonald G.F. (eds) *Perception and Identity*. Palgrave, London).

⁴⁴ “Souls, Ships, and Substances: A Response to Toner,” *American Catholic Philosophical Quarterly* 81, no. 4 (2007): 655–68, <https://doi.org/10.5840/acpq20078147>.

⁴⁵ Brown, 659.

⁴⁶ Brown, 660.

⁴⁷ This is partially the case because, given hylomorphism, the body is an essential part of the human being and so falls under the intrinsic rather than extrinsic definition. If one holds a view on which the body is not an essential part of the human being, one might be able to construe the body as an artifact whose boundaries can be fixed by human agents. But hylomorphists will deny this option.

While Brown's treatment of artifacts as extrinsic unities (and therefore dependent upon human "conventions, uses, purposes, practices and judgments"⁴⁸) is not uncontroversial either as an interpretation of Aquinas on artifacts or as a hylomorphic view of artifacts more generally, it nonetheless points to an important assumption of (most) hylomorphic views: if something is a substance, then it enjoys an intrinsic unity, which does not (by definition) depend on the attitudes, judgments or conventions of human agents or rational communities.

W. Norris Clarke⁴⁹ argues that it is important to understand the difference "between real beings and artifacts made by us," which he understands to be a difference between intrinsic and extrinsic unity.⁵⁰ On this definition of substance, constructionist approaches to the body as described above fail. As Brown notes, "no substance's existence and identity depends directly upon the conventions, practices and/or judgments of a community of human agents (the being and unity of a substance x does not necessarily depend upon its being thought about by substances other than x)".⁵¹ A substance, for the hylomorphist, is stable in the face of human agents' practices and attitudes; it is a being of its kind because of its form, which dictates its characteristic activities and ends. If the human being is substance, then, and the body is an essential part of the human being, its identity is also independent from human attitudes and practices.

⁴⁸ Brown, "Souls, Ships, and Substances," 662.

⁴⁹ *The One and the Many: A Contemporary Thomistic Metaphysics* (Notre Dame, Ind.: University of Notre Dame Press, 2001), <https://catalog.hathitrust.org/Record/004154260>.

⁵⁰ See Clarke, 64–65. As quoted in Brown, 660, fn.7.

⁵¹ Brown, "Souls, Ships, and Substances," 661.

Conditional on hylomorphism, then, there will be a fact of the matter as to whether certain material objects can stand in the bodily parthood relation, regardless of whether human agents or communities judge or act as if those objects do (or do not) so stand. It is important, therefore, to briefly clarify the relationship between several parthood relations: something can be a *material part* of me, an *integral part* of me, an *essential part* of me, or a *body part* of me. Depending on one's view of the human person, these relations will overlap in different ways. For example, on hylomorphism, my essential parts are my body (taken as a whole)⁵² and my soul: while my left leg might be an integral part or a body part (or both), it will not be an essential part, since it will not be a part without which I cease to be a human being. But most important for our purposes is that a body part of me is not thereby also either a part of me (as when I am constituted by my soul), or an integral or essential part of me.

One distinction often made by those studying Thomistic and Aristotelian hylomorphism in particular is the distinction between the *homoiomerous* and the *anhomoiomerous* (the uniform and non-uniform) parts of a being. For Aristotle, for example, according to Jennifer Whiting, flesh and bone are uniform parts, while hearts or livers are non-uniform parts.⁵³ The uniform parts are parts composed of material that is identical to the thing composed – a leg bone is made of bits of bone, and blood is

⁵² Notwithstanding the controversy between survivalist and corruptionist hylomorphic views, wherein whether the body is essential in the sense of “I, the person, cannot survive without it” is disputed (for such views see Eleonore Stump (2003). Aquinas. (London: Routledge, pp. 51–4), Jason Eberl (2009) “Do Human Persons Persist between Death and Resurrection,” (in K. Timpe (ed.) *Metaphysics and God: Essays in Honor of Eleonore Stump*. London: Routledge), and Patrick Toner (2010), “St. Thomas Aquinas on Death and the Separated Soul,” (*Pacific Philosophical Quarterly* 91, 587–599).

⁵³ Jennifer Whiting, “Living Bodies,” in *Essays on Aristotle's De Anima* (Oxford University Press, 1995), 83.

composed of blood. The non-uniform, by contrast, are composed of parts that are not identical to the thing that they compose. The non-uniform parts might also be understood as *integral* parts: parts whose nature is different from the whole that they compose.⁵⁴

On a view like this, it might seem like electrons are simply very small integral or non-uniform parts (like the heart or kidneys, or perhaps even a single heart cell). Since electrons do not have the nature of the whole they compose, but they do perform particular functions for the human being (carrying electrical charge or forming atomic bonds), this might incline one to think of them as body parts (indeed, in the next section I defend a functional view of body parts). If this is right, then perhaps we could express the relationship between integral parts and body parts like this:

For all x and y, if x is an organism and y is an integral part of x, then y is a body part of x.

But I think there are a few reasons to resist thinking of electrons as body parts, even while accepting that they are integral parts, and this requires a distinction between a person's integral parts and her body parts. In other words, I want to defend both: (1) It is not the case that every way I have of being materially parted is a way of being bodily parted, and (2) it is not the case that every way I have of being integrally parted is a way of being bodily parted.

It seems fairly straightforward to defend (1). One way of being materially parted is to be divided in half at my belly button, so that I have two parts, my top and bottom half. But it seems intuitively obvious that neither my top half nor my bottom half are

⁵⁴ See Jennifer Whiting (1992), "Living Bodies" in *Living Bodies: Essays on Aristotle's De Anima* (ed. Martha C. Nussbaum). Clarendon Press. It is not entirely clear how Aristotle would conceive of even what he takes to be uniform parts, given that we now know that bones are composed of cells that arguably do not have the same nature as the bone itself. But that is, perhaps, a topic for another day.

body parts in the same way as my heart, kidneys or left hand. I can also be materially parted in such a way that I have as a part my left big toe and my right third. But such an ersatz part, while it is plausibly a material part of me, fails to perform a function in the way characteristic of body parts.

With respect to (2), the case is a bit trickier. There are important similarities between the electron and, say, the heart, which are lacking between the heart and the leftmost third of my body. The electron and the heart perform functions for the human being, and both have a kind of unity in the performance of said functions that more ad hoc material parts lack. Nonetheless, I want to resist thinking of electrons as body parts, and this for two reasons. First, if electrons are body parts, then the substance of the debate about the conditions under which we gain and lose body parts seems obfuscated, not least because we cannot precisely define the electrons' location given the quantum mechanics involved: there may not be a fact of the matter as to whether a given electron is in a skin cell or in the air. We gain and lose electrons all the time; it's not at all difficult to lose and gain a body part! And unlike the function of other plausible body parts, the function that electrons perform within the body is highly flexible, given how electrons move between organs as they form atomic bonds. The debate about artificial organs or human enhancement is (partially) predicated on the notion that the gain and loss of body parts is not so straightforward. Mark Spencer⁵⁵ suggests contra Jason Eberl⁵⁶ that there *could* be a case where every part of the body was replaced by inorganic parts and

⁵⁵ MARK K. SPENCER, "A REEXAMINATION OF THE HYLOMORPHIC THEORY OF DEATH," *The Review of Metaphysics* 63, no. 4 (2010): 843–70.

⁵⁶ Jason T. Eberl, *Thomistic Principles and Bioethics*, Routledge Annals of Bioethics (London ; New York: Routledge, 2006), <https://catalog.hathitrust.org/Record/009141826>.

continued to be informed by the soul. And while Spencer suggests that this is neither easy nor straightforward⁵⁷, the fact that there is such a debate suggests that *bodily* parthood is a more restricted relation than integral parthood.

One might worry here that there is no substantive distinction between electrons and cells, given that both are, when taken individually, highly redundant, and our bodies seem to gain and lose them frequently without noticeable effects on the body as a whole. If I have a specialized laser that can zap 1,000 of your heart cells, and a different laser that can zap 1,000 of your electrons, is there really any difference between eliminating the cells and the electrons? And if there is no real difference, on what grounds can we maintain that the body parts are substantially different from integral parts?

One might counter that the major relevant difference between a heart cell and an electron is that the heart cell is living, while the electron is not. Perhaps only living things can potentially be body parts. One could then argue the following:

For all x and y, if x is an organism and y is an living integral part of x, then y is a body part of x.

This certainly covers the intuitive cases (like the heart cells or the liver) while excluding electrons or the most fundamental non-living parts of which electrons are composed. So far, so good. But such a view excludes at the outset some of the very devices whose potentiality for parthood is at issue in this project – namely, non-organic artificial organs.⁵⁸ It also entails that keratinous portions of hair, nails and horns are not body parts,

⁵⁷ MARK K. SPENCER, “A REEXAMINATION OF THE HYLOMORPHIC THEORY OF DEATH,” 867. See in particular footnote 77.

⁵⁸ This view leaves it open whether or not an organic non-human organ (like a porcine heart valve) could be the body part of a human being.

given that they are not living. And yet these seem to have well-defined, unified functions within the whole body such that they seem good candidates for being considered body parts.

Ultimately, answering whether all integral parts are body parts requires defending an account of bodily parthood that clarifies what types of material objects are potentially body parts and why. For now, I hope to have at least clarified the terrain: there are reasons to think that bodily parthood is not identical with material parthood or (for the hylomorphist) essential parthood, and it is a live question whether all integral parts are body parts (that is, whether bodily parthood is identical with integral parthood or a subset thereof).⁵⁹

Section Four: Bodily Parthood: A Function of Functions

According to Aristotle,

The soul may therefore be defined as the first actuality of a natural body potentially possessing life; and such will be any body which possesses organs...If

⁵⁹ Importantly, Jeffrey Brower (2014) notes at the outset of his treatment of Aquinas's ontology that Aquinas speaks of body parts "heads, hands, flesh, bones, tissues, and organs... as integral or quantitative parts" (15). However, given Aquinas's commitment to there being only two types of hylomorphic compound (substances and accidental unities), and the impossibility of these parts being either, Brower concludes that integral parts are best explained as "arrangements of portions or subportions of prime matter" (16). "This is why," he says, "Aquinas insists that, unlike hylomorphic parts, integral or quantitative parts must be conceived of as logically posterior to the wholes of which they are proper parts" (16). By contrast, John Duns Scotus (also a hylomorphist) argues for organs having substantial forms in themselves, and together being informed by a soul so as to compose a living animal of a certain kind. For a robust discussion of this, see chapter three of this dissertation and Ward "Animals, Animal Parts, and Hylomorphism: John Duns Scotus's Pluralism about Substantial Form," *Journal of the History of Philosophy* 50, no. 4 (October 12, 2012): 531–57, <https://doi.org/10.1353/hph.2012.0065>.

I note this because there are those who would deny that the body parts under consideration are parts, properly speaking (see, for example, Pruss (2017) and Olson (1995)). However, this is not a problem for the view I'll be developing. Even supposing with Aquinas (as interpreted by Brower), Pruss or Olson that we lack parts strictly speaking, there is a way to rephrase the question so that we get at the same relevant entities or portions of arranged matter relevant for our discussion. If one is committed to a hylomorphism that denies, strictly speaking, that our heads exist as substances, then the questions at the heart of this dissertation are about the body-part-wise arrangements of matter, rather than substantially existing body parts.

the eye were a living creature, its soul would be its vision; for this is the substance in the sense of the formula of the eye. But the eye is the matter of vision, and if vision fails there is no eye, except in an equivocal sense, as for instance a stone or painted eye.⁶⁰

What it is to be a human being, for Aristotle, is to be a composite of soul and body, where the soul is the formula, the substantial form, of the body, that which has life potentially. In offering any definition of body parts that aims to be compatible with hylomorphism about human beings, it is necessary that we first understand the fundamental defining relationship between soul and body. And while there is a robust tradition in Thomistic hylomorphism in maintaining that the soul is capable of existence absent the body (while noting, as does John Haldane that “this sort of living form was of a sort configured to take charge of and act through a body”⁶¹) it is not the case that a body can exist *as that body* without the soul. This is why, from Aristotle through Aquinas and to contemporary hylomorphists, there is a radical difference between the living person and the corpse that immediately comes into existence upon death. Thus, any hylomorphic treatment of the human body will make recourse to the soul.

On a basic hylomorphic view, X’s being a body part of S is explained fundamentally by X’s being configured by S’s soul, because on hylomorphism, the body just *is* that matter configured (or informed) by the soul, which is the substantial form of the human being. As Aristotle notes above, in the hypothetical case of the eye, the eye is

⁶⁰ Aristotle trans. W.S. Hett, *On the Soul. Parva Naturalia. On Breath*, vol. Loeb Classical Library 288 (Cambridge, Mass.: Harvard University Press, 1957). Book II, 412b5, 21-24.

⁶¹ John Haldane, “Is the Soul the Form of the Body?,” *American Catholic Philosophical Quarterly* 87, no. 3 (2013): 492, <https://doi.org/10.5840/acpq201387334>.

the matter configured for vision, while vision is the *formula* or substance of the eye. Thus the body is the matter configured for and by the soul, for the sake of the soul's activities.

But what kind of matter is this? What kinds of things *are* body parts? Having argued earlier in this chapter against a conventional view of bodily parthood, it remains for me to advance the core thesis of this dissertation. I aim to defend the following definition of bodily parthood: a *body part* is some material object which performs a biological function proper for the human being (a function derived from the genetic material it has or should have). Body parts differ from mere tools in that the functions they perform are vitally connected to maintaining the life of the human being and her characteristic (that is, species-defining) activities. Body parts are configured by the soul in the sense that they are directed by the soul towards activities characteristic of the human being. And this, I will treat functionally. Body parts perform functions, act in characteristic ways in the pursuit and promotion of the telos of the human being.

Importantly, my view of bodily parthood will draw a distinction between being a *human kidney* and being *the kidney of a particular human*, arguing that the function definition I advance references the latter and not the former. My concern is not whether some material object is of a particular biological kind or has a particular genetic history or origin. Rather, because the body is the matter that some particular soul informs, I aim to give an account of what it is for some object to be the body part of some particular human being.

To see the distinction more vividly, imagine that Kate is donating a kidney to Kyle. While it is filtering her blood, removing waste, and controlling her blood pressure, Kate's kidney is her body part. When the surgeon removes the kidney, while (on my

view) it remains a human kidney, it is no longer one of Kate's body parts. In between being taken out of Kate and put into Kyle, the object might remain a human kidney, but it is not anyone's body part. Only when it takes up the relevant functions in Kyle at the other end of the surgery does that kidney become Kyle's body part. Thus on my view, to be a body part of some human being is to be not merely *potentially* but *actually* performing the relevant functions for the human being in question.

One might immediately observe that this definition seems to permit an implausible conclusion, namely, that a dialysis machine located outside Kate's body would, provided it was performing the relevant function (as many dialysis machines do), be Kate's body part. This strikes many as counterintuitive if not obviously false. There are two possible replies. First, one might bite the bullet and argue that it is unusual, but not per se impossible, for a person to have a body part located wholly outside the boundaries of her skin. Perhaps skin is, after all, a merely typical demarcation of body parts (only things *within* the skin being body parts). But consider tumors and cysts. These seem plausibly described as things within the skin but not body parts (it's hard to see how a cancerous tumor is a body part). If that is right, then being within the skin's boundaries is not *sufficient* for bodily parthood. Could being located within the skin be a *necessary* condition? I think not. As noted earlier in this chapter, there are instances in which a body part protrudes from the skin while not thereby ceasing to be a body part: consider cases of disembowelment (some of the intestinal cells will be wholly outside the skin) or, less gruesomely, cases where colostomy surgery is performed and the colon is diverted to an opening in the abdomen. Nerve cells in teeth are also "wholly outside" the skin in this

sense. While being within the skin might be a typical way to reason about whether some object is a body part, strictly speaking it is neither necessary nor sufficient.

But suppose one persists in the intuition that the dialysis machine is not a human body part. Is there another condition on bodily parthood that could explain why, without reference to some particular spatial location? Yes. Here is a related but distinction condition on bodily parthood that captures, I think, the heart of the intuition behind rejecting a dialysis machine: necessarily, human body parts exist in an *interdependent* relationship with one another. Body parts work together for the advancement of the human being's life and characteristically human activities. They depend on one another for the fulfillment of their characteristic functions. While a dialysis machine depends on the body to provide blood that it filters, one could plausibly think that this is insufficient to satisfy the interdependence condition. While the kidneys depend, for example, on a host of inputs from other organs (the liver, the stomach, the heart, the brain), the dialysis machine does not depend on such inputs for its operation and cannot (without external manipulation) adjust in response to changes in other organs. This differs substantially from *either* allogeneic kidneys or (plausibly) artificial kidneys capable of interacting with the rest of the body.

At this juncture, however, I do not want to argue definitively against the idea that the dialysis machine is a body part; I merely aim to show that the more appropriate condition to capture our intuitions about a constraint on bodily parthood is the condition of interdependence, rather than a condition about location *within* the boundaries of the skin.

I have outlined what I take to be a normally necessary and sufficient condition of bodily parthood:

X is a body part of S at time t iff X performs at least one function proper to S's biological nature⁶² at t and X is interdependent with at least some other body parts of S.

Strictly speaking, the dependence condition here is circular, since it relies on our knowing what some other body parts of S are in order to determine if X is dependent on them. The dependence condition, I think, is a constraint on parthood that is useful in making epistemic judgments about what kinds of objects are and are not body parts, but it does not aim to be the *true fundamental account* (which is better captured above by the hylomorphic definition of the body as soul-configured matter).

One worry for the view that body parts must be interdependent is that not all body parts depend on *the whole* of the body to be what they are. Kate's kidney, for example, is not dependent on her uterus in order to be her kidney, though when disconnected from her body *altogether* it ceases to be her kidney. So perhaps the dependence we aim to describe in this condition is a dependence on *at least some* other body parts, but not necessarily all of them.

Note also the time-sensitivity of this definition of bodily parthood. Some X is a body part of S at time *t*, but if at some time *t*₂, X ceases to perform the relevant function for S, X will no longer be S's body part. The human soul no longer informs those X's that

⁶² I recognize that this is, perhaps by its very nature, a difficult term to parse. By biological nature here, I mean, roughly speaking, the genetic material it has or should have. There are, of course, cases where genetic variation occurs, and there are obvious persistent variations (between biological sexes, for example, or perhaps between groups whose phenotypic traits are the result of a shared subset of unique genetic code). Thus the definition must be relative to the human being under consideration, and the range of functions satisfying this theory about parthood must be sufficiently broad so as not to mistakenly imply that some normative functions are such that a human could not survive without them (as could be implied by discussing "essential" functions).

do not perform the relevant function for S. This includes cases where a part is temporarily separated (as when I lose my hand in an accident, but it is later reattached) or where a part temporarily or permanently ceases to function (as when a part becomes diseased and no longer functions, either temporarily or permanently).

It does not follow from this, however, that the X which was previously S's body part is no longer a human body part *at all*. Particularly, if one held to a hylomorphism like that of John Duns Scotus, one could affirm simultaneously that X is no longer the body part of S at time t_2 but that X is a human body part at t_2 . I will explore this view further in chapter three, but here I just aim to explain more fully the difference between X being *S's body part* and X being *a human body part simpliciter*. By contrast, on a view more like that of Aristotle or Thomas Aquinas, when X is no longer S's body part, it ceases to be a human body part *at all*. It can still be the kind of matter which is potentially a human body part (on Aristotle's understanding, only matter that is already configured a certain way will be apt for becoming a particular object, as when clay is the specific kind of matter out of which one can create a statue). While the differences between these two views are philosophically interesting, it is compatible with my thesis to hold either of them. In chapter three I demonstrate the compatibility of my thesis with both an Aristotelian and a Scotistic kind of hylomorphism.

The consequence of this thesis is ultimately that it is capable of affirming, at least theoretically, the possibility of a body part composed of atypical materials, most commonly referred to as "artificial" organs or prosthetics. If a body part is defined by its actual performance of some function(s) for some human being as described earlier (with the additional constraint of its dependence on the rest of the body), then, possibly, some

human body parts can be composed of non-biological materials, like silicone, plastic, steel or fiberglass.

One might be tempted to reject the notion of artificial body parts outright, precisely because they are composed of materials that seem categorically different from the material that composes living beings. One might also deny that artificial organs depend in the right way on the human body, not merely in terms of interdependence but also in terms of how and why they perform the functions they do. Imagine the heart in its beta testing phase, circulating ink through a model of a human being. It works perfectly, fulfilling this circulatory function. The heart undergoes no real change of activity (at least, not one detectable to us) between testing, being placed in me, and being taken back out of me. In fact, one can even point to its battery as evidence of it being dependent on something besides me, unlike the rest of my body which depends on the rest of me.

But it is not *necessary* that all substantial metaphysical change be accompanied by evidence of such a change. Here is one difference between the artificial heart prior to being implanted; it cannot circulate *my* blood. At most, it is potentially a heart, but it fails to function *as* my heart until it is interacting with my body and functioning for my sake. When it is placed in me, the artificial heart arguably does undergo a substantial change; my soul comes to inform it such that it now circulates my blood for the sake of me on the whole. It performs, per our definition above, a proper biological function for me.

But, my interlocutor might object, suppose I die, and my body decomposes. What of the artificial heart? Unlike organic materials, this object does not decompose. In fact, it seems like it can continue in precisely the same way it did before, with no noticeable change. But if this is the case, then the function definition seems insufficient.

My definition, however, is immune from this objection, because it specifies that the object perform a function *for S at time t*. The activity of the artificial heart when I am alive and it is circulating my blood is different from the activity of the artificial heart either (a) immediately after my death, since my death entails that it is no longer circulating the blood *for me* or (b) much later, as when it is returned to the lab or put into someone else. Only when its activities (beating, circulating, reoxygenating) are directed towards *my* overall telos is it the case that it is now *my* body part.⁶³ When I die, both the artificial heart and the rest of the “organic” body undergo the same substantial change, in that they no longer aim at the telos of keeping me alive. And this is true even though the artificial heart can carry on the same kind of activity as before my death, while the whole organic body cannot.⁶⁴

Conclusion

In this chapter I have argued that there *is* a metaphysical fact of the matter about bodily parthood, in no small part because of the role such metaphysical facts play in our

⁶³ Here there may be some compatibility with van Inwagen’s views. He describes in *Material Beings* the idea of something’s being “caught up in a life” as the relevant distinction for its being part of the composed whole, similar to my description of something being engaged in a function *for the sake of* the larger biological whole. However, it is worth noting that unlike the view I am developing, van Inwagen thinks our body parts are “virtual objects” (we do not have, for example, a brain or a heart). I follow van Inwagen in thinking that when the brain/finger/etc. is cut off, it’s not part of any particular life—in that sense, it’s *no one’s* brain/finger/etc. But I don’t follow him to the conclusion that, therefore, it is not a brain or a finger.

⁶⁴ There is some subtle circularity here, because death is defined in terms of the cessation of functioning from at least one of the parts (the brain, or the heart/respiratory system). So in one sense to say that when I die, my body ceases to function is to say that when my body parts cease to function, they cease to function. But I think the emphasis on *one central* organ or system (whether brain or heart/lungs) as the catalyst for the shutting down of the rest of the body does not make this circularity pernicious. It is true to say that some parts of our bodies are asymmetrically dependent on other parts: everything needs the heart in a way that not everything needs the toes or the uterus or the eyes. So death occurs when the central system or organ irreversibly ceases to function.

ethical deliberations. I have then defended an objective view of the bodily parthood relation against both personal and social conventionalism and offered some hylomorphism-specific reasons for thinking that bodily parthood is an objective matter. Finally, I sketched the contours of the functional definition of body parts and its immediate implications for evaluating the metaphysical status of prosthetics and artificial organs. In the next chapter, I turn to a deeper consideration of two hylomorphic theories—those of Aristotle and John Duns Scotus—and demonstrate the compatibility of their understanding of body and soul with both the functional definition and the possibility of prosthetic body parts.

CHAPTER THREE

Hylomorphism and the Functional Account of Body Parts: Two Ancient Theories

Introduction

The previous chapter concluded with a brief sketch of what I call the functional account of human body parts. On this view, what it is to be a human body part is to perform certain proper biological functions for the human being of which it is a body part. Additionally, I outlined one constraint on bodily parthood, namely, that body parts are such that they must not only perform functions for the human being as a whole but also be in a dependence relationship with another body part. This additional constraint is aimed to capture common sense intuitions that the human being is not a mere collection of individually functioning parts, but an integrated whole where the parts are in a more substantial relationship to one another than merely sharing spatio-temporally proximate locations.

This theory is, I will argue, consistent with a hylomorphic account of personal identity. In this chapter, I aim to show how the functional account is compatible with two distinct hylomorphic traditions, each with their own understanding of the human body and its relationship to its substantial form, the soul. The first theory is that of Aristotle (widely understood to be the founder of hylomorphism), and the second that of John Duns Scotus. I will show that each view is compatible with the functional definition of body parts and, consequently, each view will also be compatible with the notion of

artificial (or alternatively composed¹) body parts. Objections to my interpretation of both Aristotle and Scotus are noted within each section.

The Father of Hylomorphism: Aristotle and the Functional Account

On a cursory reading of some passages of Aristotle, one might be tempted to conclude that Aristotle's view of body parts is more restrictive than the functionality view I defend. Aristotle writes in *De Anima*, "Hence the soul is the first actuality of a natural body that is potentially alive." He then further specifies that "The sort of natural body that is potentially alive is an organic one."² Not all matter, according to Aristotle, is potentially alive, but only organic bodies. He makes some general comparisons between "organic" (for lack of a better word) eyes and those made of stone or wood (for example, in statues). He writes in the *Meteorologica* that the eye which is "not capable <of performing its function> is homonymously <that thing>, such as one dead or one made of stone" (Meteor. 390a1012).³ Thus it could seem as though only an organically composed (that is, composed of flesh) eye or other part is even potentially ensouled, and so potentially part of the rest of the human body. If such a reading is correct, then Aristotle's definition of body parts is not captured by the functional view I outlined in chapter 2.

¹ The notion of a part being "artificial" is a bit contradictory, since the question is whether the so-called artificial heart is in fact a *real* heart or not. For the sake of clarity with common language, I'll continue to refer to these candidate body parts that are composed of materials other than carbon based, human cells *artificial parts* but want to note that, strictly speaking, if they turn out to be genuine or real parts, it would be wrong to call them *artificial*. And while it's true that some parts of our hair, for example, are composed of keratinous proteins, taken as a whole strand, there is still a partial composition from human cells (live human cells live in the hair bulb).

² Aristotle, trans. W.S. Hett, *On the Soul. Parva Naturalia. On Breath.*, 412a27-412b1.

³ As quoted in Whiting, "Living Bodies."

I will argue, however, that a functional definition of body parts is a consistent and perhaps even superior reading of Aristotle's account of the human body and its parts. As Jennifer Whiting puts it, for Aristotle, the body's being dependent on the soul means that "it [the body] has organs which are defined by their functions, and therefore [...] it cannot exist in the absence of soul, without which these organs could not perform their functions."⁴

Functionally Defined Organs

Aristotle's hylomorphism understands the body to be ontologically dependent on the soul; therefore, Aristotle's definition of the body is made in reference to the soul on which it depends. This is best explained in terms of functions that the body performs for the sake of the soul. Consider Aristotle's comment in the *Generation of Animals* (*GA*) 734b247: ". . . there is no face not having soul, nor flesh, but when these have perished the one will be called <a> face and the other flesh homonymously, just as if they had been made of stone or wood."⁵ The reason we call a face or flesh that lacks a soul only *homonymously* those things is because without a soul, the matter in question fails to function *as* flesh or a face—thus it fails the definition of what it is to be those things. The essence of an eye, for example is to see; when an eye has lost its sight then it is an eye "in name only." So, a material object will be (or fail to be) some part of the body just in case it fails functionally.

⁴ Whiting, 77.

⁵ Aristotle., trans. A.L Peck., *Generation of Animals* /, vol. Loeb Classical Library 366 (Cambridge, Mass.: Harvard University Press, 1942.) 734b247.

Interestingly, Aristotle himself takes the *homoioimerous* (often translated “uniform”) parts of animals to be different from *anhomoioimerous* parts. The homoioimerous parts, like flesh or bones, are those whose parts are themselves that thing—the proper parts of flesh are themselves flesh, or the parts of blood are blood.⁶ The anhomoioimerous parts, like a heart or a hand, have proper parts that are not hands or hearts. Aristotle’s use of the anhomoioimerous parts to illustrate his claim about functionality and essence in bodily parthood might lead us to assume that he takes the conditions for being a homoioimerous part to differ; Whiting notes that Aristotle’s treatment of these two kinds of parts as different may mean that he thinks the flesh can persist through the animal’s death, and perhaps it is the flesh that undergoes decay.⁷ This question will be considered later in this dissertation; for now, it is enough to note that he takes *at least* the anhomoioimerous parts to (a) be functionally defined and therefore (b) perish with the loss of the soul. When the human organism dies, the heart is only a heart in name.

One might wonder whether Aristotle’s specification of the soul as the form of a particular kind of body (a natural one) would preclude the possibilities that his functional definition of body parts seems to permit. For example, Aristotle writes in *De Anima* that “the soul is not the essence and form of this sort of body [i.e. of an artifact, like an axe or a statue] but of the specific sort of natural body that has in itself a principle of motion and

⁶ Obviously, this is not how we understand the cellular structure of the body. On a contemporary biological view, even what Aristotle considers the *homoioimerous* parts are not in fact proper parts of themselves (i.e., blood is actually composed of cells, which are not identical to blood).

⁷ Whiting, “Living Bodies,” 79.

rest.”⁸ The question thus becomes whether the only kind of body that has such an internal principle of motion is organic in nature.

Code and Moravcsik (1992) argue precisely for this restrictive reading of Aristotle’s view of bodies. They claim that Aristotle’s definition of a “seeing eye” as simply “an eye having sight”⁹ is *not* a functional account at all. They argue further that Aristotle’s chief concern is with the phenomena one actually encounters in nature, and not various *possibilia*. Consider:

Although the thought experiment in which one considers counterfactual situations where something is the functional equivalent of an eye, but has a different material constituency, gives rise to fruitful contemporary questions, it none the less threatens to undermine Aristotle's own conception of bodily organs as natural. Being the functional equivalent of a natural organ does not make something natural. An artificial heart, regardless of how well it works, is none the less still an artefact, and not (in Aristotle's sense) *phusike*, or 'physical'.¹⁰

Code and Moravcsik suggest further that the *apparent* evidence to support a view of human bodies as “compositionally plastic”¹¹ is not in fact supportive of the view. They cite the *aporia* in the *Metaphysics* where Aristotle notes that even though the form of man is observed in flesh and bones, we can separate the form from those materials. They comment,

Since this example is given in the context of presenting an *aporia*, Aristotle is not here speaking in his own voice. It is clear, he writes, that this kind of thing is possible, although it is not clear in what cases it is possible (1036a78). Does he actually think that the case of man is like that of circle? After having stated the *aporia*, he answers that question in the negative—the case of man/flesh bones is not like the circle/bronze case (1036b28). Therefore, this passage should not be

⁸ *DA* 412b16-17.

⁹ Alan Code and Julius Moravcsik, “Explaining Various Forms of Living,” in *Essays on Aristotle’s De Anima* (Oxford University Press, 1995), 133.

¹⁰ Code and Moravcsik, 134.

¹¹ Code and Moravcsik, 135.

used to attribute to Aristotle the view that the form of man is 'compositionally plastic'.¹²

In other words, Code and Moravcsik's understanding of Aristotle is that he cannot hold a functional view of body parts without being equally committed to a restriction about the kind of matter of which a body part can be composed.

However, a serious treatment of Aristotle's work in *On the Parts of Animals* suggests that the dominant mode of conceiving of body parts is through their function. In the next section, I will argue that despite critiques like Code and Moravcsik's, we should hold to the functionalist view about body parts in Aristotle's case.

Functionality within Aristotle's On the Parts of Animals

While it might be true, as Code and Moravcsik point out, that Aristotle's chief concern in his biological works is to give an account of phenomena as encountered "in nature," it's not clear that this precludes understanding him as defining body parts in terms of their function. Consider what Aristotle says in Part I of *PA*:

So the best way of putting the matter would be to say that *because* the essence of man is what it is, *therefore* a man has such and such parts, since there cannot be a man without them. If we may not say this, then the nearest to it must do, viz. that there cannot be a man at all otherwise than with them, or that it is well that a man should have them.¹³

The essence of man, man's *form*, provides the reason and explanation of man having the parts that he does. We might say that form has priority over the parts, or that the parts come into existence for the sake of the human form. And this *for the sake of* relationship

¹² Code and Moravcsik, 135.

¹³ Aristotle, trans. A.L. Peck, E.S. Forster. *Parts of Animals Movement of Animals ; Progression of Animals* /, vol. Loeb Classical Library 323 (Cambridge, MA : Harvard University Press, 1937). 640a36-40.

exists on various levels between both the uniform (homoioimerous) and non-uniform (anhomoioimerous) parts – Aristotle says that the uniform exist for the sake of the non-uniform, which in turn exist for the sake of the human being as a whole.

This is important because the essence of man consists in certain *activities* or the potential to engage in those activities; the ability to engage in those distinctive activities is the reason why the body parts exist as they do. There is a clear hierarchy here between the materials through which the soul (as the form of a living being) engages in that being’s distinctive activities, and the activities themselves. The former exist for the latter.

Further on, Aristotle describes a now-familiar distinction between the hand of a corpse and the hand of a living human.

Now a corpse has the same shape and fashion as a living body;” he writes, “and yet it is not a man. Again, a hand constituted in any and every manner, *e.g.*, a bronze or wooden one, is not a hand except in name; and the same applies to a physician depicted on canvas, or a flute carved in stone. None of these can perform the functions appropriate to the things that bear those names. Likewise, the eye or the hand (or any other part) of a corpse is not really an eye or a hand.¹⁴

Aristotle provides a similar distinction in *De Anima* and *Metaphysics*; what is unique in *PA* is that Aristotle describes the *reason* that the homonymous hand, physician or flute is not the real thing: “none of these can perform the functions appropriate to the things that bear those names.” A flute carved in stone cannot be played; a physician depicted on a canvas cannot heal. *Likewise*, the eye or the hand of a corpse cannot engage in their characteristic activities and therefore cannot bear the name in a robust sense.

In his commentary on Aristotle’s *PA*, Jason Tipton (2014) argues that “In fact, function can delineate a part without the part actually being present in any ordinarily

¹⁴ Aristotle. *PA* 640b38-641a8.

conceived of way. For example, birds have only what can be called “nostrils” based on function (659b); there is no readily identifiable nose or nostrils on birds, yet something functions in order that birds may smell or do what noses normally do. *Function, in contrast to look or morphology, determines whether the part is present*¹⁵ (emphasis mine). Whether a part is present depends, not on whether it conforms to an expected appearance or presentation, but whether the function or activity for the sake of which the part exists is performed via that part.

Aristotle seems to address the question of the body’s compositional material directly at 642a. Here, he suggests that there is a ‘conditional’ necessity to the body’s materials based on the functions it must realize. “Take an illustration: A hatchet, in order to split wood, must, of necessity, be hard; if so, then it must, of necessity, be made of bronze or iron. Now the body, like the hatchet, is an instrument; as well the whole body as each of its parts has a purpose, for the sake of which it is; the body must therefore, of necessity, be such and such, and made of such and such materials, if that purpose is to be realized.¹⁶ It seems as though this *could* be evidence that Aristotle does restrict the materials that can comprise the body; perhaps Code and Moravcsik are right that in fact only organic material can compose a human body. However, I think such an interpretation misses the wider frame. Aristotle describes these cases as illustrating conditional necessity, and not absolute necessity. Conditional necessity has to do with the things of Nature, absolute necessity with eternal things. But, importantly, conditional

¹⁵ Jason A. Tipton, “The Division and Combination of Labor,” in *Philosophical Biology in Aristotle’s Parts of Animals*, by Jason A. Tipton, vol. 26 (Cham: Springer International Publishing, 2014), 103, https://doi.org/10.1007/978-3-319-01421-0_6.

¹⁶ Aristotle, *Parts of Animals Movement of Animals ; Progression of Animals /.* , 642a11-15.

necessity includes in its scope the purpose for which something is being made or generated. Aristotle is consistently concerned with understanding Nature as purposeful (see his famous comment in *On the Generation of Animals* that “Nature does nothing which is superfluous” at 739b20). So when we think about the reason for which a part exists as it does, or is composed of the materials it is, we ought to keep in mind the purpose and function that provide the reason for such a composition. Isn't it possible, on such a reading, to think that while Aristotle might not have anticipated contemporary medical technology, he nonetheless has room in his philosophical account for a part composed of such materials that genuinely fulfills the given function?

I have suggested that Aristotle's comments in *On the Parts of Animals* provides good evidence for treating body parts as primarily definable in terms of their function or purpose. This, I suggest, creates the logical space for the possibility that a body part composed of alternative materials, such as those that compose a prosthesis, could nonetheless be a genuine human body part precisely because it can fulfill those same functions.

Koslicki's Objection to Functionalism for Aristotle

Kathryn Koslicki (1997), a contemporary neo-Aristotelianhylomorphist, interprets Aristotle in a way that seems diametrically opposed to the “functionalist” view she attributes to Hilary Putnam and Martha Nussbaum (1992), of which my own functionality thesis would be a species. According to Koslicki, it is a misinterpretation of Aristotle to presume that “the relation between matter and form... is merely contingent:

two "systems" with the same functional properties can have various material makeups."¹⁷ Koslicki argues that this "Multiple Realizability" thesis cannot apply to living things in the same way that it might apply to artifacts; according to her view, "The particular kind of matter of which a living thing is made is the only kind of matter suitable to fulfilling its characteristic functions. Human beings, for instance, cannot be made of anything other than flesh and bones (and whatever else goes into the making of a human being)."¹⁸

Importantly, Koslicki's view accepts the notion that for Aristotle the body is, to quote her, an "instrument—on analogy with the artifact-model—whose material constitution seems to be restricted solely by its ability to perform certain characteristic functions."¹⁹ Where Koslicki draws the line between herself and the Putnam/Nussbaum view is whether the functional definition of body parts as I outlined it is *sufficient* to capture Aristotle's view. She denies this, and for a particular reason: for Koslicki, in the case of living things, *only* the particular matter of, say, flesh and bones, are capable of performing the requisite characteristic functions.

I take Koslicki to offer two major arguments in support of her view. In the first, she appeals to Aristotle's discussion of certain body parts (say, tongues and lips), and his description of the specific type of flesh required for those parts to fulfill their functions. Second, she argues that parts must "interact with the rest of the organic system in the right sort of way"²⁰ and concludes that prosthetic body parts necessarily fail to achieve

¹⁷ Kathrin Koslicki, "Four-Eighths Hephaistos: Artifacts and Living Things in Aristotle," *History of Philosophy Quarterly* 14, no. 1 (1997): 78.

¹⁸ Kathrin Koslicki, 78.

¹⁹ Kathrin Koslicki, 81.

²⁰ Kathrin Koslicki, 89.

this kind of interaction. I'll briefly outline her case for each argument and offer a reply in turn.

To begin, Koslicki notes that “With respect to tongues and lips, for instance, Aristotle informs us in PA 11.16 that, in order to satisfy certain conditions, human tongues and lips must be made, not only of flesh, but of soft flesh.”²¹ Aristotle restricts the type of matter to “soft flesh” because of the characteristic functions of tongues and lips, including speech and the sense of touch. Koslicki’s basic point here seems to be that Aristotle’s specificity implies that only whatever *actually* fulfills the characteristic function of a given body part is what *can possibly* fulfill that function. She denies that there are two types of flesh that could equally fulfill the touch and speech functions of tongues.²² Why? Here Koslicki again appeals to Aristotle’s discussion of the specific composition and ratio of the four fundamental elements (earth, air, fire and water), arguing that ultimately the specificity of these ratios mean that no two truly distinct types of flesh (with two distinct ratios of elements) could *equally* be “the softest flesh”—and therefore, to the functionalist’s concern—no truly distinct types of flesh could equally perform the requisite tasks of the body part in question.

While Aristotle does describe a very specific set of criteria for the matter that constitutes a particular body part (as in the “softest flesh” of tongues), there is evidence elsewhere in the *Parts of Animals* that suggests he *still* prioritizes function in the definition of an object as a particular body part. Consider his discussion of the elephant’s trunk vis-à-vis a human hand. “By means of his nose, as if it were a hand,” Aristotle

²¹ Kathrin Koslicki, 83.

²² See Kathrin Koslicki, 88.

writes, “the elephant conveys his food, both solid and fluid, to his mouth... In fact, he uses it for all purposes as if it were a hand.”²³ Aristotle goes on to note that while in most polydactylous quadrupeds, “the forefeet are there to serve as hands, not merely in order to support the weight of the animal... as his [the elephant’s] forefeet are not available for the normal function, Nature, as we said, presses the trunk into service to supply what should have been forthcoming from the feet.”²⁴ We should think of the elephant trunk as “like a hand” because it performs some of the functions of a hand. It’s not identical to the hand, since it performs other function as well, but the discussion here importantly revolves not around the type of matter of the trunk versus the hand, but on the function. If it really were the case that only an object composed of *one* ratio of elements could perform the task, then how is the elephant’s trunk able to act as a hand?

One might protest here that I am not giving Koslicki her due. After all, her discussion centers largely on the question of whether humans can be composed of something other than flesh and blood (what Aristotle calls the *homoiomerous* parts), not whether something can behave “like” a hand in those species that do not have hands. But I think the insight we can gain here is that Aristotle’s primary interest—at least in terms of the *anhomoiomerous* parts (like hands or hearts) is their function, such that he is willing to treat the elephant’s trunk *as the equivalent of* a hand because of the functions it performs. I do think, and will argue later, that Aristotle’s thinking extends to the homoiomerous parts as well; but insofar as we treat the anhoiomerous parts, it seems

²³ Aristotle, *Parts of Animals Movement of Animals ; Progression of Animals* /., 695a1-4.

²⁴ Aristotle. *PA* 659a25-27, 35-37.

clear that what matters to Aristotle in giving an account of body parts is function, not particular materials.

Secondly, Koslicki suggests that a body part necessarily has the right kind of interaction with the rest of the organic system (presumably, the rest of the body). Here she suggests, but does not explicitly argue for, a requirement for the part to participate in certain vital functions. “to interact with an organic system in the right sort of way,” she writes, “presumably entails participating in such vital functions as growth, nourishment, digestion, perception, and the like.”²⁵ She notes that, according to the Homonymy Principle, Aristotle claims that “after Socrates' death, in a matter of seconds, Socrates' body ceases to count as Socrates' body, or even a human body.”²⁶ Koslicki thinks it unlikely Aristotle would have thought the ratio of elements would have radically changed; thus, she concludes, “what has changed radically is that Socrates' body is no longer interacting with its form in the right sort of way.”²⁷

Given how Socrates's dead body ceases to count *as* a human body (given the failure of that body to appropriately interact with its form), Koslicki suggests that “it is hard to see how, for instance, a metal bone which is not in any way organically connected to the rest of the system could count as a bone. Metal bones do not participate in growth or other such bodily functions.”²⁸ She argues that the metal bone would “presumably” be treated analogously to the dead body: a part only in name. According to Koslicki, treating

²⁵ Kathrin Koslicki, “Four-Eighths Hephaistos: Artifacts and Living Things in Aristotle,” 89.

²⁶ Kathrin Koslicki, 89.

²⁷ Kathrin Koslicki, 89.

²⁸ Kathrin Koslicki, 89.

a metal bone, or a wooden leg, as literally a body part goes “far beyond Aristotle’s fire-water-earth-air based universe”; if one remains in Aristotle’s world, “there will be some function with respect to which the artificial substitute differs from its natural counterpart.”²⁹

Two core observations here: first, Koslicki’s argument seems to affirm—perhaps even assume—the more general point that body parts are defined functionally, given that her reading of the compositional restriction of “only flesh and bone” depends on the view that the difference in materials will yield a difference in function. Second, Koslicki’s view of interdependence and its importance for Aristotle is a close relative of the interdependence condition outlined in chapter 1. Where Koslicki’s condition differs from the one I offer is over an *empirical* question about whether, for example, a metal bone could be connected in the right way. She seems to assume that it can’t. But the theoretical framework to affirm artificial body parts has not been precluded except by her (I think) unsuccessful treatment of a difference in materials yielding a relevant difference in function. And a functionalist reading of Aristotle remains fundamentally undamaged by Koslicki’s arguments.

It is also worth observing that Koslicki’s argument throughout the paper takes issue with an implication of the Putnam/Nussbaum thesis that they mention directly only in a footnote (albeit a substantive one). They note specifically “Aristotle is less consistent about the homoiomerous parts’, viz., flesh, blood, bone, etc. ... We could say that an animal must have blood, without ruling out the possibility that some non-organic stuff could play that same role in the animal’s life. Aristotle’s point is that this stuff would

²⁹ Kathrin Koslicki, 89.

then *be blood*.”³⁰ On their reading, “what would be contingent would be the relation between a certain lower-level chemical composition and being blood.”³¹ While Koslicki explicitly denies this point, she does not engage significantly with the Jennifer Whiting paper to which Nussbaum and Putnam refer. In that paper, Whiting argues that “Aristotle seems to treat nearly all of the parts of animals—including homoiomerous parts such as flesh and blood—as defined by their functions and so as essentially ensouled.”³² Whiting identifies a potential challenge to this picture by noting that Aristotle *also* seems to think that flesh survives in a corpse and “is what decomposes”³³). Her solution is to posit that “Aristotle admits two accounts of flesh—one functional and the other compositional.”³⁴ Like Koslicki, Whiting takes as necessary for parthood the standing of a part in “right relation[s] to the other functionally defined parts of the organism as a whole.”³⁵ But on a compositional view of the homoiomerous parts, speaking of them in terms of *differentiae*, it is “not clear that flesh and blood cease to exist simultaneously with the whole living organism.”³⁶

What Whiting explicitly denies, that is relevant to Koslicki’s point, is that functional flesh and compositional flesh are more than contingently related.

³⁰ Martha C. Nussbaum and Hilary Putnam, “Changing Aristotle’s Mind,” in *Essays on Aristotle’s De Anima*, ed. Martha C. Nussbaum and Amélie Oksenberg Rorty (Oxford University Press, 1995), 35, <https://doi.org/10.1093/019823600X.003.0004>. See footnote 17).

³¹ Nussbaum and Putnam, 35.

³² Whiting, “Living Bodies,” 77–78.

³³ Whiting, 78.

³⁴ Whiting, 79.

³⁵ Whiting, 80.

³⁶ Whiting, 80.

Compositional flesh *can* constitute functional flesh but it needn't; rather, Whiting suggests, the relevant question in the identity of parts is the "relation to the system as a whole" which differs from the relation between that system and the constituent matter of the functionally defined parts. Functionally defined parts, on Whiting's view, as "essentially related to the system as a whole" while their constituent matter is "only contingently related to that system."³⁷

It might seem that Koslicki and Whiting/Nussbaum/Putnam are merely in a stalemate. However, I think Whiting sheds important light on the contention between them to which Koslicki fails to pay sufficient attention. Particularly, why think that the "right relation" criterion is insufficient for bodily parthood, and add the extra "compositional" requirement? In other words, it seems that Koslicki *agrees* with the functionalists that parts must stand in appropriate relations to the rest of the body, and even further defines these functionally, in terms of characteristic life activities. She tacks on an additional composition requirement but fails to defend it.

It's true that Aristotle believed the world to be fundamentally composed of the four elements, and that his biological conclusions are drawn with this in mind, perhaps even substantially tied to this view of the universe. However, at another level of Aristotelian thinking we find a commitment to embracing the actual functions and activities observed in animals and their various parts. The mere assumption that a difference in composition will yield a *relevant* difference in function is unsubstantiated by her treatment of the tongue-flesh example; a functionalist interpretation can still stand.

³⁷ Whiting, 88.

Thus I think Koslicki's denial of the empirical nature of the prosthesis-as-body-part question is too hasty. If it can be shown that a prosthesis differs *merely in composition* from its organic counterpart, I see no reason why that should impede its being a literal human body part. Aristotle might have been surprised to learn that prosthesis could be integrated in sophisticated ways or come to depend on the body's central mover (probably on a contemporary view the brain) in the relevant way, but he also would likely draw conclusions in *light of these facts*, and not *despite them*. Koslicki's question is in fact an empirical one: can a prosthesis stand in the appropriate relation to the rest of the human body? If so, there is little reason to think that one is traveling too far outside an Aristotelian framework by embracing it as a literal human body part. I will consider the question of Aristotle's embrace of prosthetics in the next chapter. Now, I turn to the second theory under consideration here, that of John Duns Scotus.

Section Two: Scotistic Pluralism: An Alternative, Compatible Hylomorphic Account

To determine whether the functionality thesis I have advanced is a plausible hylomorphic account of bodily parthood, we ought to see how the functionality thesis intersects with prominent hylomorphic views. Thus far I have argued that the functionality thesis is compatible with Aristotle's understanding of the body and the soul as outlined in both *De Anima* and *On the Parts of Animals*. While some readings of Aristotle restrict bodily parthood to those objects composed of *only* flesh and blood of certain kinds (that is, composed of certain ratios of the four elements), other equally (if not more) plausible readings suggest that functionalism is what Aristotle had in mind.

Aristotle's hylomorphism was given much detailed attention in the work of the medieval hylomorphists writing commentaries on Aristotle's own works. These thinkers both expanded the suggestive comments in Aristotle's writing and applied hylomorphism to new questions: the persistence of human life after death, the nature of Christ's hypostatic union, Christ's presence in the Eucharist, and more. Pertinent for our purposes is the debate these hylomorphists took up as to the relationship between a substance's parts and wholes, especially in light of Aristotle's somewhat obscure understanding of how the elements came together to form a *mixtum* (often translated "mixture"³⁸) and how this in turn related to complex wholes like living organisms.

Medieval hylomorphists were particularly divided over whether a substance could be composed of other substances with their own substantial form. Could a human being (a substance) be composed of parts (a heart, a liver) that retained their respective heart and liver forms? The *unicity* thesis, represented famously by Thomas Aquinas, maintained that a substance can only have one substantial form, because, as Wilkins (2015) describes it, to do otherwise amounts to "giving up the central insight that lies behind the hylomorphism principle, namely that what substantial forms do is create new units, not merely alter spatial relations among pre-existing parts."³⁹ For a person who holds a unitarian view of substantial form, the claim that a substance could have *other* substances as parts amounted to denying the uniqueness of substance, reducing a human being to the metaphysical equivalent of a heap of sand, parts that could be arranged

³⁸ See Rooney, (2013) "Duns Scotus on Elements in a Mixed Body," (*Proceedings of the ACPA* vol. 86, p. 255-266), p. 264 fn. 1). Rooney notes here that *mixtum* more closely resembles a chemical compound as medieval philosophers conceived of it.

³⁹ Shane Maxwell Wilkins, "HOW UNICITY THEORISTS CAN RECOVER THE ELEMENTS FROM MATERIAL SUBSTANCES," n.d., 7.

differently but which were not *one* in a new way. By contrast, *pluralists* about substantial forms argued that the unicity theorists face substantial problems, including explaining how the corpse of a living organism appears to continue existing with many of the same powers it had just prior to the organism's death, and how to explain the sense in which a mixed body like an organism is "composed of" its parts if, strictly speaking, those parts do not exist.⁴⁰

For the sake of this project, I do not come down decisively in this, so to speak, *substantial* debate in medieval metaphysics. Instead, my goal is to set the stage for consideration of the Scotistic position about the human body and particularly its parts as having substantial forms of their own. This is relevant to determining whether Scotistic hylomorphism can accept the functional definition of body parts, and, consequently, the claim that some prostheses are literal body parts. I will argue that Scotus's pluralism about the substances composing the human body is compatible with a functional definition of the parts. Scotus's view of the soul as providing a certain kind of order and unity to the parts that is robust enough to count as creating a *new* being (rather than a heap of newly arranged parts) and flexible enough to permit a substantial form of the human heart to explain what the object in question is.

Functional Definition and the Soul

Thomas Ward (2012, 2014) is one of the major philosophers exegeting the relevant passages from Scotus's own texts with respect to Scotus's view of human beings and their body parts. Given the large agreement in the secondary literature with Ward's

⁴⁰ See Wilkins p. 8.

interpretation (if not his defense) of Scotus, I will draw largely on his work in outlining Scotus's views. First, Ward (2012) observes while Scotus believes animals to have both a form of corporeity (by which an animal is a corporeal being), and a substantial form (by which an animal is living), Scotus "also thinks that what he and others call the 'integral parts' of animals, things like livers and hearts, are themselves composites of matter and *distinct kinds* of substantial forms, a form of the liver, a form of the heart, and so on."⁴¹ Thus Scotus distinguishes himself from unicity theorists like Aquinas not only because he posits a form of corporeity but also because he thinks the integral parts have their own forms as well.

Rooney (2013) observes that Scotus's main argument for thinking that the forms of bodily parts persist in higher organisms is the "diversity of accidents and operations of the organs demands that they have forms diverse from one another"⁴² (260). Not only that, but, Rooney goes on, the difference in when organs are generated with respect to each other and the observable fact that some organs can survive removal or death (at least temporarily) advances the case "that bodily organs must have their own (potentially) independent existences and, therefore, their own forms" (260).

One immediate advantage of Scotus's understanding of body parts as having their own substantial forms is that he avoids the problem facing unitarians who claim that a human corpse is a completely new object generated at the moment of the human being's death (with its own numerically distinct but qualitatively identical accidents). Ward captures it thus: "in identifying Mole's corpse as a newly generated substance, even an

⁴¹ Ward, "Animals, Animal Parts, and Hylomorphism," 532.

⁴² Ward, 537.

imperfect one, the unitarian must confront two significant challenges: explaining how the corpse comes to be, and explaining how the corpse comes to be so very similar to Mole.” And, as Wilkins puts it, “the corpse appears to have many of the same powers as the living body, including apparently having a heart and other integral parts that retain their shapes.”⁴³ How, then, to explain the apparent continuity between the once-beating heart and the matter that remains heart-shaped and, in some cases, still dispositionally able to circulate blood through a human body?

For Scotus, this problem is solved by positing substantial forms for integral parts like the heart. When I die, my heart goes on being a human heart, albeit one no longer ordered by my soul in the ways characteristic of having been some particular human being’s heart. So while the object that was once pumping my blood is no longer my heart, because it is no longer in the kind of organized relationship to other parts given by my soul, it is still right, on Scotus’s view, to call that object a human heart.

Does Scotus’s view of the human soul and its relationship to the human body accord with the thesis that parts are defined by their functions? I think yes, for a few reasons. First, like other hylomorphists, Scotus does not think that just *any* material is suitable for being informed by a human soul. “But,” Ward observes, “Scotus does not think that a substantial form can inform just any assortment of substances; he thinks instead that if some substances $p_1 \dots p_N$ can be informed by a substantial form of kind K , they themselves are of the appropriate kinds. ...” He goes on to note, “Scotus also holds that a K -form can only inform a subject that is ready to support the sorts of activities that

⁴³ Wilkins, “HOW UNICITY THEORISTS CAN RECOVER THE ELEMENTS FROM MATERIAL SUBSTANCES,” 7.

a K characteristically performs, and therefore requires a more or less fully developed body⁴⁴ in which to perform its characteristic functions.”⁴⁵ What makes the substances p₁ through p_N suitable or appropriate for being informed by a particular soul (whether that be of a mole or a human being) is their ability to support certain activities or function. What makes it necessary for Scotus that the body parts have their own substantial forms is that the body must be “more or less” fully developed if the human soul is going to organize and unify the parts in such a way as to make possible its characteristic functions.

Being a body part, as Ward says, “means being the sorts of things that a complete substance requires in order to perform its specific functions: Mole, for example, needs certain organs for his sensitive and vegetative functions.”⁴⁶ The body is required to be the way that is because of the activities or functions of the soul that it supports. So the criterion for being a potential body part is not merely a specific kind of matter (say, being composed of carbon-based cells) but being a kind of matter *capable of supporting the relevant functions*. If it could be shown that other kinds of matter were suitably disposed to support those functions, then they would be of the appropriate kind to be informed by the substantial form in question.

⁴⁴ Interestingly, Ward (2016) argues that Aquinas opposed immediate ensoulment of the embryo for the very reason that the rational soul’s activities required a human body with the right kind of parts to support its characteristic activities (actualizing its various powers) (35-6). So it seems that even Aquinas took the human soul to need a body “more or less” fully equipped with the right kind of organs to make human activity possible. Where Aquinas and Scotus differ, however, is in their understand of whether the human soul organizes the existing parts, or both organizes *and makes them* (the latter being Aquinas’s theory).

⁴⁵ Ward, “Animals, Animal Parts, and Hylomorphism,” 545, 555.

⁴⁶ Ward, 545.

Ward concludes his treatment of Scotus on this question by arguing that what makes an animal one substance, for Scotus, is less the single substantial form that inheres in the matter (as it does for a unicity theorist like Aquinas), but instead “that there is some activity or activities that cannot be attributed to a part or parts of that unity. In the case of an animal, *sensing*... is the paradigmatic activity that indicates that an animal is one substance...”⁴⁷ Scotus take the unique mark of substantial unity in the human being to be the characteristic activities of which only the whole substance—that is, the soul and the body together—can be the proper subject. That the mark of such unity is activity should be general evidence that a functional understanding of body parts, where they are understood in relation to these activities of which the human being is the proper subject, is highly compatible, perhaps even most plausible, for a Scotistic hylomorphism.

2.2 Scotus and the Soul’s Unity of Order

Thus far it seems that Scotistic hylomorphism is compatible with the thesis that body parts are defined by their functions. But recall that my thesis about body parts also contains a relevant restricting condition, namely, that the parts have some kind of interdependence or unity amongst themselves such that it is not the case that any can exist as what they are wholly independent of the body. Is this condition compatible with Scotus’s view?

One immediate reason to be suspicious of Scotus’s ability to accommodate this condition is Ward’s description of Scotus’s view of the essential ordering of the various parts. “To say that every part is essentially ordered to every other part is *not* to say,

⁴⁷ Ward, 556.

however, that the parts of the body are interdependent or make up an organic system in which all the parts (or at least the vital parts) are needed not only for the life of the organism but for the ongoing functioning of any one of the parts... Scotus would deny that the parts could be interdependent, because he is committed to the non-circularity of essentially ordered items.⁴⁸ This seems to put a substantial dampener on our hopes of accommodating the interdependence condition within a Scotistic point of view.

However, I think we might still salvage something in the vicinity of the interdependence condition. Ward also observes that there is some reason to think that the parts of a human being (or a Mole, in his preferred example) are “essentially ordered to one another in both final and efficient causal series.”⁴⁹ I’ll mention the final causal series in the next section, but the efficient causal series here, as it more directly pertains to the interdependence condition.

Before defending the efficient causal series as being near enough to the interdependence condition, I first want to briefly sketch what Scotus takes the soul to be doing to these seemingly autonomous parts, the organs. Scotus defends a view on which the body has “a special kind of unity, what Scotus calls a ‘unity of order,’ which is the sort of unity that things have when one *depends* on another”⁵⁰, and this unity of the body parts is what makes it the case that the parts are able to form a new, substantial whole upon being ensouled. The unity of order is, for Scotus, more than a mere aggregation (a heap of objects) and less than a unity of “inherence,” which occurs between a subject and

⁴⁸ Ward, 536.

⁴⁹ Ward, 552.

⁵⁰ Ward, 536.

an accident.⁵¹ So there is something different about the arrangement of the organs when they are composing a human being that differs from their arrangement when they compose a heap of organs. Scotus is not precise in terms of what the unity of order is, but we know that it involves their being “properly related or ordered to one another.”⁵²

When we think about the way that body parts seem to depend on one another, what we aim to capture is, I think, the sense in which the living body exists as an integrated whole and functions in each of its parts because of its interactions with other parts. The heart, for example, cannot perform its functions of pumping blood if there is no blood to pump. It also can’t fulfill its characteristic function of delivering oxygenated blood to the body if the lungs do not take in oxygen with which to oxygenate the blood then circulated by the heart. So the heart exists, we might say, for the sake of the lungs and the lungs also exist for the sake of the heart. What distinguishes a *body* from a mere collection of organic parts, like a cadaver or even an arrangement of recently extracted (still viable) organs awaiting transplant is the way in which those parts come to perform their functions within and for the sake of the whole body.

Ward admits that this kind of picture is plausible as a way of understanding what Scotus has in mind in terms of how the body parts might be essentially ordered to one another. He writes,

If we think of a more or less complete organic body at some advanced developmental stage, where roughly all the parts have been produced, then it does seem plausible to suppose that there is an essential order of efficient causation among these parts, where the *activity* of one part, *p1*, is dependent on the *activity*

⁵¹ See Ward, 545.

⁵² Ward, 548.

of another part, p2, at the moment of p1's activity, and where some first part—the heart, according to Aristotle—is the first cause in the series.⁵³

Thus I think Scotus's treatment of body parts as being essentially ordered to one another in this efficient causal way is near enough to the interdependence condition that his version of hylomorphism remains compatible with the core thesis being defended here.

Note, too, that on Ward's treatment of Scotus, there is a difference between the persistence conditions of the *organs themselves* and the *body that they compose*. "The organs of an organism do not themselves cease to exist at the moment the organism ceases to exist, but the body they composed does cease to exist, because that body was constituted not only by organs but also by the final- and efficient- causal relations that these parts bore one to another."⁵⁴ So, in the case where we are faced with a cadaver and a living human being, there is a substantial difference between them. The cadaver is not a body, even if all of the parts of the body remain those very parts. The body, which required certain relations between those parts, no longer exists. This suggests, I think, even more strongly that Scotus would accept something relevantly similar to the interdependence condition on bodily parthood. For something to be part of a body it must be not only capable of performing certain functions (matter of an appropriate kind) but also related to the rest of the body in the right way.

2.3: Pawl and Spencer Making a Scotist out of Aquinas?

I established earlier in my discussion that Scotus and Aquinas stand on opposing sides of the debate about whether substances could have other substances as part;

⁵³ Ward, 553.

⁵⁴ Ward, 554.

Aquinas denies this proposition while Scotus affirms it. Recently, however, Timothy Pawl and Mark Spencer (2016) have worked to revise Thomistic hylomorphism in what seems to be a decidedly Scotist direction. They note that they depart from Aquinas in thinking that “the integral part’s matter is informed *only* by the substantial form of the higher-order substance”⁵⁵ and argue instead that the continued functionality of a severed hand, for example, is explained by their theory that “hand has its own form, which it retains even after being severed.”⁵⁶ Thus they argue for a hylomorphism that can explain some of the cases most relevant for this project, such as transplantation: “integral parts seem to be able to exist without loss of functionality outside their original complete substances; for example, a human heart can be removed from the human body and sustained without loss of functionality, for the sake of later transplantation.”⁵⁷

They advance their theory by deploying an analogy between Aquinas’s treatment of the relationship between Christ’s divine and human natures. They argue that, while an integral part does exist as a part *and* separately, “it doesn’t exist *as a supposit* while it is part of the larger whole. And so we can still explain the difference between being a part and not being a part, we just explain it in terms of loss (or gain) of suppositality, and not loss (or gain) of substancehood.”⁵⁸

I want to draw attention to two claims that Pawl and Spencer advance that are relevant to my purposes here. First, Pawl and Spencer affirm functionality as the most

⁵⁵ Timothy Pawl and Mark K. Spencer, “Christologically Inspired, Empirically Motivated Hylomorphism,” *Res Philosophica* 93, no. 1 (2016): 153, <https://doi.org/10.11612/resphil.2016.93.1.6>.

⁵⁶ Pawl and Spencer, 154.

⁵⁷ Pawl and Spencer, 144.

⁵⁸ Pawl and Spencer, 152.

relevant criterion for something's being what they call (following Aquinas) an integral part and what I call a body part. They partially dispute the homonymy principle, arguing that "A hand continues to be functional for some time after it is severed: it retains the powers of a hand, until some point at which the matter breaks down to the point that the hand could not function, even if reattached to an organism..."⁵⁹ While both Aristotle and Aquinas argued that a hand, immediately upon being severed, is no longer a hand, Pawl and Spencer deny this and instead argue that it is only when the hand ceases to be functional that it ceases to be a hand. However, they go on, "we can still endorse the basic point of the homonymy principle: a functional hand and a nonfunctional hand (i.e., some matter arranged hand-wise that cannot perform the functions of a hand) are called 'hand' only equivocally."⁶⁰ This view lays out within a particular hylomorphic tradition the functionality thesis with respect to body parts and in that sense, it is further evidence for the plausibility of the functionality thesis as a hylomorphic account of bodily parthood.

Second, Pawl and Spencer affirm, as Scotus does, the importance of the teleological structure of higher-order organisms in understanding how substance parts come together to form a new whole. They note that part of what makes some parts good at performing certain functions is the teleological structure of those parts (taken as substances in themselves). "In fact, we think that it is because of the teleological structures that the substance parts have as substances that they, and not other parts, are useful for the jobs they perform, such as the exercise of the higher-order substance's

⁵⁹ Pawl and Spencer, 154.

⁶⁰ Pawl and Spencer, 155.

powers. The heart has its own teleological structure that makes it good at pumping blood, whereas the liver has its own teleological structure that makes it lousy at pumping blood.”⁶¹ It is clear that an artificial organ, like a biological one, has (on its own) the teleological structure of pumping blood. It is organized in such a way that makes it good at pumping blood and bad at being, for example, a liver. One might object here that there are still too many possible uses of the artificial heart—perhaps I can use it to pump any fluid from point A to point B—but even if its teleological structure is *more* general than a biological organism, that needn’t prevent us from thinking that it has a teleological structure sufficiently compatible with the heart’s purposes.⁶² In fact, one might observe, pluripotent stem cells have an even *more* general teleological structure than an artificial organ, given that they can differentiate into any number of kinds of cells aimed at a wide number of purposes (and, presumably, we think pluripotent stem cells are or were at some time part of a human body).

Moreover, Pawl and Spencer conclude, “The heart’s teleological structure that it has as a complete created material substance is ordered to the end that the woman has as a complete created material substance. We don’t take this to be a problem; we take it to be a benefit.”⁶³ This closely resembles Ward’s discussion of Scotus’s thinking of organs as having an essential order of final causality, albeit in a slightly more Thomistic lens. Whether Pawl and Spencer’s treatment of these questions is consistent with Aquinas’s

⁶¹ Pawl and Spencer, 153.

⁶² Note, too, that the teleological structure of the biological heart is compatible with pumping something other than blood as well (and indeed we expect it to, as when we perform scans watching how the heart pumps a certain kind of ink, for example).

⁶³ Pawl and Spencer, “Christologically Inspired, Empirically Motivated Hylomorphism,” 153.

own text is a question for debate; but it is clear that both a functional view of organs and a certain emphasis on the *teleological* dependence of the lower (integral, bodily) parts on the whole human being seems to make artificial organs as body parts a real possibility on a hylomorphic metaphysics. And, most relevant for our purposes in this chapter, it seems that even what we might take to be a rival hylomorphist to Scotus may have more compatibility with the functionality thesis than we first imagined.

Conclusion: The Logical Space for Artificial Parts

In this chapter, I argued that a functional definition of body parts is compatible with the hylomorphic theories of Aristotle and John Duns Scotus. I have shown that the functional definition of body parts has some historical support and is compatible with core hylomorphic commitments to the nature of the human being as being a compound of body and soul. I have also suggested that both accounts have correlates of the interdependence condition for bodily parthood as outlined in the second chapter.

The functional definition of body parts, as I noted above, creates the logical space for artificial parts that perform the relevant functions to be literal human body parts. In the next chapter, I consider more specifically the case for artificial organs being literal body parts on the views of Aristotle and Scotus, as well as some key contemporary interpreters. I also consider a worry that a functional definition of body parts will permit too many objects to be body parts.

CHAPTER FOUR

Hylomorphism and Artificial Body Parts: Ancient and Contemporary Objections (and Replies)

Introduction

At this point in the argument, let's pause and recapitulate where we have been and where we will go from here. In the first chapter, I argued against both a constructivist (either individual or social) account of human body parts and an "Extended Mind" view on which any object employed in pursuit of a human task would count as an extension of our cognitive system and (therefore as a body part). Instead, I outlined a restricted view of parthood depending on function and interdependence. In chapter two I defended the compatibility of my account with two distinct hylomorphic views of body parts: Aristotle's own hylomorphism, and the Aristotelian-inspired hylomorphism of John Duns Scotus. But while my argument so far may have shown that Aristotle and Scotus's views accord with seeing body parts as functionally defined, I have not yet shown that they can accommodate a view in which those functions are performed with artificial (non-organic) material. One might frame the question of this chapter as, "Can we have body parts whose material composition is made of something other than human cells?"

Describing the material that commonly or, more contentiously put, *naturally* composes a human body part is tricky. I refer to human cellular material (allogeneic material) mainly to pick out two key features, both of which other philosophers consider relevant to conversations about body parts (be that around transplants, artificial limbs, end-of-life issues, or something else). The first is the relationship between our bodies and

our species-distinguishing DNA. An allogeneic part, as opposed to a heterologous part, comes from an individual of the same species. A heterologous part is derived from an individual of a different species (often in the case of human medical need, the species is a pig). And I refer to cells because we normally understand living organisms to have cells as the fundamental “unit of life” out of which tissues and the organism as a whole is composed.

But we can imagine transplant cases *within* cells that would not involve human DNA at all: perhaps someone needs a transplant of the smooth endoplasmic reticulum (ER) in some of her cells. In those cases, are we dealing with human body parts, since the ER does not have human DNA (though the cell as a whole does)? One might also worry that since cell parts are ultimately composed of photons, electrons, or even more fundamental subatomic particles, describing the “natural” material of human bodies should not involve cells at all.

For the sake of the argument advanced in this chapter, I will focus on the cellular level for a few reasons. First, because it is reasonable to treat the cell as a kind of fundamental unit of life, given that it is treated as such in contemporary human biology. Second, this project is primarily concerned with the identity of what Aristotle identified as *anhomoiomerous* or non-uniform parts, such as hearts, livers, or kidneys. While it is true that cells themselves are *also* anhomoiomerous (they are composed of distinct parts themselves), with respect to a liver we can see that the liver is composed of things that are relatively similar: chunks made of pluralities of the same kind of cell (namely, a liver cell). Thus I will focus my inquiry on whether something that is *not* composed of human

cells can be a body part, though I acknowledge that there are other units of compositional analysis to which we could refer.

I will argue in this chapter that at least some non-cellular objects can be human body parts. First, I will show that both Aristotle and Scotus's views can accommodate artificial body parts. I will then review and respond to some key objections from contemporaryhylomorphists that only things composed of Aristotle's "flesh and blood" can perform the functions in the right way to be considered body parts.

Section One: Aristotle's Acceptance of Artificial Body Parts

Is Aristotle's view of bodily parthood compatible with artificial parts? I will defend an affirmative answer in two ways. First, I will show that some prominent objections to this view raised by Koslicki (1997), Munzer (1993), and Mittelman (2011) all turn on empirical, rather than conceptual, limits. Therefore, it is possible that some artificial materials could be body parts even if current technology cannot perform the functions in question (even if the current artificial liver cannot sufficiently filter blood).

Others object that artificial parts fail to be connected to the "motive power" of the soul, because they often (at least currently) operate with an external power source (such as a battery). I will argue that although many artificial body parts do or can have such an independent power source, they are nonetheless sufficiently dependent on the soul to count as body parts. Aristotle's reference to the soul as the "motor" or "motive power" of the body does not require that body parts be efficiently moved by the body's nervous or circulatory system. Rather, in cases like the artificial heart, I argue that the part depends on the soul for the *teleological* function of the part and on the rest of the body for the

relevant material interactions. This being *finally* moved by the soul is enough for an artificial part to be a body part on Aristotle's conception.

Material Composition and Functionality

One common objection to a view wherein Aristotle *accepts* artificial body parts is the claim that Aristotle believed only very particular materials can perform certain functions. In this case, some argue, only "flesh and blood" are suitable to actualize the functions that characterize body parts. Even if one is a functionalist "all the way down," these arguments go, one will still require that body parts be cellularly structured out of allogeneic material, because only such material will be capable of fulfilling the defining functions of the part in question. This is Koslicki's main objection to the "functionalist" reading of Aristotle, as we reviewed in chapter two. As she writes, "However, unless one is willing to go far beyond Aristotle's fire-water-earth-air based universe, there will be some function with respect to which the artificial substitute differs from its natural counterpart."¹

One might debate here about whether or not *Aristotle himself* might have been willing, upon learning contemporary details about the physical world and its makeup, to go beyond his elemental universe; but even if we were to remain within the elemental picture, it strikes me that the question of whether *other* combinations of the elements could yield the functions of certain body parts is still empirical. Koslicki uses the example of flesh and flesh* to illustrate how a material difference inevitably yields a

¹ Kathrin Koslicki, "Four-Eighths Hephaistos: Artifacts and Living Things in Aristotle," 89.

functional difference.² Suppose, she argues, that flesh* is made of just slightly more earth than flesh. Then, she goes on to show, the properties of flesh* will be slightly harder and more brittle, and since a tongue must be the “softest flesh available,” in Aristotle’s words, flesh* will not function as well as flesh.

But of course Koslicki altered only one element in her hypothetical combination. Suppose that we have flesh, Koslicki’s flesh*, and I introduce flesh**, which has slightly more earth than flesh, but also more water than flesh*. In flesh**, imagine that the new ratios of water, earth, air and fire are still different from flesh (so it is a different material composition), but my alterations result in a particularly springy material due to the combining of more water and more earth. Why couldn’t flesh** be a tongue just as well as flesh? We could accept Koslicki’s general point that material composition matters for functionality—we could not have a tongue, perhaps, that was completely immovable³—but without suggesting that there is only one kind of material that can function in the requisite way.

Koslicki does offer a related argument against Aristotle’s accepting artificial parts, which is that body parts must have right kind of interaction with the rest of the organic system (presumably, the rest of the body). She suggests that “To interact with an organic system in the right sort of way presumably entails participating in such vital

² See Kathrin Koslicki, 88–89.

³ Here I imagine that if an individual uses a technological device as his or her voice that the technology is not a one-to-one replacement of a tongue, but instead replaces one of the tongue’s functions (aiding in articulation and speech). And this may not be sufficient to say that the device *is* the individual’s tongue, especially if the individual uses the tongue in his or her mouth for other purposes (eating, for example).

functions as growth, nourishment, digestion, perception, and the like.”⁴ Participation in *these* kinds of functions might be more restrictive in terms of what kinds of materials can succeed. Can a steel rod, for example, participate in the growth that a shin bone does? Can a flexible silicone implant participate in the nourishment functions that typical muscles or tendons (flesh, more generally speaking) can?

Despite the fact that she explicitly denies that Aristotle should be interpreted as working within an empirical realm⁵, the core of Koslicki’s argument is empirical. She *presumes* that metal bones⁶ do not participate in such vital functions, but it is unclear whether (a) a body part must participate in *all* such “vital functions” and (b) what counts as the right kind of “participation.” A metal bone does not, it is true, *grow* in the way a young child’s organic tibia grows, but it can contribute to growth indirectly, as when a metal bone or partial bone enables the restoration of bone elsewhere in the leg or hip. For example, press-fit or cement-less implants for hip or joint replacements⁷ are designed to stimulate bone growth and, eventually, some degree of fusion between the implant and the bone. Is it right to say that the implant lacks *any* participation in growth in this case? I don’t think so, but even if one were inclined to dismiss those cases, growth is only one of a host of activities typically definitive of biological “life” and biologists do not agree that

⁴ Kathrin Koslicki, “Four-Eighths Hephaistos: Artifacts and Living Things in Aristotle,” 89.

⁵ Koslicki argues on p. 91 that Aristotelian explanations are “top down” – determined by his metaphysics rather than being a “tentative empirical conjecture”

⁶ Admittedly, calcium is also a metal, so there is a sense in which bones composed out of calcium (as is typical in human beings) are metal. However, I retain the term metal bone here because this is what Koslicki’s own text refers to (presumably she has in mind a metal like steel or titanium, which is often used for implants or prosthetics).

⁷ Emily Singer, “Implanting Artificial Limbs in the Body,” MIT Technology Review, accessed December 4, 2019, <https://www.technologyreview.com/s/421607/implanting-artificial-limbs-in-the-body/>.

all “living” things must participate in all activities at all times to count as living. Thus postmenopausal female mammals do not participate in reproduction (and their organs lack the potentiality for *future* participation), but it seems that those organs are still their body parts.

Does Koslicki mean to suggest that a body part must contribute to *all* such functions or activities? It seems unlikely, given that our leg bones currently do not (except in an indirect way, which even the simplest prosthetic leg does, too) contribute to our digestion or perception. Our leg bones make a direct contribution to our locomotion; but in this case, a metal bone would (and does) make the identical contribution. It’s not clear why Koslicki is justified in denying a metal bone the status of a body part merely because it does not “grow” in a way typical of other bones in the body – and even these typically stop growing when they reach a particular size. Perhaps Koslicki has in mind something like self-repair. It is true that the metal bone does not self-repair in the same way that an organic one does; without external intervention, a metal bone that is broken cannot be fused back together. But this does not seem insurmountable. As in the growth case, the metal bone can indirectly participate in self-repair, as when the metal anchors other bones or bone fragments to better ensure internal fusion. Additionally, in some cases we might think that the introduction of the metal implant *constitutes* the self-repair of the whole, as in cases where bones have been damaged or broken and cannot naturally (without surgical intervention) come back together. And if the calcium-based bones can sometimes fail in their ability to self-repair, without losing bodily parthood status, then it seems that the vital functions are not strictly necessary for the parthood relation even if they are reliable indicators of the same.

Koslicki *assumes* that the metal bone is not “in any way organically connected to the rest of the system”⁸ but this is an empirical claim, not a metaphysical one. It’s true that the metal’s persistence conditions are different from the rest of the body, but this is also true among organic parts, where flesh’s persistence is different from bone. All three will, I argue, cease to be the parts they are in the human body when the person is no longer alive, because at that point those parts no longer perform their functions *for the sake of* the soul that was that body’s form. The metal, bone and flesh all face the same persistence conditions with respect to teleological function. The mere difference of their material persistence conditions (at what rate does metal, as opposed to bone, break down out of its particular shape) is not enough to differentiate them in terms the potential to be a body part.

A related but distinct objection to the exclusively functional definition of parts comes from Stephen Munzer (1993). Munzer argues that Aristotle overstates the importance of function in the definition of an organ, and that it would be better to “define organs in terms of particular collections of one or more types of cells that have specialized in various ways and possess a certain organization or structure.”⁹ He argues that the better interpretation of Aristotle’s view is that a particular cellular structure explains function. If that’s right, and cellular structure that explains function, then something being a pancreas or a kidney is not explained by its activity or function within the body, but instead by its structure. This would preclude artificial parts, since they

⁸ Kathrin Koslicki, “Four-Eighths Hephaistos: Artifacts and Living Things in Aristotle,” 89.

⁹ Stephen Munzer, “Aristotle’s Biology and the Transplantation of Organs,” *Journal of the History of Biology* 26, no. 1 (March 1993): 109, 129., p. 113.

would lack the appropriate cellular structure and, consequently, fail to perform the requisite function.

Yet Munzer himself suggests not much later that functionality *does* determine the material requirements for a body part, rather than the structure for which he previously argued. He writes¹⁰ that “The crucial thought is that, in order for eyes to perform the function of seeing, they must be composed of the proper sort of material.”¹¹ Here Munzer is referring to Aristotle’s comments about the necessary properties of the liquid in the eyes. Aristotle discusses the liquid in the eyes in light of the more general question as to why eyes are different colors. Aristotle ultimately rejects Empedocles’ theory about different colors being caused by differences in composition, because he thinks we “ought in point of fact to posit that the sight, in all cases, consists of water, not of fire.”¹² Function still explains the reason for the material composition of the eyes here. Munzer makes an empirical, not a conceptual, correction to Aristotle and argues that “cells and the chemical byproduct of cells would be a better choice for the proper sort of material to make up, not only an eye and other parts of the body, but also living human beings as a whole.”¹³

Interestingly, Munzer seeks to impose constraints on the body’s material construction *because of* function. The material of a human being must be such-and-such (softest flesh for the tongue, or liquid around the eyes, etc.) because of the defining

¹⁰ Munzer also references Cynthia Freeland’s work which makes a similar claim (see Freeland’s essay “Aristotle on Bodies, Matter and Potentiality,” in Gotthelf and Lennox (1987)).

¹¹ Munzer, “Aristotle’s Biology and the Transplantation of Organs,” 114.

¹² Aristotle., trans. A.L Peck., *Generation of Animals* /. 779b20.

¹³ Munzer, “Aristotle’s Biology and the Transplantation of Organs,” 115.

activities of those parts. But if this is true, then function is still the ultimate constraint on the matter of the body. It is for the sake of the eye's seeing that there must be liquid in the eyes, or for the sake of tasting that the tongue must be made of the softest flesh. So Munzer might have made a helpful empirical correction to Aristotle's "liquid in the eyes" in replacing that outdated notion with more accurate contemporary biology, but this does not undermine the possibility that another kind of material could enable the eye to see even if that material were not cellularly structured.

Munzer attempts to put material ahead of function in the definition of a part, but this seems to make a mistake of *final* and *efficient* causality, and one that should not be ignored. Munzer claims while discussing whether moles (who are largely blind) have eyes: "I know of no zoologist who would consider a properly functioning human eye and a mole's eye to be, in Aristotle's language, homonymous under an appropriate definition of eye. They are synonymous eyes under a definition of 'eye' that marks it out as a *natural kind of object with cells arranged in a fashion that typically, but not invariably, allows beings having one or more such objects to see in a broad sense*"¹⁴ (emphasis mine). It very well may be the case that the particular cellular structure of an eye—the cornea, the epithelial, the retina, etc.—are the efficient cause of the eye's seeing. But they exist for the sake of the eye's seeing, and in this sense, the eye (and the function of sight) is prior to the cells which compose it. Even in understanding "eye" in the sense Munzer thinks will vindicate his view, he depends on function to explain that for the sake of which the cells exist and exist as they do. Thus while Munzer raises the question about

¹⁴ Munzer, 115–16.

whether “the right” sort of material can perform the function, the possibilia within that “right sort” classifier remain.

Unsurprisingly, some philosophers’ *modus ponens* is others’ *modus tollens*. Thus, while proponents of a functionality reading of Aristotle might conclude that, given the truth of the functional account, artificial organs follow, others might deny artificial organs and by consequence deny the functional account. Jorge Mittelmann (2010) seems to take this approach. He argues in a discussion of the divisible insect in Aristotle’s *De Motu Animalium* (the zoological work following the *Parts of Animals*) that Aristotle’s treatment of the central organ (the heart) “threatens to undermine ... the usual boundaries between the natural and the artificial.”¹⁵ Because Aristotle argues that the central organ is the primary mover of the body, rejecting the idea of multiple movers spread throughout the body, the other parts of the body seem to lose their distinctiveness from other artifacts, such as a cane, which is connected to, and moves with, the body in an external way. Mittelmann explicitly worries that “Deprived in this way from their proximal kinetic principle, limbs would resemble inert appendixes (like sticks) or replacement limbs (like prostheses).”¹⁶ Rather, he suggests, Aristotle *should* argue that the living being is composed of “natural parts,” which “seems to require that they not be totally passive, but rather that they move spontaneously, instead of being dragged along like a

¹⁵ Jorge Mittelmann, “A Bug’s Life: Aristotle’s Metaphysics of Divided Insects,” *CR: The New Centennial Review* 10, no. 3 (2010): 79, <https://doi.org/10.1353/ncr.2010.0039>.

¹⁶ Mittelmann, 81.

stick.”¹⁷ It is the aim of Mittelmann’s argument to preserve the boundary between natural and artificial, ensuring “the distinction between organs and prosthetic limbs.”¹⁸

Like Munzer and Koslicki, Mittelmann offers little *argument* as to why we ought to think that organs and prosthetic limbs are categorically different, or that the latter cannot be part of the human body. In fact, in keeping with the argument offered earlier about the primacy of function in demarcating body parts, Mittelmann observes, “one ought to say that (according to the Aristotelian model of organic unity) it is the presence of a function that unifies the instrument designed to perform it. The latter becomes one only because it performs a single function (or a characteristic set of soul-functions). In contrast, one should contend that (despite its continuity) a divisible insect suffers from scarce functional or organic unity”¹⁹ (emphasis in original). If it can be shown that prostheses fulfill a single or a set of functions in the appropriate way, it isn’t clear that such a prosthesis will fail to be part of the organic unity of the whole body.

Mittelmann might respond here that fulfillment of a function is not the only relevant criterion for judging prosthetic limbs: the “natural connection” or “continuity of their matter” is also relevant.²⁰ He observes, “not all materially continuous things turn out to be ‘one’ to the same degree, since in some of them the cohesion of their ‘parts’ is also a natural fact... that there is a single principle of rest and motion that inhabits their

¹⁷ Mittelmann, 81.

¹⁸ Mittelmann, 82.

¹⁹ Mittelmann, 91–92.

²⁰ See pages 99 and 87, respectively.

spatially extended parts.”²¹ He concludes, “For a limb, ‘to be alive’ means nothing other than to preserve this tie of union, which enables it to take part in a movement that is not its own. But if a limb is alive in this way, what then would prevent prostheses from being alive as well? If the heart moves the hand as if it were an external appendix, nothing will apparently prevent an artificial substitute from being moved in the same way.”²² It seems, therefore, that Mittelmann’s argument has at least two conditions, each of which is necessary for something to count as a limb or body part on the Aristotelian picture. First, the candidate part in question must fulfill the appropriate function, taking part in the movement of the body for the sake of the soul. And second, the tie of union between the limb and the central mover must be such that it is more than a mere “external appendix.”

Interestingly, Mittelmann does not address that some natural body parts are moved in just the same way as a walking stick would be. Horns, teeth and claws are moved more like external appendices than Mittelmann’s “single principle of rest and motion.” But this does not seem to prevent us from thinking that they are part of the living body. It is true that horns, teeth and claws all grow; perhaps this is enough to count as participation in the single principle of rest and motion to satisfy Mittelmann’s criterion. But of course, this is vulnerable to the critique offered above with respect to Koslicki’s argument about metal bones: there is an indirect sense of a metal bone’s participation in growth and self-repair, and some of that activity is (or can be) spontaneous in the same way that claws, horns or teeth can grow and self-repair without additional intervention.

²¹ Mittelmann, “A Bug’s Life,” 87.

²² Mittelmann, 95–96.

Thus Mittelmann's question is quite apt: what *does* prevent the artificial limb from being alive in the relevant way? Mittelmann seems to assume that the artificial limb *cannot* be joined to the central mover in a sufficiently strong way, but he does not argue for this conclusion. Consider the following case: a left leg prosthesis can, when attached, respond to the brain's²³ signaling to flex at the knee and ankle. The prosthesis responds to the brain's signals in much the same way as the natural right leg does. Do we have good reason to think only one of these is a body part? The mere difference in their material make up does not seem sufficient even by Mittelmann's lights, since it is not the *material* but its *union with* the central mover of the body that distinguishes limbs from non-limbs. But in this case, both the natural leg and the prosthesis are "joined" to the central mover in the relevant way: both "take part in a movement that is not its own" and both move from a "single principle of rest and motion." Why, then, would we conclude that natural limbs and artificial ones differ in their ability to be part of the human body?

Supposing that this objection—that Aristotle would only accept "living matter" as a candidate for composing a body part—has been successfully addressed. One could nonetheless argue that artificial body parts face a different objection from the Aristotelian view: their being too independent of the soul to count as being "informed" by the soul. In the next section, I'll explore this problem and suggest a possible solution.

²³ Many hylomorphists take the brain to be a more biologically accurate candidate for the "central mover" or "central organ" as Aristotle describes it. I do not intend for my discussion to unnecessarily presume that such an organ exists. Several hylomorphists discussing the various possible criteria for death (whole brain, higher brain, heart/lung, etc.) are in substantial disagreement about this component of Aristotle's account. However, my intention is to show that, on a plausible treatment of the brain *as* this kind of "central organ," a prosthetic limb is not categorically excluded from being a body part.

Artificial Organs' Independence from the Soul

Mittelmann's argument helps us to see that an Aristotelian acceptance of artificial body parts must be able to account for how these parts are connected to the whole, and particularly to the primary organ, since this is how Aristotle understands the soul to "inform" and "move" the rest of the body. A more general worry in this vicinity is whether or not an artificial body part is too independent from the soul to be informed by it. If an artificial organ is not informed by the soul, then it cannot be, on an Aristotelian view, a human's body part.

One reason to think that prostheses are too independent of the soul is that they (often, though not always) have an independent power source, such as a battery, that operates independently of the rest of the body. A left ventricular assistance device (LVAD), for example, comes with a battery that is worn around a patient's waist to provide power to the device. An implantable cardioverter defibrillator (ICD) is also battery powered. The same is true of the total artificial heart (TAH). Do these external power sources suggest that the devices in question are independent of the rest of the body and, more importantly, the soul as the body's mover?

Mark Spencer, in commenting onhylomorphic theories of death, observes that in the thought of both Aristotle and Thomas Aquinas "the soul is also the source of the movement of the organism... there is a primary organ through which the soul's motive power is communicated to the entire body."²⁴ Is this still true of an artificial part? I argue that this is still true, when we consider what it means for something to require the

²⁴ MARK K. SPENCER, "A REEXAMINATION OF THE HYLOMORPHIC THEORY OF DEATH," 849.

presence of the rest of the body in order to perform its function. The “external” power source of an LVAD or an artificial heart is granting at most the *potentiality* of the object to be moved. The LVAD is made *able* to move blood from the left ventricle to the aorta by the battery; but the LVAD acts only in the presence of the blood itself, that is, in response to the other activities of the body. There is little substantive difference between the way that an organic heart could be understood as motively dependent on the soul, and the way in which an artificial heart could be. The same way that an organic heart requires the presence of blood and other organs (particularly the lungs) in order to perform its function is true in the artificial case. It’s clear that without the rest of the body neither an organic nor an artificial heart will function *as* a heart in a given body. Thus I conclude the following: if an organic heart can be motively dependent on the soul, so too can an artificial one.

But even supposing that one does not accept this treatment of artificial parts, I would nonetheless argue that there is a clear hierarchy between teleological and motive dependence on the soul. Aristotle consistently, in the *De Anima*, the *Parts of Animals*, and elsewhere, emphasizes the purpose of the body being the overall activity of the soul. “Now, as each of the parts of the body, like every other instrument, is for the sake of some purpose, viz. some action, it is evident that the body as a whole must exist for the sake of some complex action.”²⁵ It’s true that, prior to their being integrated into a body, a prosthetic limb does not exist *for the sake of* that body, or perhaps even for the sake of any body. However, when that prosthesis comes to perform the particular function of the body part, being used for the sake of a particular soul’s overall activities, it undergoes a

²⁵ Aristotle, *Parts of Animals Movement of Animals ; Progression of Animals* /. 645b16-20.

substantial change. When the artificial heart, for example, performs the functions of a human heart, it does so for the sake of the soul whose body it supplies blood to. And it does this supplying function for the sake of that person's activities. Such a prosthesis depends on the soul for the purpose of their activities; their movements are only understood in the context of the movements of the whole body, which are themselves understandable only in light of the ends at which that body aims: the ends provided by the soul.²⁶ And while it might seem that this substantial change is implausible, it is no more so than the substantial change we widely assume happens in the case of an organic transplant in which one human being's heart becomes part of another human's body.²⁷

Spencer argues that it is possible that the soul qua form of the body can persist even in cases where the soul no longer functions as that body's motor.²⁸ He writes, "If a machine compensates for the heart's motive power before the loss of circulation becomes irreversible, it seems that the body could continue to be informed by the soul. In this case, many spontaneous integrative activities of the whole organism, such as bodily growth, maintenance of homeostasis, digestion, excretion, and the fighting of diseases, continue;

²⁶ Here is an interesting possible counterexample case: suppose that I have two additional robotic arms, that are controlled by my brain. On one plausible view they are not, while I have both of my organic arms, my body parts (just handy tools, perhaps). But when I lose my two organic arms in an accident, it now seems that my prostheses can "step in" as my arms. But, one might wonder, how could any substantial change have been undergone in such a case? But this is where the Aristotelian of my persuasion must argue at least somewhat counterintuitively – despite their not appearing to *be* any external changes, there has been a substantive change in those prostheses. For an interesting discussion of this in the context of Aquinas's view of virtual existence and nutrition, and the question of whether external change is necessary for there to be substantial change, see Little (2017).

²⁷ As I mentioned briefly in chapter one, there is widespread agreement that a transplant of an organic (cellular) heart results in the substantial change that is its becoming the heart of the person into whom it was transplanted.

²⁸ To be the "motor" of the body is a technical Aristotelian term, which refers to being the source of the body's movement.

the soul continues to implement its powers through the body's organs.”²⁹ Spencer does suggest that in a case like this, the power source *itself* is not part of the body, but instead “an external motive power source that allows the necessary material disposition to remain so that the soul can continue to inform the body and provide the internal source of the functions of the remaining integrated living organs.”³⁰ However, his footnote to this observation suggests that he thinks a body could still be soul-informed even if it were *entirely* comprised of inorganic parts. “The necessary conditions here,” he writes, “would be that the origin of some motion be internal rather than from an external machine, and that the matter be of sufficient sophistication and organization to be informed by a soul. It is an empirical question as to whether this could ever actually be done.”³¹ This seems like a fairly expansive view of the possibility of artificial (or inorganic) body parts, especially if only *some motion or other* needs to be internal in order for a part to be soul-informed. Spencer does seem to walk back some of his musings a few lines later, noting that in the case of non-cerebrum inorganic parts, “their motive power would more than likely be external to them, not due to their integration into life processes, and their functioning would likely stem from their design, not from their being informed by a soul; such non-informed parts would still be functionally equivalent to informed organic parts.”³²

Spencer’s questioning prompts us to consider what we mean by something’s “being moved to function” by a specific source. It’s possible that Spencer means here to

²⁹ MARK K. SPENCER, “A REEXAMINATION OF THE HYLOMORPHIC THEORY OF DEATH,” 866.

³⁰ MARK K. SPENCER, 867.

³¹ MARK K. SPENCER, 867. See footnote 77.

³² MARK K. SPENCER, 867. See footnote 77.

point us to the *efficient cause* of something's function. The efficient cause of the artificial heart's pumping action is (at least currently) largely its battery and design – though the possibility remains that advances in this technology would result (as in other prostheses) with direct connection to the nervous system. In both the natural and the artificial cases there are more than one efficient cause to consider. One is the source of the object's capacity to pump blood. The others are relevant other things (like blood) that actualize the function. An artificial heart differs from a natural heart in the source of its capacity to pump blood. A natural heart's capacity to pump blood comes from its structure, the ability of heart cells to expand and contract in the right way. An artificial heart, lacking those cells, will have a capacity to pump blood that comes from its structure, having a pump powered by a battery that can move the blood through the chambers for reoxygenation. But this is not the whole story. Either a natural or an artificial heart actualizing that function depends on the rest of the body. Neither will pump blood without blood present; both could, presumably, pump other materials should that become necessary (in some cases a natural heart will pump dyed liquid, for example, in CT scans). If we look to the whole of the body part's function, structure or design is insufficient to explain its functioning, much less to explain its functioning as *that* part for *that* particular human being.

I admit that an artificial heart, for example, has parts that expand and contract prior to being put in a human body. But those parts only act *as* a heart when they in fact expand and contract so as to pump a person's blood through the rest of the body. The functioning of the artificial heart is describable in one sense as parts whose design makes them expand and contract; but in a robust sense, it is not acting *as* the heart, it is not

fulfilling the heart-specific functions, unless it is integrated into and functioning in a human body. As Brad Berman (2015) writes, “because the essential function of such a [non-uniform] part is determined by that of the whole it composes, a thumb would, at best, be a finger only in name if severed from a hand and so divorced from its potential contribution to grasping (the hand’s function)...”³³ Only when the artificial heart is connected to the rest of the body can it actualize this function. Thus as Berman observes of non-uniform parts (like hands or hearts), “they are what they are only *when* composing that body.”³⁴

This view is committed to what might seem to be a counterintuitive conclusion, namely, that despite appearances, the artificial heart that one purchased from a doctor undergoes a substantial change when it is connected with the body and takes on the functions of a heart. While this might seem to be a big bullet to bite—where is the external evidence of substantial change, of the kind we see when a caterpillar becomes a butterfly?—it is in fact no bigger than the claim we have seen from Aristotle and other hylomorphists, that the heart of a newly deceased person is no longer a heart except in name. Indeed, one appeal of a hylomorphic view like that of John Duns Scotus (as described in chapter two) is that it does not require that we think the substantial change that it undergone in these cases is so extreme. When the artificial heart undergoes its substantial change, we can argue on a Scotistic view that it retains its old “artificial heart form” while being taken up and made into the heart of some particular human being.

³³ Brad Berman, “Aristotle on Like-Partedness and the Like-Parted Bodies,” *Early Science and Medicine* 20, no. 1 (April 9, 2015): 35, <https://doi.org/10.1163/15733823-00201p02>.

³⁴ Berman, 34.

Similarly, when that person dies, the heart (either natural or artificial) ceases to be *their* heart but remains a heart.

Ultimately, however, my argument about the substantial change in the artificial heart will turn on a distinction between something's being *a human heart* and something's being *the heart of a (particular) human*. It might be true that in normal cases, human hearts serve as the hearts of particular human beings. However, this does not prevent its being true that a non-human heart can be some particular human being's heart. I understand Berman's claim that hearts or hands are only those things *when* composing the body as: "this object is *X's hand* only when it is composing *X's body*". Outside that time, it might be *a human hand* or *an artificial hand* but its persistence conditions as a human hand differ from the conditions under which it is *X's hand*.

To explain and defend this distinction, I now turn to the second hylomorphist in relation whom we will explore the main thesis of this project: John Duns Scotus.

Section Two: Artificial Parts in John Duns Scotus: Human Hands and Hands of Humans

John Duns Scotus offers a hylomorphic view of body parts (again, primarily referencing the *anhomoimerous* parts) wherein they have their own substantial forms. For Scotus, a human heart has its own substantial form, and this is compatible with it also being a proper part of the substance of a particular human being. Scotus defends this by arguing that the human soul, rather than being the form of each body part, is responsible for the essential ordering of the parts to the ends of the human being as a whole and her characteristic activities. In this way, I think, Scotus makes possible that an artificial organ can be the body part of a particular human being. First I will consider how artificial organs could fit into Scotus's essential ordering, and then I will consider the difference

between being “a human hand” and “the hand of a particular human,” a distinction supported by Scotus’s view.

Artificial Organs and Scotus’s Essential Ordering

One objection to considering artificial parts as body parts on a Scotistic picture of the human body would be that they cannot enter into the right kind of “essential ordering” that Scotus requires. How can the soul, we ask, be said to order an object whose performance of the relevant function is not efficiently caused by any of the other parts? Here we must acknowledge Scotus’s approving reference to Aristotle’s embryology, in which the heart is generated first and efficiently causes the generation of the other parts.³⁵ But clearly it is not the case that the biological organs of a body “efficiently cause” the artificial organ. Can the artificial organ still be part of the right essentially ordered causal series?

I answer yes on both the efficient and final causal grounds. Let’s first consider the efficient causality question. It is true that the artificial part (indeed, any transplanted organ in general) will not be generated *by* the rest of the body in question, and its activities may be in some new respects independent of the rest of the body. The artificial heart has its own power source (currently, a battery) and does not depend on, for example, the brain or the nervous system sending it signals to pump blood throughout the body. Is this enough to deny its participation in the efficient causal series altogether? No. For, like the biological heart, the artificial heart will require blood, the oxygenating activity of the lungs, the filtrating activity of the kidneys, and more, to perform the

³⁵ See for example Ward, “Animals, Animal Parts, and Hylomorphism,” 552.

characteristic heart function of pumping clean and oxygenated blood to the body. The rest of the body is the agent of the artificial organ's ongoing activity, such that even if the "independent" power source is functional, this does not guarantee the proper function of the artificial organ. In this sense, the artificial organ is as dependent on the rest of the body as its biological counterpart.

But even supposing that we were to deny the artificial organ any place in an efficient causal series, I will still argue that it participates in the final causal series that Scotus outlines as part of the unity of order that the soul brings to the body parts in making them part of the substance of a human being. According to Ward, "First, there is good reason to think that the unity of order that obtains among several part-substances is the unity of an essentially ordered *final* causal series. In this view, two part-substances are unified just if one is, or comes to be, or acts, *for the sake of* another..."³⁶ This is clearly true in the case of an artificial organ, which both comes to be and acts for the sake of other organs. The artificial heart comes to be, and acts, for the sake of pumping clean oxygenated blood throughout the body. One could say it comes to be for the sake of every other body part, given that its development as medical technology was prompted by certain human bodies' need of a functioning heart for the survival and continued functioning of all (or most) of their other parts. The telos of the artificial heart is identical to the biological one: the functioning as a heart for the sake of a particular human body. If Scotus is right that the soul imposes a unity of order in this final causal series way on the various parts, it is hard to see how an artificial part would be exempt from being unified in this way by the soul. The soul directs the artificial part in the sense of providing it with

³⁶ Ward, 552.

the relevant end for the sake of which it acts, even if the soul is not the *generative* power behind the artificial organ's existence.

Ward continues: "Each final causal chain terminates at some activity of the whole organism composed of many part-substances, and therefore every part-substance comes to be for the sake of the whole, even if there is some pair of part-substances such that neither is the final cause of the other."³⁷ Perhaps the artificial heart is not the final cause of the toes (though admittedly, it doesn't seem like the biological heart is either), but it isn't necessary that it be. All that is needed is that the artificial part exists for the sake of the whole body, which it clearly does. And there are, plausibly, at least some part-substances that exist for the sake of the artificial heart: the lungs or kidneys, for example, exist for the sake of the blood which the artificial heart distributes to the body.

Importantly too, Rooney observes that it is not the case that *each* part stands in the relationship of potency with respect to the soul's active power. Rather, "the whole matter from these [parts] has an order to such a form as to its adequate act with respect to which no part of the matter would be an adequate potency."³⁸ For Scotus, then, the integral parts are "together in potency to the soul."³⁹ We do not evaluate whether a particular organ stands in potency to the soul, but whether the whole complement of integral parts can be such as to sustain the soul's characteristic activities. Thus while it might be tempting to ask whether one particular artificial organ is potentially a body part, it is more apt, on Scotus's view, to consider the (potential) body in which that artificial organ functions.

³⁷ Ward, 552.

³⁸ Patrick Rooney, "Duns Scotus on Elements and Organs in a Mixed Body," *Proceedings of the American Catholic Philosophical Association* 86 (2012): 261, <https://doi.org/10.5840/acpapro20128620>.

³⁹ Ward, "Animals, Animal Parts, and Hylomorphism," 536.

Can *that* complement of part-substances be together in potency to a human soul? If my treatment of efficient and final causal series is right, the answer is yes: a body with an artificial heart is just as apt for being actualized as a human body by a human soul as one with a biological heart.

Thus we find in Scotus's notion of the soul imposing a unity of order on the body a fellow journeyman on the road to taking artificial organs or prostheses to be literal body parts. Artificial organs can participate, I have argued, in both efficient and final causal series.

Human Hands and Hands of Humans

On Scotus's view, a key distinction can be drawn between something being "a human heart" and something being "the heart of a particular human." Why is this? Well, for Scotus, the "human heart" is defined by its substantial form, one that governs it throughout its persistence, from generation in gestation to final corruption in a corpse. This substantial form, importantly, differs from the soul of the human being. Given that Scotus denies that that soul of the human being *is* the substantial form of the human heart, there is a difference between the persistence of the human being as a whole, and the persistence of the human heart. The heart can outlive the person, so to speak. Indeed this is why Scotus is in part so keen on his view of part-substances, because they provide an answer to the puzzling resemblance between Socrates and his corpse. *Socrates*, Scotus can say, no longer exists, but Socrates's *body* persists (the form of corporeity exists as well as the forms of the various integral parts). So there are still human hands when we regard Socrates's body. But they are not Socrates's hands anymore. So, it seems for

Scotus, there is a difference between something being a *human body part* and something being *the body part of* a particular human.

Why is this relevant for considering artificial parts? Well, on the view of bodily parthood I aim to defend here, we need to restrict all objects in the set of body parts of X to being within the set of human body parts. True, human body parts are very good at being body parts of particular humans. This is in part why they can successfully be transplanted, and perhaps why they were among the first things we employed when trying to replace a body part within a particular human being. But their success does not entail another object's failure. Given my arguments for thinking that the bodily parthood relation is functionally defined, the kinds of objects that can be in such a relation will be empirically determined.

Section Three: Contemporary Objections

I have argued so far that Aristotle and Scotus both provide ways of thinking about body parts compatible with artificial organs' being the body parts of human beings. I would be remiss, however, to ignore objections raised by Jason Eberl, a contemporary interpreter of Thomas Aquinas. Eberl argues that Aquinas's view of the human body explicitly prohibits the possibility of artificial organs or prostheses becoming literal body parts.⁴⁰ His interpretation of Aquinas here is relevant to our discussion because it considers in a new light the challenges raised earlier with respect to both the material

⁴⁰ Given the manner of his defense, I take Eberl to also hold the view he attributes to Aquinas, and so will treat his comments as exposition and defense of his own position, in addition to their being interpretive of Aquinas's own thought.

composition of parts and the presence of an external (and Eberl calls accidental) form in the case of an artificial organ.

Eberl argues first that Aquinas requires human beings to be composed of a “living *biological* organism”⁴¹ (emphasis in original). Further, he argues, “Aquinas considers natural substances, such as biological organisms, and artifacts to be significantly distinct types of beings...”⁴² The main difference according to Eberl’s reading of Aquinas is that natural substances have *interior* principles of unity, while artifacts have at most *exterior* ones. An artifact has a substantial form imposed upon it, but a natural substance’s substantial form is internal to it. And, Eberl concludes, “This fundamental difference between natural substances and artifacts precludes an artifact becoming a ‘proper part’ of a natural substance” because “the artifact already has its own principle of organization—namely, the accidental form that results from the aggregate or functional unity of the artifact’s constituents.”⁴³ Given Aquinas’s commitment to there being only one substantial form for an entity (the very principle that Scotus denies!), we can see how its presence interferes with the artificial part’s being a body part.

Interestingly, Eberl does not offer a defense of his conclusion that the existence of an accidental form (the artifact’s own substantial form) precludes that object from becoming a proper part of a natural substance. He claims that “A pacemaker, on the other hand, does not lose its principle of organization when it is placed inside a patient with

⁴¹ Jason T. Eberl, *Thomistic Principles and Bioethics*, Routledge Annals of Bioethics (London ; New York: Routledge, 2006), 51, <https://catalog.hathitrust.org/Record/009141826>.

⁴² Eberl, 52.

⁴³ Eberl, 51.

bradycardia...”⁴⁴ Here one could object that this is not the case, or at least, it is not definitively the case. The pacemaker’s function is, as I noted above, directed by the patient at least teleologically, because it serves the heart which in turn serves the ends of the soul. Additionally, the pacemaker is responsive to the heart and cannot function as a pacemaker without the heart. The heart’s arrhythmias prompt the pacemaker to function *as* a pacemaker – without the heart, indeed, without the rest of the body, the pacemaker is merely an artifact. When disconnected from the rest of the body, the pacemaker does have an external form, the potential to function to correct arrhythmias in the heart; it does not actualize that function until it is united to the body.⁴⁵

This does not seem so dissimilar from the way that the heart of a recently deceased individual, while lacking the substantial form of the body, nonetheless has *some* form (Aquinas would say, I think, the form of a corpse-heart). That the heart has an accidental corpse form does not preclude its having been a body part, nor indeed its becoming one again, given that successful transplants of allogeneic hearts are not uncommon. And if, as Eberl seems to, we could accept the transplanted allogeneic heart as a body part, and it has an accidental corpse form prior to being transplanted, then Eberl rejects artificial organs or pacemakers because of their material composition, not their having an external form. His claim that “The pacemaker functions due to its own internal constitution and programming; it is not ‘caught up in the life’ of the patient (van

⁴⁴ Eberl, 51.

⁴⁵ It is important to note here that the pacemaker might not be a body part for another reason, which is that there is no equivalent part for which it serves as a prosthesis. The pacemaker is used in the heart as a means of preventing malfunction in heart rhythms; but in a properly functioning heart, there is no equivalent part that does this preventative work. So perhaps on these grounds we could question the parthood of a pacemaker. My point here is to show that it need not be objected to on the grounds that Eberl’s grounds about whether it maintains its earlier form when placed in the patient.

Inwagen, 1990, p. 4)⁴⁶ is unsubstantiated both teleologically and, I would argue, functionally.

Indeed, Eberl opens his work by arguing that human body parts “operate independently and function collectively to support the existence and activity of a living, sensing and thinking being. Both the independent operation of one of a body’s organs, and its functional unity with the body’s other organs, are governed by the formal, or *functional*, unity of the organism itself.”⁴⁷ For Eberl, the soul (the human being’s substantial form) is responsible for the way that the organism is functionally united. Indeed, the most relevant consideration Eberl puts forward for considering a person dead (the soul separated from the body) has to do with the performance of vital metabolic functions.⁴⁸ Consider, too, how Eberl contends that a patient with high cervical cord transection loses the lower half of their body: “The rest of their body, though still structurally joined to them, is no longer a proper part of them, because it no longer participates in their integrative organic functioning.”⁴⁹ Like Koslicki, Eberl seems to take function and material constitution to be jointly necessary and sufficient for something to be a body part. Yet both imply that material constitution determines function without offering an argument as to why. Eberl argues that “If a patient with high cervical cord transection regains functional unity of their brainstem with the body connected to them—by having new neural tissue or an artificial electrical conductor grafted onto the spinal

⁴⁶ Eberl, *Thomistic Principles and Bioethics*, 51.

⁴⁷ Eberl, 5.

⁴⁸ See Eberl, 59.

⁴⁹ Eberl, 59.

cord to eliminate the transection—then their rational soul would re-inform the body owing to their brainstem’s control over the body’s vital metabolic functions being regained.”⁵⁰ But in a note to this comment, he argues that the artificial conductor would not be a proper part of the patient, because it is “not suitable for being informed by their rational soul.”⁵¹ This seems contradictory. The measure of the body’s being informed by the rational soul again is a gain in function. But why think that the artificial electrical conductor, which is the efficient cause of the reintegration of brainstem and vital metabolic functions, is excluded from the overall integrative unity of the body? Eberl notes that the conductor “nevertheless can function as a ‘facilitator’ to bring about the functional unity of the brainstem with the rest of the body”⁵²—but this starts to sound like the conductor is in almost every respect a body part, especially in the most important sense of being integrated with the rest of the body. Eberl provides no reason to think there is a substantial difference between a “facilitator” of integrative unity and a participant in such unity. The only difference seems to be that the ‘facilitator’ is an artifact under some descriptions. But this still assumes, rather than argues for, the inability of an artifact to be truly integrated with the body.

In developing his account of both the beginning and end of human life, Jason Eberl argues that the human soul cannot inform non-organic matter (drawing on Aquinas’s arguments about what matter is suitable for being informed by a rational soul). To illustrate the claim that, for example, artificial ventilation is *not* informed by the soul

⁵⁰ Eberl, 60.

⁵¹ Eberl, 133.

⁵² Eberl, 133.

(and therefore *not* a body part), he claims: “The requirement of *extensive* technological and pharmacological support – far beyond the ‘little more than nursing care’ required in Shewmon’s case of the 19 year old boy who was wholly brain dead – indicates that the source of such patients’ vegetative operations is not something intrinsic to them, but rather is from an extrinsic source”⁵³ (emphasis in original). In essence, Eberl’s argument is that an operation is extrinsic just in case the technological support is extensive.

But the extension of technological support is not a good criterion by which to judge whether an operation of a human person is of their soul or extrinsic. Consider the following series of cases:

- A wooden leg that is connected to a person’s upper thigh by a strap
- A wooden leg connected to a person’s upper thigh by a fitted ball and socket mechanism
- A bionic leg connected to the brain via wires in the spinal cord
- A non-motorized wheelchair operated manually
- A motorized wheelchair operated manually
- A sip and puff wheelchair
- A wheelchair controlled using EEG or other brain activity

There is no definitive point between these types of “artificial” devices where the technological support suddenly evinces the absence of soul-directed activity. If, as Eberl himself argues, the brain is the primary mover of the body (the organ through which the soul directs the rest of the body’s activities), it seems that the wheelchair controlled using EEG is closer to being intrinsically, rather than extrinsically, operated. The brain thinks “go left” and this translates into leftward locomotion. Yet such a wheelchair requires the highest level of technological support both in the sense that all locomotion is mediated through technology (i.e., without a wheelchair the person cannot locomote) and in the

⁵³ Eberl, 57.

sense that the technology is the most extensive (it involves both technological support in the AI in the wheelchair, the EEG machine and its attendant devices, etc.). By contrast, a wooden leg connected to the thigh by a simple strap requires little if any technological support (at least as I take Eberl to define the phrase) – yet the wooden leg has the least interaction with the rest of the body and is unresponsive to its environment as a functioning organic leg would be. The bionic leg, which requires much more technological support, is closer to a functioning organic leg because of its responsiveness to the brain (moving according to the brain’s activity). Its source of movement is the brain, rather than a derivative movement from the upper thigh or being moved by hands (as when one manually operates a wheelchair).

Perhaps Eberl’s argument was meant to show something about essential functions. One could argue that while locomotion is a *proper* function of a human being, it is not essential in the way that eating or breathing is. Perhaps “essential” here is meant to pick out those functions without which the individual cannot live (as a human person). Eberl’s example of the whole-brain dead boy is designed to defend his claim that the whole brain criterion of death is correct, so perhaps the technological support that Eberl has in mind is present just in those cases where vegetative functions are being performed by artificial means (as in respiration, nutrition and hydration). Even in this case, however, Eberl’s emphasis is misplaced. The vegetative functions of the brain-dead boy are extrinsic because they cannot be directed by the brain, not because they require technological support.

There are cases where the brain directs the activity of a body part that is extensively technological. In those cases, technology does not evince extrinsic rather than

intrinsic operations. So the extensiveness of technological support is not sufficient to show that an operation is extrinsic rather than intrinsic. In Eberl's whole-brain dead case, the relevant condition that renders the patient's vegetative operations extrinsic seems to be, not the fact that they are mediated by technology, but the fact that the brain cannot direct them in any meaningful way.

Consider the difference between this and the case of an individual who, though she has lost higher brain functions, is nonetheless capable of receiving a type of ventilation where she breathes partially (or wholly) determine the timing and length of her breaths. This is a different kind of ventilator support, but it is extensively technological nonetheless. In this case, the ventilator does not seem to evince that the patient's vegetative functions are being extrinsically performed, because the patient's brainstem is still involved in directing her breathing.

Thus I would posit the following: Eberl is right to think that in cases of brain death, where the brain cannot meaningful direct the operations of the rest of the body, those bodily activities performed by artificial devices are done so extrinsically. But this is not entailed by the degree of technological support, given the cases where extensive technological support is required but the relevant artificial object is meaningfully directed by the brain.

I hasten to add I do not believe that something's being or not being directed by the brain in a more or less *direct* way is a necessary condition on something being a body part, because it is not a necessary condition for something's being directed by the soul. My argument is rather that Eberl's own suggestion of technological support as an indicator of extrinsic (non-soul) operations is flawed.

Conclusion: At Least Some Artificial Body Parts

In this chapter I turned to the question of material composition and considered whether Aristotle and Scotus could support the existence of artificially composed body parts. I have argued that both views are compatible with such parts and defended this conclusion against objections stemming from the relationship of materiality to functionality, the independent “motive power” of artificial organs and their “artifactual” design. I have also argued that the core definition of body parts defended in this project is not required to draw an Extended Mind-type conclusion about all artifacts, especially given my proposed integration constraint on body parts. Many of my arguments offered here rely implicitly on gathering evidence—biological, testimonial, and perhaps otherwise—to determine whether some given artificial organ is a person’s body part. Thus, in the next chapter, I turn to the question of how such evidence is gained, how it might be defeated, and explore in more depth the relationship of my view of body parts to the first-person testimony regarding prostheses and how they are (or are not) considered body parts by the individuals who have them.

CHAPTER FIVE

Body Parts, Body Image, And What We Know

Introduction

In Chapter Three and Chapter Four I argued for a definition of bodily parthood with a condition of functionality (the object performs the right type of function for the person) and interdependence or integration (the object is appropriately connected with and dependent on other body parts). In keeping with hylomorphism's understanding of personal identity, I have argued that the human body is the matter informed by a human soul, and that *what it is* to be informed in this way is to perform certain functions for the sake of the person while being integrated with the rest of the matter performing related functions. But thus far I have said nothing about our epistemic situation with respect to these metaphysical claims. Do we know some x is a body part by its functional performance? What counts as integration with the rest of the body, and how do we know such integration is achieved?

One appealing answer is to argue that the best and most consistent evidence we have about the body part relation comes from the individuals themselves. After all, we live within our bodies and we alone have a first-person perspective on our bodies. Both consciously and unconsciously, I "operate" my arm or leg. I engage those parts in their characteristic functions and experience them *as* functioning in those ways. Thus, as we saw in chapter one, some views of the bodily parthood relation describe it as wholly determined by this first-personal experience.

One challenge with such a view is that there are many things that we would presumably think are our body parts which we do not experience in the relevant sense. This helps, I think, to bolster the claim against the needing to have a seeming that something is a body part in order to make it the case. Suppose we discover a hitherto unknown organ, one that reside between the left knee and the meniscus. Surely our unawareness of the organ's presence or function would not hinder it from being considered a body part? Or consider the actual current debate about the *interstitium* – a network of connective tissues wrapped around almost every other organ system in the body. While researchers were aware of the tissue's existence, it was not until more recently that its distinct character has been identified – prompting some biologists to argue that the interstitium merits being treated as its own organ.¹

That many—if not all—of us would not have a seeming that the interstitium is a body part does not seem to effect whether or not it merits the status of being an organ in its own right. In fact, biologists refer to the need for further study into composition *and functionality* in order to determine whether it in fact ought to be so considered. So seemings of the relevant kind seem *unnecessary* for bodily parthood claims.

But what about sufficiency? A sufficiency claim seems more along the lines of what those who follow a view of the body inspired by the phenomenologist Maurice Merleau-Ponty would hold. As Merleau-Ponty writes, “I can only understand the function of the living body by accomplishing it and to the extent that I am a body that rises up toward the world. Exteroceptivity thus demands an articulation of stimuli, the

¹ Petros C. Benias et al., “Structure and Distribution of an Unrecognized Interstitium in Human Tissues,” *Scientific Reports* 8, no. 1 (March 27, 2018): 1–8, <https://doi.org/10.1038/s41598-018-23062-6>.

consciousness of the body invades the body, the soul spreads across all of its parts, and behavior overflows its central region.”² He specifically seeks to make sense of two phenomena that will concern us here as well: the phantom limb and anosognosia. In his treatment of the supposed insufficiency of both psychological (psychical) and physical explanation, Merleau-Ponty suggests that the body is “the vehicle of being in the world, and, for a living being, having a body means being united with a definite milieu, merging with certain projects, and being perpetually engaged therein.”³

One way to explain the divergence between the thesis of this dissertation and that of Merleau-Ponty and others in his tradition is to note that both use the term “body” equivocally. What I am seeking is a primarily (though not wholly) biological object, one that is explained for human beings in much the same way it is for other animals. Merleau-Ponty, by contrast, is considering a specifically self-conscious perspective and the body *insofar* as one is aware of it and intending it for various activities and uses. This “lived body” to borrow Merleau-Ponty’s phrase, is not identical to the biological object with which I am concerned. Rather, the lived body concerns our self-conscious orientation to the world. Thus when Merleau-Ponty suggests that “the phantom arm is not a representation of the arm, but rather the ambivalent presence of the arm,”⁴ he seems more concerned with how this “ambivalent presence” reveals something about the interior life of the individual and her orientation to the world – she remains “open to all of the actions

² Maurice Merleau-Ponty, *Phenomenology of Perception* (Abingdon, Oxon ; Routledge, 2012), 78.

³ Merleau-Ponty, 84.

⁴ Merleau-Ponty, 83.

of which the arm alone is capable.”⁵ But this kind of concern is, I think, axiological (both aesthetic and ethical). It concerns how the individual perceives herself and how she perceives her (possible) actions and reactions in the world, and how she engages with other objects in the world. Perhaps the lived body is just those parts of our body to which we assign certain aesthetic and ethical value: and this could include objects that we would not consider part of the biological body but would consider part of the lived body. For example, a master fencer will feel as though the épée is a part of (an extension of) his arm, or a violinist will feel as though her bow is an extension of her hand and wrist. It does not seem to be the case that either an épée or a violin are *biological body parts* even though there is a real sensation or experience of them as part of the individual using them. Thus we see a divergence between something being a part of your body in the biological and metaphysical sense and in this “lived body” sense. This is not impossible, nor perhaps always problematic. My goal is to maintain that the body parts I am concerned with here are not subjectively determined, even if we do not have uniform ethical or aesthetic responses to all those (objectively determined) parts.

In this chapter, I will offer an account on which bodily parthood is not determined by subjective experience, as some philosophers have suggested, but we can nonetheless understand how certain experiences can justify beliefs about the boundaries of the body and its parts. Experiencing some object as part of (or alien to) one’s body provides defeasible justification for a belief that it *is* part of or alien to one’s body. The defeaters for such beliefs are biological indicators of continued function and integration in the ways described in chapters two and three.

⁵ Merleau-Ponty, 84.

To begin, I will lay out some of the types of experiences where individuals make bodily-parthood judgments, focusing on the integration and use of prostheses and well-known body illusions such as the Rubber Hand illusion. Then, I will briefly outline the philosophical view stemming from Maurice Merleau-Ponty's view of the body *as* a lived experience and the implications of that view for the above cases. Then, I will argue that a view on which these experiences are defeasible evidence for bodily parthood propositions can explain both the reasonableness of individual testimony and maintain objectivism about bodily parthood. Finally, I will suggest that this view accords with Aristotle's general approach to biology and particularly his approach to animal anatomy and observation.

Section One: Experiences of Integration or Alienation

Prostheses

There is substantial data available about amputees' use of and experience with prosthetics. In the past ten years, advances in biotechnology and particularly neural technology have prompted a number of studies of the way that amputees' use of and relationship with their prosthetics might change depending on the amount of neural control they exercise over the same. For example, Niedernhuber et. al. (2018) notes that "Amputees themselves label prosthesis usage without the need for attention a core aspect of bodily self-consciousness."⁶ They similarly describe a number of studies in which interoceptive feedback from the prosthesis strengthens the self-attribution of the

⁶ Maria Niedernhuber, Damiano G. Barone, and Bigna Lenggenhager, "Prostheses as Extensions of the Body: Progress and Challenges," *Neuroscience & Biobehavioral Reviews* 92 (September 2018): 6, <https://doi.org/10.1016/j.neubiorev.2018.04.020>.

prostheses as part of the amputee’s body.^{7 8} The more integrated the prosthesis—and particularly its movement and functional performance—is connected with the individual’s own thought processes and neural networks, the more likely the individual is to wear and use the prosthesis.

And Emily Graczyk et. al. found in their study of prosthetic usage at home that “These real-life conditions enabled us to study the impact of sensation on prosthetic usage... We found that sensory feedback fundamentally altered the way participants used their prosthesis, transforming it from a sporadically-used tool into a readily and frequently-used hand.”⁹ One way to make sense of Graczyk’s claim is to argue that the metaphysical change indeed occurred through the participants: by altering their sense of ownership of the prosthesis (through the sensory feedback), they altered participants’ *use of it*. It is not that by changing their *view* they changed the metaphysical situation. But their changed view leads to a change in functional performance, bringing the prosthesis into use in the right way so as to be their body part.

The level of achievable integration varies depending on the kind of prosthesis and the kind of function at which it aims. Gallagher and MacLachlan observe, “As a working instrument, the functional efficiency of an artificial leg is greater than that of an artificial

⁷ Niedernhuber, Barone, and Lenggenhager, 4.

⁸ If interoceptive information plays a crucial role in owning artificial body parts, artificial interoceptive feedback from the prosthesis might be one step towards stronger self-attribution of the tool (Longo et al., 2016). For example, wearable technologies can provide subtle heartbeat-like feedback using soft tactile stimulation (Azevedo et al., 2017). Suzuki et al. (2013) enhanced a rubber hand illusion using cardio-visual feedback arising from the artificial hand. (Niedernhuber, 2018, p. 4)

⁹ Emily L Graczyk et al., “Home Use of a Neural-Connected Sensory Prosthesis Provides the Functional and Psychosocial Experience of Having a Hand Again,” *Scientific Reports* 8, no. 1 (June 29, 2018): 1.

arm and is therefore more readily accepted as a substitute limb.”¹⁰ Here it seems Gallagher and MacLachlan identify a similar link between functional performance and individual acceptance, even before much of the contemporary progress in neural technologies had been achieved.

As is perhaps well-known, amputees often feel the presence of a “phantom limb” in the place where their recently amputated limb once was. They often report feeling as if this limb were under their control. Recently, prosthetic developers have studied how a patient’s thinking about their phantom limb might be able to overcome some barriers to TMR (targeted muscular reinnervation)¹¹. Indeed, as a popular article in *The Economist* reported in 2018, there has been some success in using these thoughts about the phantom limb to write the algorithm that then drives motors in the prosthesis. “The new system [of correlating a patient’s thinking about moving the phantom limb and the computer-generated algorithm moving motors in the prosthesis] is not perfect... [The] delay between intention and execution means the user does not yet experience the prosthesis as if it were part of the body. These imperfections, are, though, things that might be overcome in the future.”¹² This is an important development in the integration of the individual’s sensations with respect to his or her body and how the prosthesis is

¹⁰ Pamela Gallagher and Malcolm Maclachlan, “Psychological Adjustment and Coping in Adults With Prosthetic Limbs,” *Behavioral Medicine* 25, no. 3 (January 1, 1999): 118.

¹¹ Targeted muscular reinnervation is a surgical procedure aimed at improving functionality in upper-limb prostheses, particularly by transferring residual nerves from the amputated limb. See Jennifer E. Cheesborough et al., “Targeted Muscle Reinnervation and Advanced Prosthetic Arms,” *Seminars in Plastic Surgery* 29, no. 1 (February 2015): 62–72, <https://doi.org/10.1055/s-0035-1544166>.

¹² “Experience of Phantom Limbs Lets Amputees Control Real Replacements,” *The Economist*, December 1, 2018, <https://www.economist.com/science-and-technology/2018/12/01/experience-of-phantom-limbs-lets-amputees-control-real-replacements>.

manipulated and used. Such developments are linked to an individual's increased feeling that the prosthesis is part of them.

But part of the reason for such studies is that there is *not* a universal experience of prosthesis users with respect to how they view the prosthesis fitting into their self- or body-image. As Norlyk et. al. observe, “there is an ongoing concern with underuse and non-use of artificial limbs in lower limb prosthetic rehabilitation.”¹³ One problem that arises is what psychological researchers label “abandonment” of the prosthesis, where an individual does not use the prosthesis and actively resists integrating it in any functional performance. Such users argue that the prosthesis is alien to their body—not a body part at all. Given this lack of universal experience of prostheses as “fitting into” an individual's conception of their own body or their body schema, one might wonder how we can account for this view even in cases where the prosthesis seems to satisfy the functional thesis outlined in earlier chapters. Does an individual's psychological rejection of the prosthesis undermine its metaphysical status as body part? If not, how do we explain the beliefs and experiences of these individuals?

Body Illusions

Shibuya et. al. note that “In daily life, we never mistake nearby objects or other people's bodies as our own body. We consistently experience our body (parts) as belonging to us and as a coherent and unified entity separate from the external world”¹⁴

¹³ Annelise Norlyk et al., “Being In-Between: The Lived Experience of Becoming a Prosthesis User Following the Loss of a Leg,” *SAGE Open* 6, no. 3 (2016): 1, <https://doi.org/10.1177/2158244016671376>.

¹⁴ Satoshi Shibuya, Satoshi Unenaka, and Yukari Ohki, “Is This My Hand? Body-Ownership and the Rubber Hand Illusion,” *The Journal of Physical Fitness and Sports Medicine* 4, no. 2 (2015): 213, <https://doi.org/10.7600/jpfsfm.4.213>.

and argue that therefore body-ownership is fundamental to self-consciousness. However, they go on to observe that outside of “daily life”, there are a number of illusions—most centrally, the Rubber Hand Illusion (RHI)—whereby the brain can be induced to accept as part of the body some object that they take to be extra-corporeal. The Rubber Hand Illusion is an experiment in which a seated individual’s hand is hidden from view and a similar, rubber hand is placed in the individual’s sightline (in a place similar to where their hand would rest on a table). The rubber hand and the hidden hand are then simultaneously stroked for a minute or two. As the *Guardian* described it, “In combining the visual information with the touch sensations, the brain mistakenly concludes that the rubber hand must be part of the person’s body. When questioned about the feeling, the volunteers said it seemed that their own hand had vanished and the fake hand had become their own.”¹⁵

Shibuya et. al. note that “right-hemisphere brain damage can induce somatoparaphrenic delusion whereby patients deny ownership of their body parts” and amputees’ “frequently experience phantom sensations that their lost hands or legs still exist and belong to their body.”¹⁶ In surveying the RHI studies, they aim to argue that body-ownership is highly flexible. “The RHI indicates that our body-ownership is very flexible, and our brain can incorporate a noncorporeal object into our own body, although the precise underlying neural mechanism is still unknown.”¹⁷

¹⁵ Rachels, “Active and Passive Euthanasia.”

¹⁶ Shibuya, Unenaka, and Ohki, “Is This My Hand?,” 213.

¹⁷ Shibuya, Unenaka, and Ohki, 215.

Why is this important? It seems to show two things: first, that there are cases where subjective experience is *as if* the rubber hand or some other object is *part of* a person's body, but where the subject herself does not judge that this is the case. Second, the RHI (and Shibuya's explanation thereof) suggests that there is separability between our "sense of" body ownership and whatever objects in fact make up our body.

A second kind of illusion that has recently been studied is that of whole-body swapping. In this experiment, participants were positioned to see a mannequin's body from the perspective of the mannequin's head through positioned cameras, and both synchronous and asynchronous strokes were applied to the abdomen of the participant and the mannequin. Participants, based on their responses, were induced to feel the strokes to the mannequin's abdomen as if they were "inside" the mannequin's body. Petkova and Ehrsson argue that "Having the experience of being the owner of one's body is clearly adaptive, and its function probably relates to the problem of localizing and correctly identifying oneself in the sensory environment."¹⁸ They argue that the study of body-swapping suggests a way to understand the perceptual processes at work in our own construction of a body schema and our sense of body ownership. "Our experiments reveal that healthy volunteers can indeed experience other people's bodies, as well as artificial bodies, as being their own. This effect is so robust that, while experiencing being in another person's body, a participant can face his or her biological body and shake hands with it without breaking the illusion. The existence of this illusion (and the identification of the factors triggering it) represents a major advance because it informs us about the

¹⁸ Petkova and Ehrsson, "If I Were You," 1.

processes that make us feel that we own our body in its entirety.”¹⁹ Petkova and Ehrsson suggest that what might be at work is the brain’s drawing on its near-constant experience of the body to which it belongs from a particular perspective based on the location of various parts in relation to the eyes (which are fixed in the skull).

That we can mistake our own body for that of someone else, or the rubber hand for our own, suggests that our sense of body ownership and a majority of our experiences of the same rely on perceptual information and particular perspectives that govern the sensations (and the sense data) that we receive. For example, Petkova and Ehrsson report that after the conclusion of the experiments, “several of the participants spontaneously remarked: “Your arm felt like it was my arm, and I was behind it”, “I felt that my real/own body was someone else” or “I was shaking hands with myself!”²⁰ They go on to argue that it is the “the matching of multisensory and motor signals from the first person perspective” that can create a “full sense of ownership” of one’s body, rather than the traditional view which “emphasizes that body perception is a direct result of bottom-up processing of afferent signals from muscles, joints and skin.”²¹ In other words, these experiments suggest that body *ownership* or our sense of our body parts as our own is highly experiential and related to the signals that we get and the lifetime of experience our brains have of perceiving the world from fixed perspectives (for example, from the perspective of our eyes’ positions in our skull). However, the

¹⁹ Petkova and Ehrsson, 1.

²⁰ Petkova and Ehrsson, 5.

²¹ Petkova and Ehrsson, 6.

illusions suggest that this ownership condition can run independent of our bodies themselves as understood biologically (and, I would argue, metaphysically).

To sum up, I have suggested that the possibility of inducing bodily illusions and the variety of experiences of prosthetic limbs as either part of or alien to the rest of the body require explanation in terms of our thesis. In other words, it is not enough to argue for a metaphysical thesis and a set of conditions without investigating how those conditions manifest themselves in terms of individuals' own self-perception and how this might or might not be explained. In the next section, I take up the question first of the most plausible account of why beliefs about bodily boundaries and body parts based on how individuals experience those boundaries and parts are *pro tanto* justified. In doing this I rely on the intuitionism of Michael Huemer (and his defenses of Phenomenal Conservatism in particular), and on more recent work in the non-inferential justification of certain perceptual experiences along similar lines. I argue that these accounts of justification, experience and defeat makes sense of two important claims: (1) that individuals who describe their body as having or lacking particular parts on the basis of their experience have justification for their beliefs—they are not simply irrational and (2) that even the strongest epistemological account of this justification leaves room for defeasibility of the same beliefs.

Section Two: Huemer's Intuitionism: An Explanation of These Stories

Michael Huemer outlines the basic principle of *phenomenal conservatism* (PC) as follows:

If it seems to *S* that *p*, then, in the absence of defeaters, *S* thereby has at least some degree of justification for believing that *p*.²²

On this view, an agent's having an "appearance" or "seeming" of some state of affairs provides some amount of justification for their believing in that state of affairs. Thus, if it seems to me that my coffee cup is on the table, it appearing to me that way (the appearance of the silver and black striped object resting atop the greenish surface) provides some justification for my forming a belief that my coffee cup is on the table. Huemer does not require that this be all-or-nothing justification, just that it provide *some degree* of the same. Critics of Huemer have argued that there are other sources of foundational or fundamental epistemic justification or that PC does not provide such fundamental justification at all. I will assume for the sake of this argument that PC does explain one source of foundational justification, and suggest that PC can help explain, in the most sympathetic terms possible, the reasonableness of individuals' beliefs with respect to their body parts even while our metaphysical thesis leads us to draw conclusions contrary to these individuals' claims. In other words, the PC thesis helps us to affirm both that individuals' experiences of their own embodiment provides some justification for the beliefs they hold without committing us to thinking that those beliefs are true.

One worry about Phenomenal Conservatism is its (relative) uselessness in what we might call "outlier cases". Being in unusual circumstances, that is, in the kind of case where the seemings would not have as obvious a connection to reality, seems like it will

²² Michael Huemer, "Compassionate Phenomenal Conservatism," *Philosophy and Phenomenological Research* 74, no. 1 (January 2007): 30, <https://doi.org/10.1111/j.1933-1592.2007.00002.x>.

always defeat the evidential force of PC. If one has a seeming and is told one is in unusual circumstances or an outlier case, it might appear as though one possesses a defeater for one's seeming.

But it is not clear that being in an outlier case always undermines the evidential force of PC *or* that prosthetic (or other) cases are in fact outliers in this sense. Being in an outlier case seems to weaken some of the evidential force of our seemings, perhaps for lots of commonsense reasons: we lack a history of seemings with which to compare our current ones, we possess a reason to think our seemings could be completely disconnected from reality, etc. But we will nonetheless have some evidence provided by how things seem to us, and this evidence, even if weakened, does not seem *wholly* defeated merely by being in an unusual situation.

Secondly, the body part case (more specifically, the prosthesis case) does not strike me as that much of an outlier. Humans make determinations all the time about objects that are (and are not) our body parts. We make decisions that reference our body image, our sense of our body in space. The presence of a prosthesis does not seem to catapult us into an outlier case even if the conclusion for which I argue: that a prosthesis is (or can be) a body part is unusual. It might indeed run against the seeming an individual has. The defeater at work in the case before us is not the unusualness of the prosthesis; it is the actual functionality of the candidate part and its integration with the rest of the body.

Importantly, as is noted in a variety of places about the relation of this kind of personal identity or embodied metaphysics, we should not take conclusions from epistemology or metaphysics to have *automatic* implications for our ethical beliefs or

actions. In other words, that I can show how an individual might have defeated beliefs about her body parts, say, in a case of whether her arm is at this time part of her body, does not entail that there is only one appropriate ethical action to take in the case where she requests its removal. What we can clarify in this discussion is the status of her belief, “this is not my body part,” and not the further normative status of the request. Perhaps there are cases where one can justifiably request the amputation of a body part; this dissertation cannot say.²³ What it can say is what the request amounts to: it is not a request to remove something alien to the body (as is a request to remove, say, an ovarian cyst), but a request to remove a body part.

Huemer (2007) intends that his PC view allow for all *kinds* of appearances, including “sensory, intellectual, mnemonic, or introspective.”²⁴ Thus the seemings or appearances relevant might be sensory, as in certain body illusion experiments when one *feels* the rubber hand as one’s own, or introspective, perhaps in cases such as Body Integrity Identity Disorder (or BIID, formerly known as apotemnophilia), where an individual has an internal, introspective seeming that their limb or other body part is alien to them or does not belong. Similarly, much of the goal of neurotechnological advances in prosthetics is aimed at improving the sensory experience of the user, providing *more* sensation of the prosthesis as part of their body (visually, tactilely, and introspectively).

Huemer admits that one can have justification for a belief that one does not in fact hold. In other words, one can have a seeming or an appearance without coming to believe

²³ For some discussion of the issues surrounding this question, see Sabine Müller, “Body Integrity Identity Disorder (BIID)-Is the Amputation of Healthy Limbs Ethically Justified?” *The American Journal of Bioethics* 9, no. 1 (January 5, 2009): 36–43. <http://www.tandfonline.com/doi/abs/10.1080/15265160802588194>.

²⁴ Huemer, 30.

the proposition in question: “This may happen, for instance, when one takes oneself to be experiencing a sensory illusion, so that one does not believe things are the way they appear; note that one’s lack of belief does not typically change the way things perceptually appear.”²⁵ This is the explanation behind many of the illusions discussed in the previous section: individuals report strong sensations (seemings) that their body is configured some particular way without coming to hold a belief in the same. Indeed, in some experiments, as de Vignemont notes, “participants report feeling as if a body part belonged to them while judging that this is not their own body part.”²⁶ One plausible reason they fail to form the relevant belief is because they are aware of a defeater for the seeming—presumably something like, “I am in an experiment in which I will feel as if something is my hand even though it is not.” They know, through the testimony of the experiment leaders and other facts about their bodies that the seeming of the rubber hand being their own is false, stemming from an illusory source.

Participants in these kinds of experiments possess the defeater and the relevant appearance simultaneously; presumably this helps prevent them from forming the belief that “this rubber hand is my hand” even while acknowledging the strong sensation or seeming that this is the case. But, in more complex, non-experimental conditions, such as those with prosthesis users or those with BIID or in other relevant psychological situations, it is not clear that the agents are aware of defeaters for their belief. Thus when they assert that their arm or leg is not their body part, or that some other object is, or use this as the basis for a particular medical request, they do not speak irrationally. Rather,

²⁵ Huemer, 31.

²⁶ de Vignemont, “Bodily Awareness.”

they speak from a justified belief, one justified by their experience *that* the relevant object is or is not part of their body. As Kathrin Glüer puts it, “According to phenomenal intentionalism, an experience-belief that *Lp* provides its subject with a defeasible reason to believe that *p*. ... Perceptual reasons are ‘prima facie reasons’ in the Pollockian sense of *being good unless defeated*.”²⁷

I take it that, like the cases of body illusions, the beliefs formed by those with BIID or other particular psychological situations are in fact defeated beliefs. This naturally raises the question of *what* does the defeating of these beliefs and *how* the defeat works. Epistemologists use the term “defeat” to refer to cases where an agent appears to have (or in fact has) some justification for a belief, and yet the existence of other evidence interferes with her belief (or credence) being justified, all things considered. In cases like the trick lighting, a person sees a cup that looks red, and forms a belief based on her experience or seeming, but then learns that a joker is shining a red light into the room that makes everything look red, even if it is not. Some epistemologists argue that this agent’s belief is *defeated*: her justification for holding the belief (her perceptual experience of the red cup) has been undermined by learning about the joker and the trick lighting.²⁸

Epistemologists distinguish between undercutting defeaters and rebutting defeaters. An undercutting defeater typically interferes with some piece of evidence’s “ability to justify” a particular proposition, and a rebutting defeater typically provides

²⁷ Kathrin Glüer, “Defeating Looks,” *Synthese* 195, no. 7 (July 2018): 2999, <https://doi.org/10.1007/s11229-016-1186-x>.

²⁸ Admittedly epistemologists will argue about whether or not this is a case of defeat. I use it here merely to illustrate the concept.

some additional evidence that the proposition in question is false rather than true, or true rather than false (without directly touching the existing evidence or its justifying power).

According to Huemer, “In view of the innate tendency of appearances to confer justification, one can be justified in refusing to accept the content of an appearance only if one has some justification for mistrusting that appearance.”²⁹ This is a fairly high threshold for the defeater to achieve. On Huemer’s PC, appearances are weighty, providing immediate justification, and the only way to defeat them, so to speak, is to have a justified mistrust in the appearance. Do we have such mistrust in the cases we are considering here?

Yes. There is a global reason of proven fallibility: *it has been shown that our brains can make mistakes about what is and is not part of our body*. The evidence from illusion cases is that the brain can be induced, in the right setting, to have appearances as of bodily parthood that do not correspond to reality (even as understood by the participants in the experiment). So having the seeming, *this is my hand* is had with a global awareness that the seeming is not infallible. Should I learn I was in an experiment of the right kind, I would presumably resist forming such a belief (or lower my credence in the proposition).

This global reason does not, I think, do too much work on its own. We generally assume we are not in the kinds of conditions that generate false body-part beliefs, and with good reason. To meet Huemer’s criteria for defeat, then, we need some justification

²⁹ Michael Huemer, “Epistemological Asymmetries between Belief and Experience,” *Philosophical Studies: An International Journal for Philosophy in the Analytic Tradition* 162, no. 3 (2013): 747.

for thinking we are (or more specifically, our brains are) in that kind of situation. Do we have such evidence?

One could object here that this is question-begging. I *assume* that the BIID beliefs are false, and therefore I look to find a reason to distrust the individuals' seemings, finding it in BIID (or relevantly similar psychological circumstances). How can we avoid this kind of question-begging? The recourse here is, I think, in the functional and integration-related empirical data about the objects in question. These data do not require any conscious awareness on the part of the brain, nor do they rely on any appearance from the individual. That is, I can run tests completely independently of the individual who argues that her arm is not her body part: I can test its response to neural signaling from her brain, its reflexive responses, its circulation, oxygen saturation, muscle tone, ability to pick up and put down other objects. In short, I can see whether or not the hand does characteristic "hand" work for the individual, even if she psychologically rejects it qua body part. This data suggests that she is in the kind of situation where her psychological beliefs are untrustworthy. Thus, we should think her belief about her arm is defeated.

But attention to the appearances is not unimportant even if that is not the basis on which we (ultimately) rest beliefs about what is and is not part of our body. The appearances or phenomenology of Merleau-Ponty's "lived body" is important for a person's overall wellbeing, sense of self-image, confidence, social success and more. In fact, part of the reason that so much emphasis in contemporary prosthetic research is put on conscious integration, usage and awareness on the part of the user is *because* one's body image plays an important role in overall wellbeing. As Graczyk et. al. observe, "The

improvements in user experience demonstrated here show that sensory feedback fundamentally reshapes the way that prosthetics users view their prosthesis in relation to their bodies, their abilities, and their interaction with others.”³⁰ Improving this kind of *felt* integration is important because it has impacts on an individual’s overall wellbeing. And as Ehrsson describes, “It is also possible that having a sense of ownership of the prosthesis would be helpful to the user in its own right. If the prosthesis is experienced as being ‘one’s hand’, it would probably be easier and more intuitive to use. Furthermore, a feeling of ownership of the prosthesis could have a ‘cosmetic’ value to the user because he or she would not be continuously reminded that the prosthesis is artificial, thereby reducing body dissatisfaction.”³¹ To deny that beliefs formed on the basis of seemings about one’s body are infeasible is not to deny that such beliefs are important.

To conclude, adopting a Huemerian approach to the question, we can say that while a belief “X is (or is not) my body part” can be justified on the basis of a seeming or appearance (a phenomenological experience broadly understood), it can also be defeated. Other facts about body parts, in particular the function and integration facts I have argued for in this dissertation, can undermine a belief about body parts.

We can understand, therefore, two important facts about the testimony of individuals with respect to their body parts as a result of these reflections. First, we can see the rationality of individuals who claim that such-and-such an object is or is not their body on the basis of their experiences. For indeed, on Huemer’s view, they are *prima*

³⁰ Graczyk et al., “Home Use of a Neural-Connected Sensory Prosthesis Provides the Functional and Psychosocial Experience of Having a Hand Again,” 10.

³¹ H. Henrik Ehrsson et al., “Upper Limb Amputees Can Be Induced to Experience a Rubber Hand as Their Own,” *Brain* 131, no. 12 (December 2008): 3450, <https://doi.org/10.1093/brain/awn297>.

facie justified. Second, we can see that what alters these beliefs is a *defeater* of the right kind, whether in experimental settings through knowledge of the illusion or perhaps through other forms of cognitive intervention.

Now one might ask whether or not it is *fair* to intervene in cases where in individual seeks the removal of his or her body part, or whether the right approach is some kind of cognitive alteration, or something else. One could argue that overall health (including emotional and psychological) is more important than the health of some particular part, and overall health is best achieved by the part's removal. This dissertation makes no definitive ethical pronouncement on the question of how one should treat individuals who request removal of a body part that is not in itself diseased or dysfunctional; however, there are good reasons to think that this dissertation does change some of the relevant thresholds for these scenarios. For example, there does not need to be a high level of informed consent for one child to give her crayon to another. However, there is a high requirement of informed consent for one person to give her kidney to another. If something—like an implanted cardiac device or a prosthetic leg—is indeed your body part, then there are higher thresholds to be met before it could be removed. Similarly, the level of consent required for an individual to undergo elective amputation surgery must be much higher than if we took it to be the case that the individual was undergoing the surgical removal of some object that was clearly not part of the body (say, a penny lodged in the digestive system).

Getting clear on the metaphysics may not answer all our ethical questions, but it clarifies the nature of that question. This is important, as I discuss in the next chapter,

because responding appropriately to ethical questions requires knowing the stakes involved.

Conclusion: Returning to an Aristotelian View of the Matter

As I noted at the beginning of this project, the theory of bodily parthood I have defended assumes some basic tenets of hylomorphism: that human beings are composites of body and soul and that the soul is the form of the body. From this, I argue what it is to be “a part of” the body is to be informed by the soul in the relevant way. Functionality and integration are two necessary and sufficient conditions for something’s being a body part (they are, one might say, a way of cashing out what it means to be informed by the soul).

I draw much of my historical support for the theory of this project from Aristotle, a founding proponent of hylomorphism. However, thus far I have explored only the metaphysical dimensions of Aristotle’s writing. In this chapter I turn to his understanding of scientific evidence and how one gathers evidence (and gains knowledge) of the soul informing matter. I will argue that Aristotle suggests that the best way to understand soul’s informing activity is to attend to the biological phenomena, particularly in terms of functionality. Thus we can see whether or not something acts as a hand or fails to act as a heart, and this forms the core of our evidence about that object in relation to the individual’s body.

In particular, the kind of evidence that Aristotle sought for determining the existence and differentiation among body parts in his biological and zoological works was functional in nature. Aristotle employed the empirical study of functions, and study of the matter that *matters* for those functions, to develop conclusions about the bodies of

living things. This evidence is, I think, the major source of evidence that can be used in contemporary discussions of the kind of objects with which this dissertation is particularly concerned (prosthetic and artificial limbs, organs and the like).

Functions are measurable in biological terms. We can see whether an object pumps blood. More specifically, we can see whether an object pumps *your blood* or *my blood*. As James Lennox describes it, for Aristotle, “[f]orm, in the case of living things, turns out to be capacity to perform living functions, i.e. soul; and thus the form of a living thing is causally prior to the matter, because it is the goal for the sake of which the parts of the animal—its matter—come to be and exist.”³² In *On the History of Animals*, Aristotle describes at length in the beginning the different kinds of animals, how they differ in parts and the compositions, arrangements and purposes of the parts, describing his reasoning thus: “What has just been said has been stated thus by way of outline, so as to give a foretaste of the matters and subjects which we have to examine; detailed statements will follow later; our object being to determine first of all the differences that exist and the actual facts in the case of all of them.”³³ Aristotle claims that we must begin with the parts of the human body because we begin with “the standard most familiar to [us]”³⁴ which is the human being.

This shows us that Aristotle’s chief source of evidence about body parts was the observations about functions, and particularly how a given material (the esophagus or the

³² James Lennox, “Aristotle’s Biology,” in *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta, Winter 2019 (Metaphysics Research Lab, Stanford University, 2019), <https://plato.stanford.edu/archives/win2019/entries/aristotle-biology/>.

³³ Aristotle, trans. A.L. Peck, *History of Animals, Volume I: Books 1-3*, vol. Loeb Classical Library 437 (Cambridge, MA: Harvard University Press, n.d.). See 491a10-15.

³⁴ Aristotle, trans. A.L. Peck. (491a21)

heart) was composed so as to be able to perform those functions. He provides in the proceeding sections of the *History of Animals* lengthy descriptions of human bodies and their parts, and the purpose for which those parts exist. It is from these descriptions that Aristotle derives his necessity claims about certain body parts. For example, the esophagus is (necessarily) made of a certain kind of tissue *because* it must perform digestive and nutritive functions. The necessity is conditional on the functions that the part performs. This establishes that the measurement of an object's functional success is paramount to determining its candidacy for parthood. Something could be made of "human flesh" but this does not mean it can function *as* the part it is supposed to be. The "uniform" parts like flesh will of *conditional necessity* have certain properties in order to actualize certain functions. But the necessary properties for something's being "flesh" are set by the functions that "flesh" must achieve. And thus in determining something's candidacy for being part of a particular human's body, we must evaluate its functional performance.

Aristotle reiterates the importance of functional observation in his description of the differences between male and female sexual parts in the *Generation of Animals* (GA): "Now for the exercise of every function instruments are needed, and the instruments for physical faculties are the parts of the body. Hence it is necessary that, for the purpose of copulation and procreation, certain parts should exist, parts that are different from each other, in respect of which the male will differ from the female."³⁵ Determining the uterus as a body part of a female body, for example, requires two antecedent commitments. First, it requires considering procreation one of the biological functions of animals. This

³⁵ Aristotle., trans. A.L Peck., *Generation of Animals /*. " (716a26-30).

seems fairly intuitive, particularly given evolutionary concerns about the maintenance of the species' over time. Second, Aristotle must identify that these parts exist *for the sake of* procreation, even if they do not exist in all human beings. In observing how the uterus plays a role in procreation, Aristotle concludes that it is a body part of a female human being, even though it is not a part that all human beings have in common (or indeed a part that serves, to his knowledge at least, a continuous function).

One could object here that, notwithstanding our ability to measure actual functional performance, we cannot see whether a given object is *meant to* or *supposed to* pump blood. Consider the following case. An innovative surgeon is in the middle of a heart transplant. He is informed that the heart that was supposed to be sent to the hospital for transplant has accidentally gone to another hospital. Knowing that his patient on the table needs a blood-circulating object, he creates out of objects in the room a temporary circulatory device.

The objects that are used by this surgeon were not *originally* designed to pump blood. One could argue that upon looking at them we could not see that they were “supposed to” – but they actualize the function successfully nonetheless. I see no reason why the original design of an object should prohibit its being incorporated into the body in the relevant way so as to be a body part, provided that it performs the functions that define that part and can be integrated with the rest of the body in the right kind of way. It's certainly possible that our surgeon's on-the-fly invention might fail to be a body part on this criterion; it need not fail on the functional side merely because its original purpose or intention does not match its current function.

By now we are familiar with Aristotle's distinction between bronze and living hands: what makes the something part of a living body (a hand in more than name) is its function for the sake of the body in which it operates. In the *Parts of Animals*, Aristotle is even more explicit in how this matters for epistemic concerns. He critiques Democritus's statement, in which we apprehend a man (and consequently his parts) by shape and color. "Likewise, the eye or the hand (or any other part) of a corpse is not really an eye or a hand. Democritus's statement, therefore, needs to be qualified, or a carpenter might as well claim that a hand made of wood really was a hand."³⁶ Aristotle is even more explicit here about the insufficiency of a material-only examination of a body part. He claims we must modify Democritus's statement that a man could be understood by touching his shape and apprehending his color (see 640b35), because *otherwise* we could claim that a wooden hand "really was a hand."³⁷ So the study of material composition of parts will not aid us in determining whether or not something is a part. Instead, according to Aristotle, we must study the "functions appropriate to the things that bear [those] names". By studying function, we can determine whether or not a wooden hand can do the tasks of a hand—grasping, squeezing and other manipulative tasks Aristotle assigned to the hand.

This is not a definitive defense of my thesis. It does, however, suggest a harmony between the epistemological emphasis in Aristotle's theory of biology and the emphasis I argue for here. If we study the function of the relevant parts we are equipped to make bodily parthood claims. Material composition is neither necessary nor sufficient; and

³⁶ Aristotle, *Parts of Animals Movement of Animals ; Progression of Animals* /. 641a1-10.

³⁷ Aristotle. 641a1-10.

likewise with an individual's conscious perception (whether inclusive or exclusive) of the object in question.

CHAPTER SIX

Medical Ethics and Bodily Metaphysics

Introduction

Thus far I have argued for a specific metaphysical thesis—a thesis about conditions for bodily parthood—and suggested some reasons to think it is true both from hylomorphic a priori reasoning and from some other sources of empirical evidence. But one might reasonably wonder whether such a metaphysical project has any practical bearing on medical decision-making or legal reasoning. Given that both currently invoke some concept or other of bodily parthood in order to justify their conclusions, whether about the legal status of a person’s MAD device or the permissibility of turning off an implanted artificial organ, or more generally about ownership and rights of allogeneic organs being donated or transplanted, it seems clear that claiming that something is a body part of some human being affords it weighty moral status.

In this chapter, I will argue that my metaphysical thesis intersects in important ways with current questions in medical ethics, particularly around end-of-life actions, personal damage and harm, and ownership. While I do not think that my thesis can tell us *how weighty* the “body part of” status is, or how it ought to be considered against other ethical considerations, it can at least offer a deliverance on whether some object in question is a body part or not. And this is important, if it is true (as seems to be the general ethical and legal consensus) that there is at least some special weight afforded body parts that is not afforded to property.

Section One: Ending Medical Interventions or Attacking Body Parts?

End-of-life care raises a number of contentious ethical questions, perhaps most familiarly the question of whether, and in what ways, physicians and patients are permitted to end medical interventions with the aim of hastening death. The American Medical Association maintains a distinction between *active* and *passive* euthanasia, arguing that it is permissible for physicians to participate in passive euthanasia—ending medical interventions with an awareness that this will hasten death—but not in active euthanasia (such as administering a lethal dose of a barbiturate). Part of maintaining such a distinction depends on the ability to distinguish between what objects count as part of the medical intervention and what objects count as parts of the body. The distinction between active and passive euthanasia is controversial among medical ethicists,¹ and some argue that what matters is the *intention* of the agent in question. If someone acts—whether turning off a ventilator or stabbing someone in the neck—so as to bring about death, then the action is active euthanasia whether or not the intervention is an action on the body or an instrument helping the body. Many people would agree that my unplugging the ventilator so that my rich uncle will die and I gain the inheritance is a case of murder, even though the action in question is indirect (I have not given him a lethal dose of narcotics that itself causes death, but instead removed the object that was preventing his lung failure from causing his death). But if active and passive euthanasia might turn on intentions, some have argued that the details of the intervention or action matter as well. If some medical devices are body parts, then “turning off” the ventilator is no longer removing a form of treatment merely knowing that death will ensue; it is

¹ See, for example, Rachels, “Active and Passive Euthanasia.”

directly acting *on the body of the patient*. Let's briefly consider three devices, all of which aim at aiding or performing key cardiac functions in a patient. I will show first that the ethical debate about ending these interventions turns on whether the devices should be considered body parts. Then, I will argue that the thesis I have offered in the foregoing chapters provides some way to adjudicate some of these disputes, and thus advances the ethical conversation. A better understanding of the metaphysics of body parts provides an avenue for progress in these areas of medical ethics.

LVAD (Left Ventricular Assistance Device)

In this first case, the device has been debated in a number of ways about its metaphysical status as body part, mechanical intervention, or something else. Ruth Fischer and Jeremy Simon argue explicitly over this status in their discussion of Mr. P, a patient who asks his physicians to disable his LVAD, a device providing assistance to his left ventricle in pumping blood. They note that Mr. P cited “the indignity of being helped to the toilet and his continuing debilitating fatigue as reasons for his request.”² Jeremy Simon writes that he is hesitant to turn off this patient’s LVAD because, he claims, “Once the patient leaves the hospital, the LVAD ceases to be a medical treatment and becomes effectively part of the patient himself... it forms an integrated part of an independently functioning organism. We would not remove a patient’s biological heart, transplanted or native, simply because the patient was suffering greatly from heart failure

² Jeremy R. Simon and Ruth L. Fischbach, “Doctor, Will You Turn Off My LVAD?,” *Hastings Center Report* 38, no. 1 (2008): 14, <https://doi.org/10.1353/hcr.2008.0002>.

and did not want to go on; nor should we disable his LVAD.”³ Simon goes so far as to say this is “tantamount to removing the patient’s heart.”⁴

By contrast, commenting on the same ethical question, Ruth Fischer argues that because the LVAD “depends on external power sources and pharmaceutical maintenance, removing these externalities is akin to the passive euthanasia that physicians already perform.”⁵ Fischer refers to the LVAD as a medical intervention or a technology, rather than a body part, and also distinguishes the patient himself from the intervention/therapy that he deems more costly than beneficial to his overall wellbeing.

Both Simon and Fischer accept the act/omission distinction now common in medical ethics when debating cases of ending life-sustaining treatments. The debate about deactivation of the LVAD arises precisely because only some kinds of actions with respect to end of life care (and the cessation of treatment) are considered legally (and perhaps morally) permissible. It is permissible, for example, to stop some treatments but not permissible to “deactivate” a biological and functioning organ. A physician can legally turn off a ventilator, but not fatally puncture both lungs. In understanding what action a physician who deactivates an LVAD is doing, it becomes important to determine whether or not the LVAD is a body part. If it is, then the physician cannot claim she is merely removing a treatment. On the other hand, if the LVAD is not a body part, she could presumably make this argument.

³ Simon and Fischbach, 14.

⁴ Simon and Fischbach, 15.

⁵ Simon and Fischbach, 15.

On my view of body parts, something is a body part of some human being at some time just in case it performs a function for the body (directly or indirectly) and is integrated into the rest of the body in some substantial way. The LVAD seems to plausibly assist the heart in performing the functions necessary for the circulation of blood. In particular, the LVAD helps the blood to flow within the heart and oxygenate appropriately, which is vital to subsequently circulating oxygenated blood to the rest of the body. It is less clear in what ways the LVAD itself is integrated in the body and/or interacts with other body parts. While it might be considered “part of” the heart (a replacement for the left ventricle) and in that way connected with the rest of the body, there is not much evidence for direct interaction between the LVAD and other body parts. There is, however, I think some good reason to think that the LVAD has a teleological interaction with the rest of the body and with the soul. It exists within the person’s body for the sake of sustaining the heart, for the end of maintaining the patient’s biological life.

It seems that there could be a case to be made for the LVAD being a body part and for it not being one. Importantly, though, this debate will turn not on whether it is implanted (as opposed to outside the body) as some intuitions in medical ethics suggest. Rather, the determination can be made on the basis of whether it performs a function (and of what kind) and the integration of the device within the whole of the patient’s body.

The TAH (Total Artificial Heart)

As Robert Veatch (2003) observes, there is a “well-established consensus that patients have the right to forgo life-supporting medical interventions when, in the minds of the decision-maker, the treatment is no longer offering benefits that exceed the

burdens.”⁶ Patients (and/or their proxies) can, according to this consensus, opt to withdraw artificial nutrition or hydration, ventilator support, oxygen support or dialysis. Veatch observes this consensus in order to lay the groundwork for evaluating the removal of a Total Artificial Heart (TAH) at a patient’s request. “Thus it seems reasonable that,” he writes, “if other life-saving technologies can be withdrawn on this basis, a TAH that was not offering net benefit could as well...”⁷ But Veatch notes that the TAH presents a unique problem because in most cases of artificial or technological support the device is not only turned off but also removed (a patient is extubated as well as having her ventilator turned off). But to remove the TAH requires an invasive surgery that starts to take on a more active, rather than passive, character. Veatch continues: “The received wisdom is that, if a patient or surrogate withdraws consent for further life-supporting technology such as a ventilator or dialysis machine, the physician must not only cease using the technology, but must remove it. Moreover, such removal is not considered to be the direct cause of death so the physician who is obliged to remove it is not considered to have committed a homicide.”⁸ In the TAH case, though, the “turning off” of the heart *is* a direct cause of death. “Throwing a switch that stops a TAH is more like injecting a drug that paralyzes the heart muscle or like excising the SA node... The direct and immediate result is death—as long as our society continues to rely on cardiac as well as brain-oriented definitions of death.”⁹

⁶ Robert M. Veatch, “INACTIVATING A TOTAL ARTIFICIAL HEART: SPECIAL MORAL PROBLEMS,” *Death Studies* 27, no. 4 (May 2003): 306, <https://doi.org/10.1080/07481180302902>.

⁷ Veatch, 307.

⁸ Veatch, 307.

⁹ Veatch, 309.

Veatch's ultimate solution to the problem is to argue for the universal adoption of brain-oriented definitions of death rather than cardiac ones. In such a case, the irreversible stoppage of cardiac function will not directly and immediately result in death, but death will occur some moments later when the blood flow to the brain tissue has ceased and with it all brain activity also ceases. Veatch seems to assume, rather than argue for, the appropriateness of turning off a TAH upon patient request. His brain-death argument makes such an action permissible by making it only an indirect cause of death.

But there is still a problem for Veatch's view if the TAH is not merely a machine but a person's heart. There are clearly cases where the "inactivation" of a body part leads to irreversible brain stoppage in just the same way, and it is not for that reason considered permissible. For example, a fatal liver stabbing will cause a patient to bleed to death, whether the death is pronounced upon a cardiac criterion or a brain-dead criterion. In either case the liver stabbing is considered the cause of death (the person who stabbed the dead individual will be prosecuted for homicide or manslaughter), even though it is indirect (as Veatch claims of the inactivation of the TAH).

The difference seems to be that in the case of the TAH, we assume that it is a machine rather than a body part. That enables us to claim that the action in question is not an attack on a person or a person's body (that indirectly results in her death) but instead a cessation of medical intervention. Depending on the deliverance of our metaphysical investigation, then, it seems the action of switching off the TAH will change. The "indirectness" that Veatch describes by shifting the death criterion from cardiac to brain function will not help if the TAH is someone's heart.

Is the TAH a body part? Empirically speaking, the TAH has perhaps the strongest evidence in favor of considering it so. The TAH performs a clear and distinct function for the body, namely, circulating oxygenated blood (among other things). It is connected to and dependent upon the rest of the body in many if not all of the same ways as the biologically human heart. Admittedly, the TAH does rely for power on a bedside console, since the tubes connecting to the two pumps in a TAH provide the necessary control and initiation of the pumping action of the TAH. This is not too dissimilar from the electrical activity of a SA node that initiates each heartbeat. And while the electrical dependence is not identical between a TAH and a biologically human heart, there is, I think, enough integration for the TAH to count.

And if that is the case, then Veatch's solution to the moral problem of TAH removal fails. For even if the removal or destruction of a body part is only indirectly related to death (in the sense that Veatch seems to mean it), it is nonetheless a criminal act to remove or destroy a body part with the aim of hastening death, even with patient consent.

The ICD (Implantable Cardioverter-Defibrillator)

The third case, which sits between the LVAD and the TAH is the ICD (the implantable cardio-verter defibrillator). An ICD is a type of intervention designed to assist the heart by providing shocks to reregulate arrhythmias. In such cases, the heart considered *without* the ICD is failing to function well. In arguing about ICD cases, Timothy England and his colleagues suggest that "if the patient has received a transplanted kidney, this may not lawfully be removed (or otherwise 'deactivated') by a doctor just because it would no longer be appropriate to replace the kidney were it to

cease functioning...”¹⁰ So, if the ICD is a body part, the fact that it is assisting a failing organ does not provide a good reason to deactivate it, even if it were the case that the person would not be eligible for a heart transplant. And removing such a body part *at the patient’s request* would also be considered murder at least in most contexts: that I deem my own life futile does not provide moral or legal permission to stab me.

I am not making definitive arguments here about the moral permissibility of ending a patient’s life by her own request. Rather, I am suggesting that the metaphysical status of the artificial parts will make a substantive moral difference in how they can be treated. If the ICD is a body part, it cannot be deactivated any more than a kidney can be stabbed in order to end the life of the patient in question.

England et al. suggest that ICDs are not exact *replacements* for an easily discernible body part (that is, it does not occupy the place or perform a total function by which we designated other parts like kidneys or livers). Instead, *depending on whether it is a patient’s body part or not*, its removal or deactivated will be legally and perhaps morally permissible. England et.al. clearly think the metaphysics here make a difference, though they opt for a new status – an in-between “device” and “body part” that is a bit unclear. They write, “an integral device, though not organic, is part of the patient. We suggest that where technology has been integrated into the physical being, a patient should retain stronger autonomy than he does with external mechanical devices... Nonetheless, an integral device is not truly a part of the body. Thus, deactivation should

¹⁰ England, England, and Coggon, “The Ethical and Legal Implications of Deactivating an Implantable Cardioverter-Defibrillator in a Patient with Terminal Cancer,” 539.

be permitted in some circumstances.”¹¹ The problem, as they point out, is that if the ICD is a part of the body, “the way the law has developed, a patient is not entitled to have a vital part of the body ‘deactivated’ even if he consents.”¹² But England et. al. draw their metaphysical conclusions, it seems, largely on the basis of a particular desired outcome. They aim at justifying some occasions of ICD deactivation with patient consent. But, because patient consent is irrelevant in cases of vital body parts, they conclude that the ICD is not such a part. But there is no good reason offered to think this independent of the received conclusion that sometimes the ICD is permissibly deactivated.

On the view of body parts I have defended thus far, determining whether the ICD is a body part requires some empirical information. For example, does the ICD perform a function for the body as a whole? At best, it seems an ICD performs an indirect function aimed at the body, a counterfactual function. The ICD exists to correct the heart *in the case where* defibrillation is necessary. In other words, the ICD performs an occasional and non-regular function for the body by shocking the heart back into normal rhythm. But it does not support or perform a regular function of the body or any of its parts. Secondly, the ICD is not well integrated the rest of the body’s functions. It does not perform any assistive functions for other organs aside from the occasion indirect assistance to the heart (which can help the other body parts). And, if we accept (as I think we should) that being “inside” the typically conceived geography of the body is not a good reason to think that something is a body part, then we do not need to worry about the ICD’s implanted status making it a body part of the patient.

¹¹ England, England, and Coggon, 540.

¹² England, England, and Coggon, 539.

One objection to this view would be that some body parts—say, horns on a female sheep or goat¹³—do not perform a *regular* function but instead, much like the ICD, stand at the ready to function in the event of adversity (say, a predator attack). These horns similarly do not perform assistive functions for other organs, although their function (when activated) protects the whole body and in that way “assists” the other organs. So perhaps the more precise problem with the ICD is not that its functioning is intermittent or that it does not interact with the other organs, but that even its intermittent function is not specific by the human being’s form. At most the ICD helps the heart to perform *its* characteristic functions in some cases. But this is still, it seems an intervention rather than an ongoing function or activity.¹⁴

In that case, England et al.’s conclusion about the permissibility of refusing defibrillation in the ICD case can stand without the need for new “biofixture” category. The ICD can be an interesting kind of medical intervention—one that operates within the body rather than externally—but it is an intervention nonetheless and therefore within the scope of permissibly deactivated or refused interventions.

Thus far I have argued that attending to the metaphysics of an object’s being a body part (or not) of a human being has a bearing on the ethical permissibility of rendering non-functional that object (whether through removing its power source or it from the body entirely). Determining its status as a body part changes the ethical valence of TAH deactivation and distinguishes it from ending a medical intervention like ICD. In

¹³ I’m grateful to Dr. Pruss for this example and the questions it raised.

¹⁴ Admittedly, it is true that the nodes of the heart (the heart’s own electrical sources) do perform defibrillating-type activities in some cases. This is an additional consideration for determining whether the ICD is an intervention or a true body part.

the next section, I consider a second ethical worry about body parts, namely, distinguishing between cases of personal harm or assault and cases of property damage.

Section Two: Personal Harm or Property Damage?

In 2009, bioethicist and attorney Linda Glenn described in detail a case she litigated for Mr. Collins, a veteran of the military who, as a result of extensive injuries, was paralyzed from the waist down and used a MAD (mobility assistance device) which functioned as his lower torso muscles and lower legs.¹⁵ Allways Airlines had damaged Mr. Collins's MAD in transit, and he sought compensatory damages for personal harm. Mr. Collins and his counsel argued that the MAD, given its functional role with respect to the rest of Mr. Collins's body, was an extension of that body; damage to the MAD constituted damage to the person.

The case's compelling question was not whether the airline in question had damaged something of Mr. Collins's—rather, the question was *what kind of thing it was that they had damaged*. Glenn writes, “Allways Airlines did not challenge liability; they accepted that there was negligent handling of Mr. Collins equipment. What Allways did challenge were the damages and the foreseeability of damages. They likened the circumstances to an automobile accident where the owner was not in the vehicle; they argued that they did not harm Mr. Collins, they only damaged his device.”¹⁶ The insurance adjuster for Allways argued, in other words, that the MAD was *not* a body part of Mr. Collins and on that basis the airline was not responsible for paying any personal

¹⁵ Linda MacDonald Glenn, “Case Study: Ethical and Legal Issues in Human Machine Mergers (Or the Cyborgs Cometh),” *Annals of Health Law* 21 (2012): 6.

¹⁶ Glenn, 177.

damages. What Glenn and her fellow counsel sought to demonstrate was the opposite: the best understanding of the MAD was that it was an extension of Mr. Collins, a part of his body and therefore to do damage to it was to do damage to him. She writes, “We explained that modern day prosthetics are the new normal: implants, transplants, embedded devices (e.g. pacemakers), nanotechnology, neural prosthetics... The MAD was an extension of Mr. Collins; by harming his MAD, the harm extended to Mr. Collins.”¹⁷

Similar cases of harm to prosthetics or other integrated, functional devices present similar problems. Artist Neil Harbisson, who uses what he calls an “eyeborg” that uses an antenna connected to an implanted, vibrating chip that translates color into sound. Harbisson argued with the UK passport agency to have the eyeborg included in his passport photo. As Stuart Jeffries reported, “He argued that it was not a piece of technology but part of his body, and they eventually yielded – a first for cyborg rights.”¹⁸ In describing himself in the report, Harbisson explained, “I’ve been a cyborg for 10 years now. I don’t feel like I’m using technology, or wearing technology. I feel like I am technology. I don’t think of my antenna as a device – it’s a body part.”¹⁹ Harbisson was attacked in 2011 by policemen who did not understand his device. He writes, “Last year I was attacked by three policemen at a demonstration who thought I was filming them. I told them I was listening to colours, but they thought I was mocking them and tried to

¹⁷ Glenn, 177.

¹⁸ Stuart Jeffries, “Neil Harbisson: The World’s First Cyborg Artist,” *The Guardian*, May 6, 2014, sec. Culture, <https://www.theguardian.com/artanddesign/2014/may/06/neil-harbisson-worlds-first-cyborg-artist>.

¹⁹ Jeffries.

pull the camera off my head.”²⁰ Suppose, as do Adam Carter and Orestis Palermos, that in this scuffle all that was damaged was Harbisson’s device (without damage to his biological body). As they pose the question, “would you say that we should regard Neil as having been personally assaulted, or should the inversion of his colour spectrum via intentional harm to the eyeborg be understood along the lines of mere property damage?”²¹

We see in these examples an important use to which theses about metaphysical (bodily) parthood can be put, in understanding whether certain devices fall under the class “body parts” in the sense relevant to determining cases of personal harm rather than property damage. Carter and Palermos, following the Clark/Chalmers view of extended cognition, suggest the plausibility of a new category of *extended personal assault* that would apply, perhaps, to cases like Harbisson’s or Collins’s. Or, even more widely, cases like the seizure of cell phones in warrantless searches of individuals under arrest (see for example the Supreme Court case *Riley v. California* in 2013). If we take extended cognition to be a robust and plausible thesis about our cognitive systems, then the notion of personal assault must be widened to account for damage done to those objects that compose our extended systems.

Like Carter and Palermos, Linda Glenn (2002) suggests that we adopt a legal continuum, fixed by property at one end and persons at the other.²² By property, Glenn

²⁰ Jeffries.

²¹ J Adam Carter and S Orestis Palermos, “THE ETHICS OF EXTENDED COGNITION:,” n.d., 16–17.

²² Linda Glenn, *Biotechnology at the Margins of Personhood: An Evolving Legal Paradigm* (ProQuest Dissertations Publishing, 2002), 90, <http://search.proquest.com/docview/305459208/>.

means inanimate objects, land, and the like; by persons, she has in mind the Kantian notion of rational, fully self-conscious individuals. In the middle, she claims, one could introduce the “notion of quasi-property, an idea that was recognized long ago in 1872 by the Rhode Island Supreme Court, with regard to the treatment of dead bodies, as well as used recently in frozen embryo cases”²³ and “*quasi-personhood*”. For Glenn, the closer something is to a Kantian ideal, the more rights it has, and suggests that this maps nicely onto some of the ways we already grant more rights to individuals as their autonomy and rational capacities grow (witness the gain of rights to vote or consume alcohol at varying ages). And as we have already seen, the notion of a “biofixture” (see England et. al.) has been proposed as a way of bridging the apparent gap between (mere) property and biological body parts.

It is important at this juncture, however, to note what is and is not implied by the thesis I have defended thus far. A thesis about what objects stand in the body part relation does *not* adjudicate the longstanding legal and philosophical debates about whether bodies *simpliciter* are also our property. In one sense, which specific prosthetic limbs or other technologies are considered body parts will make little difference to their treatment. If we accept a thesis that bodies are property, then all that will change as a result of my thesis is that the type of property will have shifted—now, a prosthesis will be “body property” rather than “land property” or “object property”. Thus here is one way in which it might seem that the metaphysics makes no real difference.

This might lead us to think that there will be no substantial payoff to making progress in our understanding of the metaphysics of body parts. In either case, one might

²³ Glenn, 90.

say, the artificial heart, the prosthetic lower leg, the hip replacement, is property of one kind or another. Thus making a distinction between the computer in my backpack and the artificial hand typing on it has no ethical payoff.

But this is not quite right, for we do make a distinction between damaging an individual's property and damaging her body. While our rights over our bodies may be analogous to property rights, we might (and still seem to) make a distinction between something being merely our property and something being part of our body proper. If I steal your cell phone without physical contact with you I cannot be charged with assault, but if I pull your hair out and run away with it, I have not merely committed theft. As Charles Foster observes, the analogy to property seems to break down in our desire to explain the moral wrongness of, say, using a cadaver's ear as an ashtray or playing soccer with an unknown head discovered in a medieval cemetery.²⁴ If the only moral or legal description of these situations involve the notion of property, something has been overlooked, according to Foster. He goes on to claim that the relevant thing is human dignity and to suggest that what makes the above acts wrong in a particular way is that they interfere with human flourishing (his "thriving"²⁵), a fundamental component of which is bodily integrity.

I will leave Foster's particular thesis about dignity and bodily integrity aside for now, and instead suggest that we see in other philosophical and legal frameworks a persistent gap between "mere" property and human bodies. As Imogen Goold observes,

²⁴ Charles Foster, "Dignity and the Ownership and Use of Body Parts," *Cambridge Quarterly of Healthcare Ethics* 23, no. 4 (October 2014): 418, <https://doi.org/10.1017/S0963180114000097>.

²⁵ Foster, 420.

“Empirical studies have demonstrated that external aspects of the body like hair, eyes, hands, legs play an important part in defining and maintaining a person’s sense of self,”²⁶ which helps to explain why many have strong preferences about the use of their body parts both before and after death. Moreover, Goold maintains that so long as “the legal system in England continues to avoid the question of the precise status of human tissue and body parts, these and other situations will remain challenging. The common law position lacks a clear, principled approach to tissue use.”²⁷

Where does this bring us? Legal and philosophical debate about the ethics of selling bodily material or the property claims of individuals with respect to their separated biological material will not be definitively answered by a metaphysics of bodily parthood. Rather, the relevant progress this project can make is to better understand the class of objects that will fall under the normative rules we create about the use and disposal of body parts. If in some cases prostheses are body parts, then they ought to be governed by the rules for that class of objects rather than the “mere property” class.

Because we already see bodies as meriting special treatment under the law (whether as a “special type” of property or as something not property at all), to count Mr. Harbisson’s eyeborg device or Mr. Collins’s MAD as *body parts* immediately raises them to the level of meriting that same special treatment. And unlike the extended notion of assault or the legal continuum notions of quasi-property or quasi-personhood, my thesis would argue that any case where a particular object has been classified as a body part of

²⁶ Imogen Goold, “Why Does It Matter How We Regulate the Use of Human Body Parts?,” *Journal of Medical Ethics* 40, no. 1 (January 2014): 5, <https://doi.org/10.1136/medethics-2012-100941>.

²⁷ Goold, 9.

the individual in question is a *straightforward* case of personal harm rather than property damage. As tempting as it might be to create a new category to “catch” these technologies or other objects, such a category obfuscates the metaphysical claim being made: that to damage either the artificial hand or the biological hand is a case of personal harm.²⁸

Section Three: Human Enhancements and Becoming Cyborgs

Both the cases of Mr. Collins and Mr. Harbisson illustrate the question about whether non-biological objects can be a human being’s body parts and thereby change the moral and legal weight assigned to doing damage to those parts. But the two cases arguably differ in the following way: while Mr. Collins’s MAD *replaces* lower limb function, performing a key locomotive function that is nearly ubiquitous in human beings, Mr. Harbisson’s eyborg device arguably enhances or alters the visual function of his eyes. The eyborg does not function as a prosthetic eye in the sense of providing visual stimuli to the optic nerve, but instead serve to *translate* colors into sounds. And as Harbisson himself observes, this is a new kind of experience and function rather than a

²⁸ Some might object that the case of the MAD is tricky because it is, sometimes, disconnected from Mr. Collins. There are I think a few ways we could treat this. (1) We could argue that in the intervals of time that the MAD is in the airplane’s cargo hold, it is not Mr. Collins’s body part. But then it seems strange for Mr. Collins to argue that personal harm has been done. And perhaps this is right in one sense – personal harm was not done at the time it was disconnected, but the damage done to the device that rendered it *unable to be used* at the later time *is* personal damage (deliberately paralyzing someone’s legs is bodily harm even if at the time you inject the drugs the individual is sleeping and thus not walking). (2) We could argue that the temporary spatial discontinuity between Mr. Collins and the MAD is not sufficient to render it no longer his body part. Mr. Collins would not be separated from his MAD if it were not for the airplane’s configuration and requirements. Moreover, most, if not all, of us do not engage our legs in their primary locomotive function for many hours of the day. But that I do not walk while I am on an airplane or while sleeping does not make me legless for those hours. Why should the fact that Mr. Collins is temporarily discontinuous with his MAD during those same intervals make it no longer his body part? Additionally, we should observe that Mr. Collins would *not* be separated from his MAD were it not for contingent facts about the physical and social spaces in which he moves. In this case, it is the airplane’s requirements that force a temporary separation, and this is worth considering in our evaluation of the case.

one-to-one replacement. “At the moment,” he said in an interview with BBC, “I can see 360 colors and I have extended this to infrared so I can hear colors that human eyes cannot see.”²⁹

Is the eyeborg a body part of Mr. Harbisson, given that it performs functions that are not species-typical, or extend far beyond species-typical levels of a given function? Human beings, one might argue, are not designed with the cones or rods in the eye necessary to see the full spectrum of light waves. Human eyes cannot *normally* see infrared or ultraviolet light, as Harbisson has argued. But thus far, our thesis has primarily concerned functions that might be considered species-typical or part of the substantial form of a human being. Recall that our definition of the functions relevant to determining bodily parthood involved those functions that sustain biological life; does the eyeborg do this?

And more broadly, we see in the theory of extended cognition a number of devices that are more plausibly described as enhancing rather than replacing or assisting pre-existing level of a particular biological function. Consider the following two examples. Otto, the example from Clark and Chalmers, has substantial memory loss due to Alzheimer’s, and uses an implanted computer chip in his brain as a replacement for his lost memory capacities.³⁰ Arguably, remembering is a necessary function for sustaining biological life (remembering food sources, poisonous plants, etc.) and thus we might think the chip is performing the kind of function like an artificial hip or hand. Contrast

²⁹ “The Man Who Hears Colour,” *BBC News*, February 15, 2012, sec. Magazine, <https://www.bbc.com/news/magazine-16681630>.

³⁰ Andy Clark and David Chalmers, “The Extended Mind.”

this with Oslo, Otto's twin, who has excellent memory but uses an implanted chip in order to extend his capacities beyond what would be ordinarily possible. Do both Otto and Oslo have the same body part? Does Oslo have an additional, new body part, a new brain part, or not? And why?

By itself, the thesis I have defended cannot give a decisive answer to this question, in part because it takes for granted that human beings have a substantial form (the soul) that informs the matter constituting the human body. This substantial form also determines what kinds of activities are characteristically human, part of the definition of our kind. What would be needed to understand the Otto/Oslo example is an understanding of whether our substantial form can be "enhanced" and in what sense. Can a human being, for example, add an arm or an ear?

One difficulty with denying this possibility is that a biological or statistical norm is not an exceptionless or even necessarily a good guide to what is normatively true of the species. For example, it is not (I think we would all agree) ab- or sub-normal to have red hair, though it is atypical of the species in the extreme.³¹ And even those prosthetics that replace or assist in already-existing functions, such as locomotion, do so in ways that we might plausibly say "enhance" those functions within that individual past what is "normal" for the species. Consider how a titanium running prosthetic does not experience the kind muscle degeneration as a biological leg, and therefore requires less time to rest and regenerate than another leg. Or consider an organic example. Supposing that I have a severe eye problem for which I require the removal of my eyes' lenses. This comes with

³¹ The redhead population is quite small globally, with most estimating between 2-6% of the global population.

a surprising side-effect in addition to making my vision blurry: I can now see a bit of ultraviolet light. I now have, it seems, eyes with a new power (since normally human eyes cannot see into the ultraviolet. But these are still clearly my eyes. Thus it does not seem too controversial to think that we can have some parts that have enhanced capacities or even parts that introduce new capacities.³² If it is the case that, as I have argued it is, that this is a body part and not merely a device or a tool, then it is true that we can have some parts that enhance our capacities.

But perhaps the intuition that we can have an enhanced running capacity through artificial legs can be distinguished from the intuition that we cannot add a third arm as a body part in the following way: there is a difference between “enhancement” in the sense of extending preexisting capacities and “enhancement” in the sense of providing new capacities that previously did not exist. Thus one can enhance one’s memory by playing Sudoku every day or by (perhaps) a chip in the brain; but one cannot be said to “enhance” one’s hearing by introducing a way to translate colors into sounds, because this ability does not exist *at all* in the human being. We do not have a latent ability to translate color into sound that the eyeborg device actualizes or assists or even extends.

In fact, Jason Eberl distinguishes enhancements along very similar lines. He notes that transhumanists argue for the right to pursue or perhaps even have provided “ non-natural endowments that may either (a) create new capabilities foreign to human nature or (b) allow one to more fully actualize her natural human capabilities.”³³ It is this second

³² I’m grateful to Dr. Alex Pruss for this example.

³³ Jason T. Eberl, “A Thomistic Appraisal of Human Enhancement Technologies,” *Theoretical Medicine and Bioethics* 35, no. 4 (August 2014): 298, <https://doi.org/10.1007/s11017-014-9300-x>.

goal that accords with an Aristotelian-Thomistic vision, Eberl claims, because the aim of the so-called enhancement “is not to create a new species—so-called ‘posthumans’—but rather to facilitate human persons to become the most fully actualized ‘rational animals’ we can be by building upon the inherent potentialities of our extant nature.”³⁴

But this might seem worryingly circular: it seems to require a knowledge of enhancement to know whether the eyborg is a body part but partially defines enhancement in terms of whether the eyborg is a body part. If Harbisson’s eyborg is part of his body, then it is true that he has a “new” body part, in the strong sense that he has an ability and his body performs a function new to the human species in translating color into sound. But if we define body parts in terms of functions that are (at least broadly speaking) derived from genetic coding³⁵ then is the eyborg performing the right kind of function to be considered a body part? As Chief Justice John Roberts put it in his treatment of the cell phone seizure in *Riley v. California*, “modern cell phones... are now such a pervasive and insistent part of daily life that the proverbial visitor from Mars might conclude they were an important feature of human anatomy.”³⁶ The ongoing debate in human enhancement partially relies on this question of whether we can go “beyond” our DNA in substantive ways. On my definition of body parts, our bodies cannot; but more work needs to be done to understand how widely we can interpret our biological functions and their realization in matter.

³⁴ Eberl, 298.

³⁵ This could be in the sense of being actually coded for, or the weaker, “ought to be coded for” sense as I described it in chapter two.

³⁶ “*Riley v. California*,” Oyez, accessed November 4, 2019, <https://www.oyez.org/cases/2013/13-132>.

We are not without a paddle in the upper reaches of this creek. A commitment to hylomorphism is not a commitment to parity of importance between body and soul. Rather, the body is soul-configured matter. And if a body can be configured out of a wider variety of materials than once imagined, we need not conclude that the soul is as well. In other words, to suggest that we can have artificial body parts does not entail that we can have *new* body parts (new in the sense of new to the human kind). The functionalist view of the body that we took up in chapters three and four does not require us to think that the human form is as plastic as its matter. Rather, we can hold to a broadly Aristotelian picture of human nature while extending the ways that this nature is manifested in matter. In other words, it is possible to take human nature to have a set of essential capacities (though what precisely merits being considered essential in this way is a matter of debate), without requiring only biological material as the matter through which these capacities are actualized or suggesting that *any* function or activity is “part of” human nature in this robust sense. The hylomorphic approach to personal identity thus has a way of consistently, if not neatly, determining which kinds of enhancement devices are or are not body parts: as Eberl says, it will be those “forms of human enhancement, aimed at improving the extent to which our bodies support the actualization of essential human capacities”.³⁷

Does Mr. Harbisson’s eyeborg count as a new body part? The functionality thesis advocated here seems compatible with either an affirmative or negative answer. In favor of it being a body part, it is clear that the eyeborg enhances Mr. Harbisson’s sensory perception of the world, deepening his interactions with it and (at least indirectly)

³⁷ Eberl, “A Thomistic Appraisal of Human Enhancement Technologies,” 307.

enhancing the intellectual activities associated with his art. The eyeborg is also clearly integrated with the rest of Mr. Harbisson's brain, in the feedback loop between sensory perceptions, vibrations in the bone and how the brain takes this up into visual (color) information. There is Mr. Harbisson's own testimony that the eyeborg is his own body part, integrated with his body and his own self-perception. Against counting the eyeborg as body part is the suggestion that the extension of his eyeborg's light sensors to infrared and ultraviolet light spectra extend beyond the functional capacities *normal* to the eye. The eyeborg therefore introduces a new function (seeing new light spectra) that is not currently proper to the human being in the sense that human genetic material does not currently code for it. But perhaps this is not problematic, since the eyeborg still performs the normal sight functions of the eye. And there are other cases where our body parts perform "new" functions without thereby losing parthood status. Think, for example, of when I use my toes to grasp something because my hands are full, or a talented yogi walking on his hands. Perhaps, then, the challenging enhancement cases are cases where prospective parts are introduced that only perform the new kinds of functions.

One might wonder whether the debate about enhancement is at all advanced by the considerations of this dissertation. There are at least two ways in which it has been advanced. First, the question about enhancements has been better clarified in terms of enhancements that extend or deepen existing capacities and enhancements that introduce new capacities altogether. How we treat each type of enhancement might differ depending on how plastic we take human nature to be, or how important we take it to be in the debate at all. Forhylomorphists who fall along Aristotelian/Thomistic lines, human nature will be the determining guide for whether an enhancement is morally permissible

or not, and whether a particular device is part of someone's body, or a tool used by, but distinct from, their person. Second, this project presses the discussion in a helpful direction, towards clarifying what kinds of functions are in fact proper to human nature. This question cannot be definitively answered by a treatment of bodily parthood, since bodily parthood relies on a knowledge of human functions; but recognizing this better defines the philosophical problems to be solved. By clarifying these biological functions, their relationship to genetic material, we will be better able to understand what kinds of materials can realize these functions as our body parts.

Section Four: The Sale of Body Parts

My thesis about bodily parthood does not resolve a number of longstanding disputes, however. The moral permissibility of a market in which to sell body parts, for example, cannot be aided by a treatment of the *metaphysics* of bodily parthood. Does selling an artificial leg differ from selling a biological one, we might wonder. In brief, I think the answer is no. Given my account of bodily parthood, a detached biological leg has the same metaphysical status as the detached artificial one, namely, that it is not at that time the leg of some particular human being. It may have some additional moral status as *having once been* the body part of an individual; perhaps that is sufficient to make it impermissible to sell it. It is less clear whether the fact that the material is *organic* would make a difference as to whether it is sellable. The relevant fact here seems to be less the material composition of the leg as it is the status it enjoys as having been a person's leg at some previous time.

Interestingly, my thesis does seem to provide some reason to confirm a legal ruling that individuals do not have a valid claim to conversion (suing in relation to having

had property rights violated) of their biological materials once those materials have been removed. Consider the case of John Moore. In the course of treatment for leukemia, John Moore had a splenectomy; his doctors, upon discovering that Moore's cells had unique properties, partnered with another company to sell a cell line developed from Moore's biological materials (without Moore's consent). When Moore sued for conversion, claiming that his property rights had been violated by the physicians' profiting off of his biological materials, Linda Glenn notes, "... The California Supreme Court held that Moore did not retain any property or ownership interest in cells after they left his body."³⁸ Despite agreeing that the physicians had violated their duty to inform and gain consent from Moore prior to their work, the court ultimately ruled that Moore himself was not entitled to any of the financial benefits of research done with his cells because he had no compelling interest or ownership in them.

On the view offered in this dissertation, one way to make sense of the court's ruling is to note that Moore's blood ceased to be his body part upon leaving his body (provided that, as is true in most cases, leaving his body entails no longer performing its function). The cells *were* Moore's body parts once but are no more. Perhaps one could argue that for Moore's claim to work, the cells would need to still be his body parts, and if they are not functioning for Moore, they are not.

This relies, of course, on accepting a view that we do lack a property or ownership relation to things that were once our body parts. And this seems highly plausible. If I suffer the loss of a limb in a car accident, surely I am entitled to have that same limb reattached, even if, metaphysically speaking, it is not my limb at that time?

³⁸ Glenn, *Biotechnology at the Margins of Personhood: An Evolving Legal Paradigm*, 15.

We maintain some meaningful relationship with our former body parts, and perhaps things that were once body parts remain our property unless explicitly given away.³⁹

This seems to make sense of the wrong it would be to steal my leg from the scene of the accident, though it is not at that time, my leg, as well as cases where one steals a prosthetic leg from a closet even while it's not in use. But in both cases, it is not wrong because the object in question is *at that time* a body part; rather, it is because it continues to belong to me if along different (property related) lines. That something ceases to be a body part does not entail that it ceases to belong to you, as the above examples show. Thus, it seems, one could maintain the metaphysical verdict about Moore's blood cells while disagreeing with the ruling that he lacks a property interest in them. We can have property interests in former body parts.

But do I maintain that same relation with exclusively future parts? This is less clear. For example, suppose that I am being fitted for a prosthetic limb following my car accident, but have not yet purchased the limb. On route to get it, another patient who is equally well-fitted to have it, and perhaps is in greater need of it, receives the limb. It would seem that despite the prosthesis's potentiality to be my limb, I do not thereby acquire bodily rights or even property rights over it. (Of course, this is different from a case where I have already purchased the limb, since in that case it seems that it has already become my property even if it is not yet my body part.) I cannot argue that it being *intended* to be mine justifies my taking it from the patient to whom it was given. In

³⁹ Here it might be helpful to consider doctrines of abandoned property—if Moore could be shown to have “abandoned” his blood cells in the relevant sense, then he loses the property claim to them, regardless of their having once been in his body. Only if he had expressed an intention to keep the blood cells, perhaps, could he claim a property right over them. A simpler example of a similar idea might be cases where we leave our hair clippings at the barber, presumably abandoning them when we leave. Thus a person would not be stealing your property to come along and collect the clippings. But if you save the clippings in a drawer to put in a baby book, and then they are stolen, that constitutes theft.

fact, if I take the limb off of this patient, I am assaulting her. This seems to apply to allogeneic parts as well. Redirecting an allogeneic heart to a different patient on the transplant waiting list is not to assault the patient to whom it was originally directed, even if it might be (depending on other facts) breach of contract or theft.

What could explain this asymmetry? Perhaps the answer lies in the kind of metaphysical transformation we take to happen when something becomes a body part. Strictly speaking, when the artificial heart begins to beat, it undergoes a substantial change, becoming not a mere object but a body part. More precisely, it becomes *your* body part. Here we see the importance of the distinction made in chapter three between being “a human heart” and being “the heart of a particular human.” This would provide a neat way to explain rights over present and former parts but not future ones: future parts are not yet *your* body parts even if they are intended to be. We assume that it is morally and legally permissible to bump individuals further down on a transplant waiting list, for example, depending on need and prognosis. But we cannot remove another person’s kidney without their consent and compelling justification, nor can we take a kidney someone has put “on ice” that was once in their body, unless perhaps it has been abandoned.⁴⁰

⁴⁰ Dr. Alexander Pruss suggested the following case to me: suppose that Bob is donating his kidney to Alice, but, upon being betrayed by Alice, he throws the kidney (in its icebox) in the trash. Alice finds the abandoned icebox and has the kidney put in her. It looks like Alice has done nothing wrong, since the kidney is no longer Bob’s body part and, moreover, has been intentionally discarded by Bob. Here it seems to be a case more like that of abandoned property, in which Alice would not be in error for retrieving and making use of what was once Bob’s kidney.

So what does this mean for the debate about the sale of body parts? In short, my dissertation suggests that the ethics that ultimately govern the sale of biological materials must also govern the sale of certain prosthetics, particularly, those that have at some time been part of a human being's body. Contrary to external appearances, those prostheses have undergone a metaphysical change: that prostheses becomes a body part when it begins to perform the relevant function for the individual to whom it belongs, and this change alters its moral status even at those times it is disconnected and therefore not a body part. If we determine that we can sell body parts, then the sale of such prostheses is similarly acceptable. Contrarily, if we restrict the sale of such body parts, then perhaps we ought to restrict the sale of these prostheses.⁴¹

One interesting potential counterexample of this is the sale of gametes, about which there is an interesting debate. Gamete sales are widely accepted in the United States, with compensation varying depending on the type of gamete and costs associated with retrieval, as well as desirable qualities in the donor (education, race, age, etc.). But a relevant question to whether or not one can sell one's gametes is the question of whether or not gametes are body parts! Consider the following options:

- (1) Gametes separated from the body are body parts of the individual who produces them. In this case, the moral permissibility of the sale of gametes ought to follow the general consensus about the sale of body parts in general.

⁴¹ One might worry that I have confused, rather than clarified, the debate here. If the prosthesis is not a body part as soon as it is not performing a function, what cases would even parallel the question of biological organ sales? It's certainly true that there are fewer parallels given the distinctions that I have drawn—there are fewer cases where someone would be selling their prosthetic body part *when it was still their body part* (as opposed to their property). So perhaps this needs a bit of reasonable expansion. One might think that, for a person who regularly relies on her prosthetics, even in the brief intervals when they are not in active use for their main function (as when removed for sleep or bathing) they remain body parts. Why? Well, certain parts of our bodies only perform their “main” functions in a portion of the time – legs do not always perform acts of locomotion, nor do the small intestines constantly digest food, since we are not constantly eating—and perhaps it is reasonable to think that in the cases where a prosthetic is temporarily removed with the intention of putting it back on immediately, it remains a (non-active) body part in the intervening time.

- (2) Gametes separated from the body are *not* body parts of the individual who produces them. Then they either belong to the individual in a property sense or they do not. If they are property, their sale is (presumably) permissible, barring specific exceptions on former human body parts.⁴² If they do not, then they cannot be sold.⁴³

Determining the body parthood status of gametes does not, by itself, determine whether gametes can be sold (since the morality of selling body parts is still disputed). But it does move this particular question into its more appropriate context; namely, we better understand the ethics that will govern gamete sales when we learn whether or not gametes (prior to being removed from the body) are body parts.

Conclusion: The Difference Metaphysics Can Make

I have suggested in this chapter that a metaphysical account of bodily parthood can contribute to ongoing debates in medical ethics. Particularly, I have suggested that an account of such parthood can adjudicate disputes about certain medical objects (artificial hearts, ICDs, and the like) and the permissibility of removing or “turning off” those objects. I have also argued that determining an object’s status as a body part will make a difference in whether certain cases of damage to that object constitute personal harm as opposed to property damage. Finally, I have argued that the metaphysics of bodily parthood may make a difference in the ethics of human enhancement, depending on how

⁴² Admittedly, as I note in the following paragraph, the ethics of the sale of (former) body parts is still widely disputed. Perhaps the reasoning here is that there is an exception to things that have once been body parts, even if they are no longer. Perhaps former body parts are a special class of objects, not quite property in the usual sense, but not part of the living body of the individual.

⁴³ This is not too dissimilar from early intuitions in case law that one cannot own a corpse, for example – it is no one’s property. See the discussion on p. 479-480 in Douglas and Goold (2016) and p. 786-87 in Wall (2011).

we determine the concept of human nature and what kinds of enhancements to that nature are morally permissible.

While the metaphysics of bodily parthood does not answer all ethical questions in the relevant domain, it does help to progress a number of conversations or clarify the underlying disputes that need resolution before a particular determination can be reached – as in the case of the sale of certain prosthetics or gametes.

A charge has been levied against metaphysics that it has little relevance to ongoing matters of concern to human life. As Aaron Griffith puts it, the theories that result from a western concept of metaphysical study “seem either irrelevant to our complex and messy social lives or implicated in the defense of social arrangements that benefit some (viz. the metaphysician and those like him) and disadvantage others.”⁴⁴ But, as Griffith shows with respect to social justice, and I show with respect to medical ethics, metaphysics makes a difference. A substantial metaphysical account of bodily parthood can answer live questions in the practical realm of medical practice and make a difference to the kind of social practices we consider morally acceptable. Far from being a merely theoretical activity, to engage in the metaphysics of personal identity—and bodily parthood more specifically—is to make progress on important, albeit thorny, moral matters.

⁴⁴ Aaron M. Griffith, “Metaphysics and Social Justice,” *Philosophy Compass* 14, no. 6 (2019): 1, <https://doi.org/10.1111/phc3.12594>.

CHAPTER SEVEN

Final Considerations

Introduction

At the beginning of this project I posed the question of whether or not a statement like, “I’m going to put my eyes in,” when spoken by a prosthetic lens user, is a statement about a device acting *in place of* the eyes, or a statement about the user’s *eyes themselves*. At this point we might be better situated to answer this question, at least by way of asking new, more directed questions that can indicate the right metaphysical route to take. On the basis of the hypothesis I have advanced, we ought to ask first whether the lenses perform a biological function for the user. Then, we should ask how the lenses are integrated with the rest of the body (the relevant comparison being, of course, how eyes are integrated with the rest of the body in non-transplant/non-artificial cases¹). And, depending on the empirical evidence we can gather about these questions, we will opt for an affirmative or negative answer. As I have argued, what makes something a body part is the substantial form of the individual (her soul), so the question as to whether *this object* is such a part is an epistemic one, making it appropriate to weigh various factors.

Given how prosthetic lenses perform a function for their user, and are integrated with the eye and the brain in at least as substantial a way as organic lenses are, it seems right to conclude that in a real sense the user is “putting in” a part of her body

¹ This is the relevant comparison because different organs and body parts will have different levels of interaction with other body parts – the calf muscle interacts less directly with the heart than the right lung, for example, and the ears less directly with the pancreas than the kidneys.

(presumably, such a user is deploying a shorthand when she refers to her lenses as “eyes” rather than as the more specific *component* of the eye). It is unusual that a person “puts in” or “takes off” a body part, but unusual, I hope to have shown, is not thereby false.

But, one might naturally ask, consider more complex interactions. How should we consider, for example, a human being’s partnership with a service animal for specific mobility or visual tasks? Is a dog or a (human) friend used by a blind individual to navigate physical spaces a body part of that individual? Or, to take a live question in contemporary metaphysics of pregnancy, is the fetus or embryo a *body part* of the maternal organism? Can the thesis outlined in this dissertation shed any light on those debates?

In the following sections, I briefly sketch how my thesis about body parts might illuminate debates about organism-to-organism interaction in two cases: mothers and fetuses and symbiotic relationships between different species. These serve to illustrate how the metaphysical discussion of the dissertation can be useful to debates within philosophy of biology. It is not decisive, but perhaps that is understandable. Perhaps we ought to heed Aristotle’s warning about the kind of subject matter with which we engage, and not “expect more precision than our subject matter will permit...The same exactness must not be expected in all departments of philosophy alike, any more than in all the products of the arts and crafts.”² There is a dynamism to our investigation into the nature of the human body and its parts that may preclude—at least here—definitive answers.

² Aristotle., trans. H. Rackham, *Nicomachean Ethics* /, vol. Loeb Classical Library 73 (Cambridge, MA : Harvard University Press, 1926). Book I.I 1094b12-14.

But in the next two sections, I hope to at least show that the arguments put forward in this project are useful to these more complex investigations.

Section One: Mothers and Fetuses: Who is Body Part of Whom?

Elselijn Kingma argues that the organism with which a mammal is pregnant (what she and others call a foster³) is a *part* of the pregnant organism (what she calls the gravida) prior to birth.⁴ She presents her view that fosters are parts of gravidae by disputing a rival view developed by Smith and Brogaard.⁵ Smith and Brogaard (hereafter, S&B) argue that the foster is a “tenant” in a “niche” rather than a part of the gravida. They argue this largely on the basis of the observation that there are boundaries between the two organisms, and no “common membrane” of the type “required for strict topological connection.”⁶ S&B liken the foster in the amniotic cavity to “a kangaroo joey that is lodged inside its mother’s pouch”⁷ and suggest it is analogous to a parasite within a host organism—a relatively isolated causal system residing within another, but not part of that other.⁸

³ This term, originally from the Danish, is meant to capture under one heading the zygote, embryo and fetus regardless of developmental stage.

⁴ Elselijn Kingma, “Lady Parts: The Metaphysics of Pregnancy,” *Royal Institute of Philosophy Supplement* 82 (July 2018): 165–87, <https://doi.org/10.1017/S1358246118000115>.

⁵ Barry Smith and Berit Brogaard, “Sixteen Days,” *The Journal of Medicine and Philosophy* 28, no. 1 (February 2003): 45–78.

⁶ Smith and Brogaard, 73.

⁷ Smith and Brogaard, 74.

⁸ See p. 75. Importantly, Smith & Brogaard here suggest that parasites are not parts of their hosts, a claim to which I agree, but then suggest that some tumors are. My view of body parts helpfully delivers two intuitive answers: that neither the parasite *nor* the tumor is a body part (and neither, for that matter, is the foster).

Kingma turns the S&B thesis on its head and claims that fosters are “part of their gestating organisms, until birth.”⁹ Her aim is to force a choice point for those considering questions related to personal (and placental¹⁰) identity: either conclude that mammalian organisms do not begin until birth or revise our view of organisms such that one can be *part* of another.

For Kingma, what she calls the “*intimate intertwinement*” of the maternal organism and the fetus/embryo is not to be overlooked in thinking about how humans and other mammals come into existence. She rejects the notion of there being any bona fide boundaries between foster and gravida. The umbilical cord, for example “is a clear example of topological connection, and moreover one that marks a functionally and metabolically essential connection.”¹¹ Similarly, the physical discontinuity between the placenta and the maternal organism only appears after birth and during pregnancy, “the placenta comprises tissues of maternal and fetal origins and grows direct into (or out of) the uterine wall, just as the tail grows out of the cat.”¹² The foster and gravida have overlapping parts, sharing an external boundary, and are not fully enveloped by a fluid filled cavity, which makes it impossible to defend the view that a fetus is a “tenant” in a “niche” as S&B desire. Hence, Kingma concludes, the foster is a part of the gravida.

One might object that there is a *genetic* discontinuity between foster and gravida, as the foster has (necessarily) different DNA from the gravida. But on the thesis

⁹ Kingma, “Lady Parts,” 174.

¹⁰ Kingma explicitly restricts her view to placental reproduction, as placentals are a subset of mammals who reproduce in the relevant way for her discussion (see p. 166, fn. 3).

¹¹ Kingma, “Lady Parts,” 173.

¹² Kingma, 173.

advocated in earlier chapters of this dissertation, this discontinuity would be insufficient, *on its own*, for thinking the foster is not a body part of the gravida, since a biological transplant from another human being, a porcine or bovine organ transplant, and (some) mechanical or non-biological parts can be shown to be body parts in the relevant sense.

Kingma does not explicitly designate the foster (that with which a female organism is pregnant) as a *body part*—the term “body part” is not in her paper—but she does claim that “fetuses—just like kidneys, blood or hair—are a part of the maternal organism up until birth.”¹³ But of course it is a matter of dispute whether kidneys, blood or hair are parts (and if so, what kind) of the maternal organism too. It seems that Kingma wants to say that all these things are parts *in the same way*. So, I think it fair to read her thesis as claiming that fosters are *body parts of* the maternal organism up until their birth.

Kingma acknowledges that one could argue here that a foster perishes at birth. “Contrary to their [S&B’s] claims, birth is a substantial change: at birth fosters cease to be and new substances – baby-organisms – come into existence.”¹⁴ This has an advantage of being numerically neat, she notes, but it comes with the disadvantage of creating a *discontinuity* between the foster and the baby-organism that many would deny. Additionally, even if one were to claim that the foster and baby-organism are *different* substances, one will still be faced the problem of explaining the parthood of the foster in the gravida (provided one would want to claim the foster is a substance even if not the same substance as the baby).¹⁵ As Kingma notes, “the worry is also that the baby,

¹³ Kingma, 167.

¹⁴ Kingma, 175–76.

¹⁵ Indeed, as Kingma notes, arguing that birth is a substantial change runs directly against S&B’s argument about when the human organism begins to exist in their (2003) paper. It might also be the case that one wants, for ethical reasons, to argue that a foster is still a substance (depending on the moral value

intuitively, seems to be numerically identical with the foster. Surely newborn babies were fetuses only seconds before? Surely the new mother is holding in her arms the very thing she was pregnant with?...”^{16,17} In light of these worries, Kingma pursues the other option (that organisms can be persisting ‘organism-parts’ of others). I will now argue that accepting Kingma’s view of the foster and gravida’s relationship would be, on my view of body parts, better explained if the *gravida* is part of the *foster*.

It seems clear from the biological evidence that Kingma presents in the course of her rebuttal of the S&B view that the foster and gravida are interdependent in the right kind of way to fulfill the substantial interdependence criterion. The foster depends on the gravida’s body in a wide variety of ways: hormonally, for oxygenation, growth, nutrition, antibody development and immunity. All of the basic material necessary for its existence is provided by the maternal organism. In this sense, then, it seems right to think that the relationship between foster and gravida is too interactive to be like the kangaroo joey “in the pouch.”

But what function does the foster perform for the gravida? Perhaps, one thinks, the foster actualizes the reproductive function for the gravida. But this isn’t exactly right. For while the foster is the result of reproductive activity, it does not perform those

of substances v. non-substances, for example). Kingma helpfully cautions us against drawing too quick an inference from metaphysics to morality on p. 177, and I take her points here to be key.

¹⁶ Kingma, “Lady Parts,” 178.

¹⁷ Reiterating that her view extends to all placental-reproducing mammals, Kingma asks here: “And surely dolphins gestate dolphin organisms that then come out as dolphin-babies?” This is important because it helpfully extends our intuitions along these lines to other animals rather than considering only the human case.

functions for the mother, even broadly understood. It is the gravida's uterus, pituitary gland, fallopian tubes and ovaries that initiate reproduction and the placenta, umbilical cord and uterus (with additional hormonal shifts) that maintain the existence of the reproduced entity until birth (and arguably after birth). Now one might think, as we noted above, that the foster ceases to exist after birth and a new substance takes its place. And there are some differences in the biological functions of each (just consider the difference in *how* a foster oxygenates and pumps blood versus a newborn).¹⁸ But there seems to be an even more obvious continuity between the pre- and post-birth organism. The lungs used to practice breathing in utero by inhaling amniotic fluid are now used to inhale room air; the heart is now pumping that blood that exists solely within the newborn's body, but it is pumping blood nevertheless. And the very same arteries in the legs and arms, the same brain, the same – well, it seems, the same *everything* – persists and functions continuously.

Interestingly, if reproductive function is viewed as the characteristic activity that the foster is performing, it seems that we might also reasonably think that the sperm which enters the fallopian tubes after intercourse and unites with the ovum is also a body part of the gravida, given that it clearly contributes to the reproductive function in as much, if not more, of the manner in which the foster would. But it seems highly counterintuitive that sperm would be a body part of the organism in which it resides. It's less clear that the sperm is interdependent on the female organism, though its survival is aided by the female's cervical mucus. So, I do not think reproductive function is a

¹⁸ Kingma helpfully notes these dissimilarities among others in fn. 27 on p. 176-177.

plausible explanation of the function a foster performs such that it could be said to be a body part of the gravida.

Perhaps one could point to certain vital metabolic functions in which the foster participates. For example, the foster does participate in circulation, since the gravida circulates blood to and through the foster. And the foster participates in the other functions that exist throughout the human body (temperature regulation, nutrition, etc.). But it is not enough to participate in these functions. A benign, inert ovarian cyst will also be part of the circulatory system, as will certain cancerous tumors (interestingly, for S&B, a tumor *is* part of its host organism, but that's for another day). But plausibly neither a cyst nor a tumor will be body parts of their host. In fact, if we were to think of the relevant functions at play in the foster/gravida relation as these metabolic ones, then it seems as though we might open ourselves to claims that parasites are parts of their hosts (given how parasites participate in metabolic functions of hosts in just this way). A heartworm parasite, for example, lives in the heart, lungs and blood vessels of some affected animals, causing the breakdown and failure of these organs and their associated functions. The worms receive from the dog or cat vital nutrients, oxygen, and more to sustain, grow and reproduce, but it seems odd to think of them as the dog or cat's *body part* for this reason. In fact such parasites by definition act to the detriment (if not the total destruction) of the host organism. So, it seems, receiving something from the body is not the same as performing a function *for* the body.

It is far from clear what kind of functions the foster actualizes for the gravida in the way that I've characterized body parts. However, this is quite different when we reverse the two relata and consider whether the gravida performs characteristic functions

for the foster. Here, it seems that the gravida is very clearly aimed at the sustainment of the foster's life. The uterus, the placenta, the umbilical cord, the amniotic fluid—not to mention the gravida's other body parts in an indirect way—come to work for the sustainment of the foster's life: they deliver oxygenated blood, nutrition, hydration, provide protection from injury and illness, and much more. As Kingma observes, the mother's skin is much more substantially the fetus's protection against the external world (its "boundary" in the S&B definition of the term) than the fetus's own skin. The intimate intertwinement to which Kingma refers is no less powerful on this view, but it runs in another direction, *from gravida to foster*.

This seems to make sense of some common intuitions we have about the way that maternal organisms nurture and even sacrifice components of their bodily health for the sake of their young. Maternal organisms experience reduced immunity in pregnancy, nauseous side effects from hormone production, and changes in blood pressure and weight, all to support the growing foster. These things are experienced for the sake of keeping the body of the foster as healthy as possible. This might be analogous to cases where other body parts experience a reduction in their own individual wellbeing (so to speak) for the sake of the whole. Consider when the heart works overtime to make up for compromised lungs due to respiratory illness, or when a damaged liver's functions are (partially) taken over by the kidneys. Stress is put on the kidneys because they are carrying additional loads for the rest of the body during the time that the liver is functioning at less than full capacity. Why? To promote the overall wellbeing of the organism's life. In much the same way, the maternal organism undergoes various changes, stresses and even reductions in function for the sake of promoting the overall

wellbeing of the foster. So, I maintain, the more plausible case for Kingma to make in defense of a bodily parthood relation between fosters and gravaidae is to posit that the gravaida is a body part of the foster, not the other way around.

Perhaps the most forceful component of Kingma's discussion is not necessarily the direction of the relationship but the broader question about biological individuality and bodily parthood. Part of the reason that we might face an "incredulous stare" in response to arguing that one organism (the gravaida) is another (the foster)'s body part is that we think one cannot be a whole organism while *also* being another organism's body part. Something's being a body part of something else seems to simply entail that it is not an organism or a biological individual in the relevant sense.

But if our reasoning is right in this dissertation, it seems possible that an organism could be a substantial unity *and* a body part of another. On the Scotistic picture developed in chapters three and four, our organs have substantial forms of their own while still being substantially unified by *our* soul such that they are part of us in the relevant sense. Perhaps it is not so strange to think that, for the duration of pregnancy, the gestating organism or at least some of her parts (surprisingly!) becomes another organism's body part.

A similar debate about the interaction of entities that have been called "biological individuals" or "organisms" has been taken up in recent discussions of symbiosis, and it is to those discussion that I turn in the next section.

Section Two: Symbionts as a Case of Body Parts?

Symbiotic relationships among species raises interesting questions for philosophers of biology, particularly with respect to biological individualism: how to determine the boundaries of a singular biological entity. Symbiosis seems to blur the lines of biological individuals, since in at least some symbiotic relationships, the two species are in an *obligate* relationship to one another: they cannot survive or function without the activity of the other. Given how the thesis in this dissertation prioritizes functions and integration as the main criteria for bodily parthood, we might wonder whether in at least some cases, symbionts are not merely partners in a common task, but rather *body parts of* one another. The objection that Kingma describes with respect to a fetus/mother being in the body part relation could be echoed here: two individual organisms (substances, in the Aristotelian sense) cannot be both substances and parts of some other substance. In this section I consider whether symbionts could be body parts.

A number of biologists have reengaged the question of biological individuality in light of the evidence of widespread partnership between larger animals and plants and symbiotic microorganisms—for example, certain bacteria in the human digestive system or the evolution and integration of the mitochondria into the cell (mitochondria originate from a different kingdom and species than other organelles). Javier Suárez asks, “Should the symbiotic microorganisms that reside within the bodies of animals and plants be considered parts of a holistic unit that encompasses the host and its symbionts or, on the contrary, should those microorganisms be considered independently from the host?”¹⁹

¹⁹ Javier Suárez, “The Importance of Symbiosis in Philosophy of Biology: An Analysis of the Current Debate on Biological Individuality and Its Historical Roots,” *Symbiosis* 76, no. 2 (October 2018): 78, <https://doi.org/10.1007/s13199-018-0556-1>.

A. H. Louie observes that biologists have already widely accepted the “endosymbiotic theory of cell evolution,”²⁰ which argues that the parts of the cell that we now take to be *parts* of the larger *whole* were once separate organisms taken up in symbiosis – gradually becoming the cell we now recognize. But this theory assumes that, having been taken up as parts of the cell, these once-separate organisms are no longer organisms in the relevant sense. Perhaps, as we saw in chapter two with Aquinas and others’ unitarian view of parthood, while the organelles retain the powers of their (once separate, substantial) forms, they lack the substantial forms themselves. To answer Suárez’s question, we need to go further and ask whether the symbionts can become parts of a larger whole even while retaining their substantial forms—remaining organisms in a substantial sense.

One ongoing debate about symbiosis is captured in Suárez’s discussion of the “holobiont” debate among biologists. According to Suárez, proponents of this concept argue that one should consider the host (one of the symbionts) *and all of its microbes* (the other symbionts) “as a unit of selection in evolution.”²¹ A holobiont, put more informally, is an organism comprised of symbionts (multiple species). Defenders of this view argue that there are “four sources of evidence: the observation that all higher organisms associate with microorganisms; the fact that symbionts are reliably transmitted intergenerationally; the fact that symbionts affect the fitness of the holobiont; and, finally, the possibility of generating genotypic variation within the holobiont by changing their

²⁰ A. H. Louie, “Relational Biology of Symbiosis,” *Axiomathes* 20, no. 4 (December 2010): 496, <https://doi.org/10.1007/s10516-010-9117-9>.

²¹ Suárez, “The Importance of Symbiosis in Philosophy of Biology,” 88.

microbial composition.”²² Notice that many of these sources of evidence map neatly onto our earlier discussion of functionality and integration, albeit with a particular emphasis on evolution; higher organisms “associate with” microorganisms, and this association is close enough to be reproduced in subsequent generations, and symbionts affect the fitness of the whole holobiont.

David Queller and Joan Strassmann have argued for a definition of organisms that captures this functionality concern in a specific way: “The organism is a biological unit with high cooperation and very low conflict among its parts so that ‘the organism has adaptations and it is not much disrupted by adaptations at lower levels.’”²³ It is not enough, however, for the parts to have some discrete number of functional interactions. They go on to argue that to be an *organism* (their preferred unit of consideration over biological individual), there must be integration toward a common function. For this reason, they argue, “few would consider the malarial parasite *Plasmodium* to be part of the same organism as its host... their physiologies are not integrated towards a common function. Instead there is conflict; each is adapted to thwarting many of its partner’s functions.”²⁴ This does not rule out the possibility of there being some organisms comprised of multiple species as parts (in our body part sense), but it does set the bar very high. As Queller and Strassmann note, “[c]ooperation does not suffice; there must be very high cooperation and very low conflict, just as in standard organisms. Our

²² Suárez, 78.

²³ David C. Queller and Joan E. Strassmann, “Problems of Multi-Species Organisms: Endosymbionts to Holobionts,” *Biology & Philosophy* 31, no. 6 (November 2016): 858, <https://doi.org/10.1007/s10539-016-9547-x>.

²⁴ Queller and Strassmann, 859.

organismal endosymbionts are fellow travellers, not mere hitchhikers.”²⁵ More specifically, they argue that there must be not merely present behavioral cooperation, but adaptive or evolved behavioral cooperation, so as to rule out cases where one species “dupes” or captures another for cooperative purposes, but the captured species has not evolved for this purpose.²⁶

Queller and Strassmann do not rule out the possibility of a holobiont as an organism in its own right, but they do suggest that defenders of the concept should not be too hasty to assume that any instance of symbiosis will satisfy the organism criteria established earlier. “Most complex holobionts such as a human and its gut microbiome,” they observe, “lack long-term fidelity. Many holobionts can be somewhat loosely associated with hosts.”²⁷ However, defenders of the hologenome concept, according to Suárez, are committed to a looser view of biological individuality, “according to which the existence of conflicts amongst the parts of a system does not rule out the possibility of the system evolving as a unit.”²⁸ Depending on how strong one makes the cooperation condition, the threshold for counting as an organism or biological individual will change.

How does this map onto the question under consideration in this dissertation, namely, the nature of the bodily parthood relation? First, we can observe that biologists and philosophers of biologists focusing on symbiosis place a similar emphasis on functionality and integration (cooperation) as criteria for thinking about biological

²⁵ Queller and Strassmann, 865.

²⁶ Queller and Strassmann, 866.

²⁷ Queller and Strassmann, 867.

²⁸ Suárez, “The Importance of Symbiosis in Philosophy of Biology,” 90.

entities, particularly organisms. This provides some evidence that our concept of body part, as derived from metaphysical considerations, may map rather neatly onto discussions in philosophy of biology. Second, the discussion of symbiosis reintroduces the question we raised in chapter three when considering John Duns Scotus on body parts: namely, can something retain its substantial form and still be part of a distinct whole? Can there be a “fish of Theseus,” as Queller and Strassmann coin the phrase, comprised of multiple distinct organisms (perhaps of different species) performing the relevant functions? It seems that on some plausible biological accounts, we should think the mitochondria in a cell retained its organism status while being integrated into a new biological individual (the eukaryotic cell). And though thinking about this on a larger scale is certainly unusual, it is not clear that the mitochondrial/cell question differs in kind from the fish of Theseus. Perhaps there is room to think that an organism could be comprised of others while still being a substantial unity in itself worthy of being considered *a single organism*. This dissertation cannot answer definitively for or against such an organism. What it can do, and I hope it has done, is to show how debates about biological individuality and symbiotic relationships are linked to, and illuminated by, discussions of parthood in metaphysics.

Concluding Remarks

The question, “is that *my* heart?” could perhaps be parsed in a number of ways. One might ask whether *that* object—an artificial heart comprised of various pumps, batteries, and valves—is my heart. One could ask whether that object is a *heart* rather than a medical device serving in place of a heart. This project has focused on asking

whether that object is *my* (or *her*) heart, in the sense that it stands in the bodily parthood relation to a particular human being.

I have argued that it is at least possible for some objects deemed “artificial” in the sense of being neither autologous nor allogeneic human organs can nonetheless be the organs or parts of particular human beings over particular spans of time. These objects can be body parts because they fulfill key biological functions and are integrated with the rest of the body, participating in and supporting the life of the whole individual. More particularly, I have argued this from an Aristotelian view of substances, and biological substances in particular. Given Aristotle’s particular concern about distinguishing *living* and *non-living* things, and his emphasis on the uniqueness of living things, one might expect that the Aristotelianhylomorphist would have the most difficulty incorporating any “non-living” material as a part of a living being. But, if I have succeeded, I have shown a way in which such a hylomorphist could consistently affirm at least some “non-living” materials as body parts of living beings. This, in turn, should suggest that views that place less special emphasis on the difference between the living and non-living could accommodate the view that “artificial organs” can be body parts much more easily. Determining what can stand in this relation matters for ethical questions about end of life care, the treatment of others (and their parts), and other disputes. Much more remains to be debated; I hope this project has offered a fruitful path forward for metaphysicians and medical ethicists alike.

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