DESCARTES’ METAPHYSICAL BIOLOGY

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1. INTRODUCTION

The more one looks at Descartes’ biology and its reception, the more significant it appears to become. By the time of his death, without ever having produced either a medical textbook or a topical essay on a medical subject, Descartes’ biology had inspired a new school of medical thought advanced by trained physicians including Henri de Roy, Johannes de Raey, Florentius Schuyl, Petrus Hoffwenius and, for a time, even the iatrochemist François de le Boë. William Harvey noticed Descartes’ account of cardiac motion and refuted it, but not without observing that Descartes was “a most acute and ingenious man” (Harvey 1649/1995, 190). Even Niels Stenson, whose anatomical demonstrations undermined nearly all of Descartes’ claims about the brain, acknowledged that Descartes “surpassed other philosophers.... [for having] explained all the actions of man mechanically,” thereby opening the door to a better anatomy by showing the “insufficiency of what others tell us” (Steno 1669/1965, 128). Perhaps most remarkable of all is the fact that Descartes’ knowledge of living things and human beings in particular was such that, prior to any of his publications, the University of Bologna sought to hire him for its chair in theoretical medicine.

Although these accomplishments draw attention to Descartes’ study of living things, other aspects of Descartes’ philosophy have long been interpreted as incompatible with any kind of distinctively biological study. The ontological foundation of Descartes’ physics is a case in point, as it officially limits the subject matter of natural philosophy to “matter” or “body,” the sole attribute of which is “extension” (AT 8A, 42). Given this limitation, two
conclusions follow: (1) because extension is inert, there is no teleology permitted in natural
philosophy, and (2) because matter is also uniform, there are no objective standards to cite
when evaluating and classifying living things. At most then, living things are just complex
arrangements of matter, the study of which may require understanding the interaction of a great
many parts, but biology is, at least in principle, no different from physics, and living things do
not represent a natural kind or distinctive object of study. In fact, there may be “no way to
keep physiology from expanding until it becomes a science of everything” (Des Chene 2001, 62).

It is certainly hard to understand how Descartes could engage in biological study worthy
of the name given (1) and (2). But it is not impossible. Two recently published papers have
tried to save Descartes’ biology. In the first, Gary Hatfield, continuing two decades worth of
efforts to call attention to Descartes’ biology, acknowledges that Descartes’ metaphysical
purposes imply “the functional organization of a body and its existence as an entity may be
merely ‘extraneous’ and notional.” Nevertheless, this “need not prevent our construing animal
bodies as properly unified entities for the purposes of Descartes’s physics or natural
philosophy” (2008, 416). Karen Detlefson defends a similar view. “Descartes can allow
(even if he does not do so explicitly) that purely material things have intrinsic end-referred
natures, albeit not at the level of ground-floor metaphysics of matter.” What this means is that
at “the physical level... living things behave in certain ways that non-living things do not
because of their physical natures” (2013, 173). Hatfield and Detlefson recognize that the study
of living things posses special difficulties for Descartes—e.g., problems (1) and (2) above—and
they speculate that the way around these difficulties is to accept what I will call an
“ontology of natures.” This new Cartesian ontology saves Descartes’ biological practice, and it
assures us that his biology has a distinctive subject matter—i.e., physical natures—but both Hatfield and Detlefson accept that an ontology of natures cannot be justified by appeal to the metaphysical foundation Descartes explicitly provides for natural science. In other words, according to Hatfield and Detlefson, Descartes does not have a metaphysical biology.

I have considerable sympathy with Hatfield’s and Detlefson’s position. Like them, I see no alternative to an ontology of natures if we are to save Descartes’ biology from the official ontology of matter that he provides for physics. The question I wish to address, however, is whether, in addition to the practical scientific necessity cited by Hatfield and Detlefson, we can find a further justification for Descartes’ ontology of natures: does Descartes provide a metaphysical foundation for his biology even if such a foundation cannot be reduced to matter as such? I believe he does. The metaphysical foundation for Descartes’ ontology of natures is the union between mind and body and the ontologically complex view of the human body that it engenders.

In this paper, I will try to show that Descartes has a metaphysical biology by emphasizing how Descartes’ study of living things stands in tension with early modern categories of knowledge, especially those codified within Italian and French universities, and how his view of matter as merely extended directs him toward a metaphysical foundation for the study of living things that is distinct from the metaphysical foundation he officially provides for his natural philosophy. It is Descartes’ confrontation with the existing categories of knowledge that led him to use the human body as his entry point into the study of all living things. Whatever behaves like and is structured like the human body is a subject for the biologist. Thus, Descartes’ ontology of natures results from a projection of our nature onto the world through a series of analogies between our bodies and the other living bodies we find in
the world. Instead of thinking of the living world as fully intelligible by reference to the properties of extension, or as an arbitrary projection onto an inert and uniform mass of particles in motion, the full intelligibility of the living world is predicated on the intelligibility of the nature associated with the union of mind and body. This will not save Descartes’ ontology of natures or his biology from a certain amount of conventionality, but it will be clear by the end of my argument that Descartes’ ontology of natures is neither entirely arbitrary nor without a metaphysical foundation.

I begin with a summary of Descartes’ ontological commitments. Next, I use Descartes’ ontology to clarify the subject matter of natural philosophy as well as medicine, the two disciplines that most clearly relate to living things. I claim that natural philosophy studies bodies, while medicine studies the union between mind and body. After this, I present the connection between natural philosophy and medicine and the manner in which medicine relies on natural philosophy. I also highlight the advantages Descartes’ teachers—the Aristotelian scholastics—would have over Descartes in conceiving the relation between the disciplines. With this material in place, I proceed to describe the trouble Descartes faces in discovering knowledge of the human body required, by his own lights, for an adequate “theory of medicine” (AT 11, 245, CSM 1, 319). I specifically try to exhaust the metaphysical resources of natural philosophy in an effort to show why Descartes was forced to turn to an ontology of natures. In the course of this discussion, I also claim that for Descartes the human body is ontologically complex, with a distinctive nature as compared to other bodies—it is not simply an instance of matter as such. Finally, I provide a metaphysical foundation for Descartes’ ontology of natures that traces back to the human body and ultimately the nature of the union
between mind and body. I conclude by reflecting on Cartesian anthropocentrism and the intelligibility of the union between mind and body in light of its role in Descartes’ biology.

2. DESCARTES’ ONTOLOGICAL COMMITMENTS

Descartes’ official ontological commitments are well known. He acknowledges interaction in four directions: (a) body to body, (b) mind to body, (c) body to mind, and (d) mind to mind. In the case of (a), purely physical interactions are at stake. For these, the laws of nature control every aspect of the interaction (AT 8A, 67-77, CSM 1, 244-247). The most obvious example of (b) concerns the imposition of our will on our own bodies, as when we move deliberately, for example when speaking (AT 6, 57, CSM 1 140), and (c) includes our body’s effect on our mind through the senses (AT 7, 88-89, CSM 2, 61). Unlike in the case of (a), both (b) and (c) involve relations between physical phenomena and thoughts that “experience shows” are “most frequently conductive to the preservation of the healthy man” (AT 7, 87, CSM 2, 60). This point emerges in Meditation Six, and it highlights how misleading the simple label “mind-body interaction” can be if not understood expansively to include both (b) and (c). Finally, examples of (d) include any direct exchanges between immaterial souls, angels, or God. Descartes spends very little time discussing (d), except perhaps in the Meditationes before he has reestablished the existence of the external world. We will not be returning to (d) here, but note that at a minimum, in order to make sense of all four types of interaction, we need to be able to identify two kinds of entity—minds and bodies—that are interacting.

In the Principia Descartes tells us minds and bodies each have their own unique “nature,” or “primary attribute” allowing for their identification (AT 8A, 31 and 38). He says specifically that, “extension in length, breadth and depth constitutes the nature,” of bodies, and
that, “thought constitutes the nature,” of minds (AT 8A, 25). Bodies have a corporeal or extended nature, and minds have an incorporeal or thinking nature. In Meditation Six, however, Descartes acknowledges a more sweeping sense of “nature,” but he also specifies an additional narrow sense not found in the Principia. He tells us there that in addition to the nature of mind and body, “nature” can also be used in the sense of “my own nature in particular.” And this is, according to Descartes, “nothing other than the complexion of all the things bestowed on me by God” (AT 7, 80, CSM 2, 56 (trans. modified)).

“Nature” in this last sense teaches: “I am not merely present in my body as a sailor is present in a ship,” but, “I am very closely joined and, as it were, intermingled with it, so that I and the body form a unit” (AT 7, 81, CSM 2, 56). Whereas in the earlier Discours Descartes concedes that he is like a sailor in a ship with regard to mind to body interaction (AT 6, 59, CSM 1, 141)—i.e., cases in which we move our bodies—in the Meditationes, body to mind interaction is not illuminated by the sailor-ship analogy. Roughly speaking, this is because the range of our sensory experiences are not about control but rather qualitative influence, and this influence entails that our relationship with our bodies is more intimate than the sailor’s with his ship. It is this intimacy that encourages us to add a third nature to the Cartesian world. To be more precise, body to mind interaction encourages us to add unions or human beings, who exist as a “combination of mind and body,” to the basic ontology of the world (AT 7, 82, CSM 2, 57).

Descartes’ correspondence during the 1640s often confirms the existence of these three natures, though it must be emphasized that limited to the nature of matter, mind, and the union between the two we have yet to see the ontology of natures advocated by Hatfield (2008) and Detlefsen (2013). For example, in letters to Princess Elisabeth of Bohemia dating just after the
composition of the *Principia*, Descartes refers to the “notion [notion] we have of the soul, of body and the union between the soul and body.” He adds that “to conceive the union between two things [in this case the union between soul and body] is to conceive them as one single thing” (AT 3, 691-692, CSMK, 226-227). Thus, by the mid 1640s, we can identify at least three natures at the “ground level”—to use Detlefon’s phrase—of Descartes’ metaphysics. First there is the nature associated with minds. Next, the nature associated with bodies. And finally, though it is not clear that they have equal standing with minds and bodies, which Descartes will also refer to as “substances,” there is the nature of unions between minds and bodies.¹⁰

3. THE OBJECT OF DESCARTES’ MEDICINE AND NATURAL PHILOSOPHY

As I have presented it, Descartes’ ontology provides three possible natures that might be studied and, depending on which it is, with as many as three forms of interaction that need to be considered; namely, (a) body to body, (b) mind to body, or (c) body to mind interaction. For our purposes, there are two disciplines whose subject matter we need to better understand: medicine and natural philosophy. We need to discuss medicine because it uses what we know of living things to preserve our health and ensure our longevity. We need to discuss natural philosophy because, in the context of the seventeenth century, it was natural philosophers who often studied living things.

In Descartes’ medicine, body to body, mind to body, and body to mind interaction are all relevant to the physician. This means that the nature of the union is of paramount concern to the physician.¹¹ Specifically, when there is something wrong with our body as a result of some physical cause, then body to body interaction will preoccupy the physician. Think here
especially of surgical interventions. Mental disorders with a physical cause, such as the example of misrepresenting the world as a result of dropsy, requires familiarity with body to mind interactions (AT 7, 84-85, CSM 2, 58-59). Treating physical ailments with a mental cause, however, will entail consideration of mind to body interactions (AT 5, 65).\textsuperscript{12} By the 1640’s Descartes is committed to this \textit{prima facie} intuitive view of medicine’s subject matter.

Discussing the subject matter of natural philosophy is not quite so straightforward. Yet an early remark from \textit{Le Monde} is a good place to begin. Descartes stipulates that by, “‘nature’ here I do not mean some goddess or any other sort of imaginary power. Rather, I am using this word to signify matter itself” (AT 11, 37, CSM 1, 92). Natural philosophy, in other words, studies matter, which will turn out to be shorthand for the bodies we have already identified in Section 2. Although “nature” can signify more than just the essence of bodies for Descartes, in \textit{Le Monde} natural philosophy concerns itself with bodies and body to body interactions alone.\textsuperscript{13}

In making this connection, and in limiting the subject of natural philosophy in this way, Descartes’ readers would have understood him to be doing something both very specific and very threatening to standard views of natural philosophy’s subject matter. They would have understood him, as Libertus Fromondus did, as offering a natural philosophy more in keeping with atomism than Aristotelian physics (AT 1, 402). Just prior to the above quoted passage from \textit{Le Monde}, Descartes asks us to exclude from the nature of bodies as many of the properties as we can. “To this end,” he writes, eliminate colors, whether something is “hot or cold, dry or moist, light or heavy,” of this shape or that, capable of behaving this way or that, and what do you have left? “Prime matter” is the answer an Aristotelian would be expected to give; it is the matter that is potentially anything. Because prime matter itself lacks all properties it can endure through all change, but for this very reason it cannot tell us anything
about the way the world is. Aware of this, Descartes still imagines the result of excluding as many of a body’s properties as possible as the route to learning what the natural world is actually like. Not so serendipitously, the only property we cannot abstract away from matter is geometrical extension, and this conclusion justifies Descartes’ insistence that bodies can be exhaustively characterized by extension alone (see also AT 8A, 78, CSM 1, 247).

In the later *Principia*, Descartes offers an illuminating description of his natural philosophical practice by way of an analogy with mechanics:

Men who are experienced in dealing with machinery can take a particular machine whose function [*usum*] they know and, by looking at some of its parts, easily form a conjecture about the design of the other parts, which they cannot see. In the same way I have attempted to consider the observable effects [*sensilibus effectibus*] and parts of natural bodies and track down the imperceptible causes and particles which produce them. (AT 8A, 326, CSM 1, 288)

The persuasive power of the analogy resides in the shared subject matter between mechanics and natural philosophy. They both study parts and particles, which, through a series of body to body interactions, produce “observable effects.” The Cartesian natural philosopher investigates the natural world in the same fashion as the mechanic, and in so doing accepts what we now call “mechanical explanations.”

This is correct so far as it goes, but we should resist the temptation to go a step further and infer that the mechanic just is the Cartesian natural philosopher. This is not correct.
Although the terms of their respective analyses are the same (matter subject to change of location due to body to body interactions), and this is surely what Descartes wants us to take from the analogy, the two practitioners are permitted very different starting points. Whereas the mechanic begins with some teleological assumption about what a particular machine is supposed to do, such as tell the time in the case of a clock—that is its usus or function—Descartes’ natural philosopher assumes only “observable effects,” such as the movement of the clock’s arms. Descartes’ shift in terminology from “function [usum]” to “observable effects [sensilibus effectibus]” marks the different worlds the two practitioners see, one loaded with customer’s goals and proper functions, and the other devoid of them. If I am correct in highlighting this difference, then Descartes denies the natural philosopher the option of accepting the reality of goals in the natural world and mandates that the goals cited by others, or even those attributed to God, be either ignored or reduced to the terms of matter in motion.

A rough contrast with the resources available to an Aristotelian scholastic natural philosopher will help clarify this last point, especially in the case of living things. For the scholastics, accounts of life and the “vital functions,” such as nutrition, procreation, growth, locomotion, etc., necessarily refers to a vegetative or sensitive soul. In Aristotle’s physics, matter (as we saw above when discussing prime matter) is the substrate that persists through whatever changes a thing endures. The form, by contrast, is what actually changes, and when a change of substance occurs, a “substantial form” has been either generated or corrupted. For scholastics, the soul is not just a thinking thing, as in Descartes’ case, but rather the form that serves to organize a living body’s matter. Specifically it is the form that, when combined with matter, creates the potential for vital functions and makes a living thing the kind of thing it is. Conceived in this fashion, living things have an internal standard they can be judged against.
and compared to, a standard that defines how they are supposed to be and what they are
supposed to do. When the soul is in complete possession of a body’s matter, the living thing is
the thing it is supposed to be in every respect: it takes on nutrition, grows, reproduces, etc.
Relative to this standard, the scholastic natural philosopher, like the mechanic, is permitted
knowledge of what a thing is supposed to do.

When scholastics offered arguments for the existence of souls, they often compared a
dead and a living body. In his commentary on Aristotle’s *De Anima*, the sixteenth-century
Jesuit Franciscus Toletus, for example, asks us to consider “every accident of a living thing,
every organ and the temperament and disposition of every organ” and then concludes, without
further ado, that all of these are “conserved by the soul.” We know this, he continues, because
“of experience, for when the soul departs, all these things melt away and are corrupted.”¹⁴

A much more influential passage making the same point comes from the work of the
mathematician and physician Jean Fernel, who wrote one of the sixteenth century’s most
widely read medical textbooks titled simply *Medicina*, though later published and slightly
modified as the *Universa medicina*. Book one of the latter is titled *Physiologia*, and explains:

So long as a man is living he performs very many tasks that he will not perform after
death; this certainly demonstrates that the body itself does not constitute the efficient
cause of these functions, but there is something in the living body that makes it more
excellent and powerful than a dead one, and able to gather itself for performing tasks.
There resides in man a sort of aptitude and efficient power for action.... the soul [is] the
origin and cause of the functions of the living body. (2003 [1657], 304-5)
Toletus and Fernel note that the same matter is present after death and from this they believe it follows that the principle and efficient cause of life is something other than the matter of the body taken by itself. In other words, they infer the existence of the soul, which is the principle of life—the efficient cause of life. In addition, insofar as natural philosophy includes the study of living things, natural philosophy’s subject matter must include matter informed by a soul.

For Descartes, as we have already seen, the soul is precisely what natural philosophy does not study; bodies and body to body interaction alone are its subject matter. In Article 5 of the Passions, Descartes’ challenges the sort of argument made by Toletus and Fernel. He tells us that their error “consists in supposing that since dead bodies are devoid of heat and movement, it is the absence of the soul that causes this cessation of movement and heat” (AT 11, 330, CSM 1, 329). The right way to judge the difference between a living and a dead body is as follows:

The difference between the body of a living man and that of a dead man is just like the difference between, on the one hand, a watch or other automation (that is, a self-moving machine) when it is wound up and contains in itself the corporeal principle of the movements for which it is designed, together with everything else required for its operation and, on the other hand, the same watch or machine when it is broken and the principle of its movement ceases to be active. (AT 11, 330-331, CSM 1, 329-330)

Descartes is taking Toletius’ and Fernel’s example of the dead body and using it against them. Although the analogy Descartes draws here is a rich one, the point to notice is that the nature of body alone is sufficient to account for the actions of a living body no less than those
of a dead one. No mechanic would say that a machine dies when it ceases to function and mean by this that it dies because it loses its soul. Likewise, no one should say that a living body dies because it loses its soul. This much is explicit, and it should be clear from the texts canvassed so far that when Descartes acts as a natural philosopher studying even vital phenomena, he presents his subject matter as limited to the nature of body and body to body interactions.

4. CONNECTING THE LIFE SCIENCES

With the subject matter of Descartes’ natural philosophy and medicine now firmly in view, what is there to say about the relationship between these two disciplines? The division of philosophy into theoretical and practical branches common among the scholastics, where natural philosophy was grouped within the theoretical branch, would have left out medicine which, starting in the thirteenth century, was an established higher faculty along with law and theology at those universities where it was taught. As such, medicine was not considered a part of philosophy at all, let alone natural philosophy, which was taught among the preparatory liberal arts.

Although they had their own canonical texts as well as distinct professorial chairs at the universities, natural philosophy and medicine were, nevertheless, closely associated in the institutional and intellectual setting of the Renaissance and early modern period (Siraisi 1990, 65ff.). For just as philosophy had theoretical and practical branches, medicine for its part had been divided between theory (theoria) and practice (practica) at least since the medieval period, when Johannitius’ Isagoge and especially Avicenna’s Canon endorsed this division of medicine. Although matters become somewhat more complicated in the sixteenth century,
the theory of medicine presumed familiarity with the arts course, with Greek and especially Latin, and with the natural philosophical principles specific to the human body.¹⁷

This was not simply an issue of natural philosophy being useful to medical theory. Instead, the relationship between the two was often presented as a case of “subalternation.” As Robert Grosseteste explained the notion in his commentary to Aristotle’s Posterior Analytics, one science is “subalternated to another whose subject adds a condition onto the subject of the subalternating [science]. The condition does not proceed totally from the subject of the subalternating [science], but is obtained from without.”¹⁸ Grosseteste’s example was that of perspective, which adds the condition of “radiant” to magnitude, the subject of geometry, with the understanding that “radiant” does not derive from the nature of magnitude. In the case of medicine, it is subalternated to natural philosophy because it derives its scientific principles, principles informing the study of human beings, from natural philosophy, and as such medicine does not question or separately justify those principles, even though it adds the goal of preserving health.

The claim that medicine is subalternated to natural philosophy was traced to Aristotle who, near the beginning of De sensu, wrote that it “behooves the physicists to obtain a clear view of the first principles of health and disease…. Indeed we may say of most physicists…. that [they] complete their works with a discussion on medicine” (1985, 436a 17-22; see also 480b 22-30). Aristotle’s view received explicit endorsement among Ancient Rationalist physicians, and in works of Galen like The best doctor is also a philosopher. It found its clearest institutional expression, however, in the requirements for admission to medical school during the medieval period (requirements that lasted well into the seventeenth century).¹⁹ The Bologna statues of 1345, for example, held that a medical student was expected to be
More than 150 years later the medical faculty of Montpellier, in 1517, were examining candidates for admission and “they first declared that no one would be admitted as a student unless he had sufficient competence in logic and philosophy, as to seem capable of medicine” (Germain 1871, 128-9). In 1598, the same expectations were manifest in the Paris statutes. In order to be admitted to the medical faculty the student had to know Greek, Latin and rhetoric, and to have studied philosophy for two years, which included exposure, through Aristotelian commentaries, to logic, ethics, metaphysics and natural philosophy (Corlieu 1877, 17; see also Lehoux 1976, 12-13).

In the more immediate Jesuit tradition in which Descartes was educated, the idea of medicine’s subalternation to philosophy could also find support in the work of Aquinas:

It is the job of the natural philosopher to investigate the primary and universal principles that control health and illness; it is the physician’s to put these principles into practice, following the idea that he is the maker of health… The physician should not limit himself to making use of medicines, but should also be able to reflect on the causes [of health and illness]. To this end, the good physician begins his training [with] natural philosophy. (De sensu, 8.277-9.316)\(^2^1\)

Commenting here on Aristotle’s original De sensu, Aquinas is reiterating Aristotle’s distinction between the productive arts and the theoretical sciences. The physician is a producer, charged with the goal of producing health, while the natural philosopher investigates the “primary and universal” causes. Natural philosophy does not set out to produce anything, but merely to learn the truth about the natural world and all the natural bodies it contains. Of course, the physician
exploits the natural philosopher’s knowledge, especially regarding causes of health and illness, yet the physician’s goal and narrow interest in the human body (as opposed to all living things) clearly differentiates him from the natural philosopher.

But Aquinas is also showing the connection between natural philosophy and the scientific side of medicine, just as Aristotle had done. This connection finds expression in one commonly used textbook of the seventeenth century that Descartes read, Eustache’s *Summa philosophiae quadripartite*, where natural philosophy is defined as the study of “natural body, insofar as it is natural” (1648, 112). As Eustache organized the subject, it progressed from the principles, causes, and common properties of natural things, to inanimate natural bodies, and finally to a discussion of animate bodies. This last part of natural philosophy included topics such as the soul and its faculties, growth, generation, the internal and external senses, motion, and even the rational soul. These phenomena are all clearly related to living things, and they provide the context in which we acquire knowledge of health and illness. If we take Eustache as a model for the organization of scholastic natural philosophy, then living things and the general study of health and illness belong to the third part of physics.

How does Descartes’ natural philosophy compare? We have already seen that it differs from the scholastic tradition in its subject matter, limiting itself to the nature of body. Nevertheless, Descartes closely followed the division within natural philosophy adhered to by Eustache. For example, despite lacking a clearly demarcated account of natural things in general, *Le Monde* does include a discussion of inanimate natural bodies that leads to an account of animate bodies in *L’Homme*. In the *Principia* as well, Descartes follows the traditional organization of natural philosophy. Part II of the *Principia* concerns general principles of all material things, part III deals with large scale visible phenomena, part IV
covers earthly phenomena, and the proposed parts V and VI were to deal with living things and human beings respectively. In other words, Descartes is working with a traditional picture of natural philosophy; however different the intension of the concepts supporting the discipline of natural philosophy may be for Descartes and the Scholastics, the extension of the concepts is the same. Most importantly, we must judge Descartes’ natural philosophy, like the natural philosophy before him, to include principles that facilitate the practical arts, such as medicine.²³

Descartes was even more explicit about this connection between natural philosophy and the art of medicine in his correspondence. Writing to the Earl of Newcastle in 1645, Descartes does, “not doubt that it is possible to acquire much information about medicine which has hitherto been unknown,” but he admits that, “the treatise on animals which I plan and which I have not yet been able to complete is only a prolegomenon to the acquisition of this information, and so I am careful not to boast that I already possess it” (AT 4, 329, CSMK, 275). Besides the “treatise on animals,” what was presumably needed was a treatise on the human being in particular. The first part of such a treatise existed, but as we will see in the next section, the views expressed in L’Homme are not consistent with a natural philosophy limited to the nature of body as mere extension. Specifically, it is not clear that L’Homme is a work in medicine as opposed to a work in natural philosophy because it attributes proper functions to the body, as, for example, when it claims the gall-bladder and spleen are “destined [est destiné]” to “purge the blood” (AT 11, 169). Yet, emphasizing only the order of knowledge suggested in the letter to Newcastle, an account of animals precedes an account of human beings. What Descartes seems to be saying, in other words, and what we would expect
a follower of Aristotle and Aquinas and Eustache to say, is that knowledge of animals aids us in acquiring knowledge of ourselves.

This appears to be the implication of a letter Descartes wrote to Mersenne in 1639 as well:

In my World I supposed the body of an animal already formed, and merely exhibited its functions [fonctions]; if I were to start it again I should undertake to include also the causes of its formation and birth. But for all that I do not yet know enough to be able to heal even a fever. For I claim to know only the animal in general, which is not subject to fevers, and not yet man in particular, who is. (AT 2, 525-6, CSMK, 134-135)

Although Descartes believes himself equipped with an account of embryological development and knowledge of the “animal in general,” he has yet to acquire knowledge that will guide medicine in curing fevers, i.e., in reclaiming health when it is lost. Importantly, knowledge of the “animal in general” is not irrelevant to medicine but, rather, it is a preliminary to the requisite knowledge.

5. BODIES AS OPPOSED TO HUMAN BODIES

According to Descartes, we are unique because of our nature as unions of mind and body. This no one disputes, even as interpreters diverge on how best to understand the union. The question that I wish to ask in this section is whether Descartes succeeds in maintaining a strict separation between, on the one hand, body to body interaction and, on the other, mind to body and body to mind interaction, when he studies living things. In other words, does he practice
the natural philosophy he preaches in the case of living things and, in particular, given the official subject matter of Descartes’ natural philosophy, does he encounter specific difficulties when studying “man in particular” and in associating us, or comparing us, with the “animal in general?”

I will go on to argue that the nature of the human body for Descartes cannot be fully described without making reference to its union with the soul, and that assimilating the nature of the human body to the “animal in general” denies the human body a place in medicine. This results from Descartes’ three part ontology of minds, bodies and their unions, which forces a choice between (1) seeing the human body as the body of a person, and so attributing states of genuine health or sickness, and (2) seeing the human body merely as a part of the material world, and so without proper functions or healthy states. Body to body interaction is never enough to characterize states of the human body relevant to medicine. So long as our knowledge of living things is restricted to the framework of Descartes’ natural philosophy described in Section 3, then however much we might learn about bodies in the world, we will not be able to reliably use that knowledge in medicine. It is only with the addition of an ontology of natures that Descartes’ natural philosophy can have practical value.

Although Descartes never says this in so many words, there are hints that he was aware of how important an ontology of natures was to the success of natural philosophy. In a long passage from Meditation Six on which I will linger below, Descartes makes three points worth noting. First, he limits the kinds of judgments we may legitimately make about natural phenomena when viewed solely as instances of body and products of body to body interaction. Specifically, we are prohibited from making judgments referring to what bodies should or ought to do, which is consistent with the conclusions already drawn in Section 3. Second, he
explains that for human beings, whose “nature” cannot be reduced to the nature of body, it is appropriate to make judgments according to what effects should or ought to result from mind to body, body to mind, and body to body interactions. Third, in the course of making this point about human beings, Descartes outlines the metaphysical foundation for a more robust ontology of natures.

The passage in question occurs just after Descartes has noted that body to mind interactions sometimes result in a misrepresentation of the benefits and dangers in the world around us. What appears to be good for us might in fact turn out to be very bad, like a sweet smelling poison (AT 7, 83-84). Initially, this may not seem like a problem that needs to be solved; no one would want to deny the fallibility of the senses, least of all Descartes. However, the fact that it is our nature, as unions between mind and body, which accounts of the possibility of mind to body and body to mind interactions means that misrepresentations of this sort are ultimately referred to our nature. In other words, there are occasions on which our nature is responsible for misrepresenting the world. Descartes concedes this point, but not before arguing that experience teaches us that we have the best nature possible given that our nature includes a body and body to body interactions. Still, Descartes works hard to understand the source of our misrepresentations—in our body, mind or in their interaction?—and it is in this discussion of our nature and the nature of bodies that Descartes lays the metaphysical foundation for an ontology of natures.

We can enter the discussion right at the point where Descartes is considering the idea that a corrupted nature might account for our misrepresentations:
Perhaps it may be said that they go wrong because their nature is corrupted [**corrupta**], but this does not remove the difficulty…. Yet a clock constructed with wheels and weights observes all the laws of nature just as closely when it is badly made and tells the wrong time as when it completely fulfils the wishes of the clockmaker. (AT 7, 84, CSM 2, 58)

On Descartes’ view an ordinary machine, like a clock, always “observes” the laws governing body to body interactions. This is the case because certain constraints follow from the nature of body. Of course, Descartes is aware that clocks can frustrate our purposes. The challenge when building machines, in fact, is always to realize our purposes within the constraints set by the nature of body. In this passage, however, Descartes is using the apparent difference between a well made and a poorly made clock to make a point about his basic ontological commitments: machines do not have a nature that can be corrupted because machines are just bodies—their nature is that of a body—and bodies do not admit of degrees of perfection since body qua body is incorruptible. They always do what the laws governing body to body interactions require and, to this extent, all bodies are necessarily equally perfect.

This much is consistent with the image of Descartes’ natural philosophy presented in Section 3, but Descartes goes on to say much more about attributing a “nature” to bodies in Mediation Six. We are about to see that although the nature of body itself does not permit corruption or judgments about how a body ought to be, or what it is supposed to do, there is a nature that does:
In the same way [that the clock was just discussed], if I should consider the body of a man as a kind of machine equipped with and made up of bones, nerves, muscles, veins, blood and skin in such a way that, even if there were no mind in it, it would still perform all the same movements as it now does in those cases where movement is not under the control of the will or, consequently, of the mind. I can easily see that if such a body suffers from dropsy, for example, and is affected by the dryness of the throat which normally provides in the mind the sensation of thirst, the resulting condition of the nerves and other parts will dispose the body to take a drink, with the result that the disease will be aggravated. Yet this is just as natural as the body’s being stimulated by a similar dryness of the throat to take a drink when there is no such illness and the drink is beneficial. Admittedly, when I consider the purpose of the clock, I may say that it is departing from its nature when it does not tell the right time; and similarly when I consider the mechanism of the human body in relation to the movements which normally occur in it, I may think that it too is deviating from its nature if the throat is dry at a time when drinking is not beneficial to its continued existence [conservationem].... As I have just used it, ‘nature’ is simply a denomination [denominatio], which depends on my thought; it is quite extrinsic [extrinseca] to the things to which it is applied, and depends simply on my comparison between the idea of a sick man and a badly made clock, and the idea of a healthy man and a well-made clock. But by ‘nature’ in the other sense I understand something which is really to be found in the things themselves; in this sense, therefore, the term contains something of the truth.... When we say,
then, with respect to the body suffering from dropsy, that is has a corrupted
nature because it has a dry throat and yet does not need drink, the term ‘nature’
is here used merely as an extrinsic denomination [denominatio extrinseca]. (AT
7, 84-85, CSM 2, 58-59 (trans. modified))

Descartes acknowledges that there are cases of illness in which we naturally desire that which
will lead to great harm. But, asks Descartes, what is it for us to have a nature in this sense?
Consistent with his remarks from Le Monde noted earlier, here in Meditation Six Descartes
also uses “nature” to signify matter or mere bodies. In this sense of nature, our nature is no
different than the nature of those things studied in natural philosophy and should be analyzed in
the same way Descartes analyzed the clock above. Our bodies, like every other body, are just
extended things, all necessarily observing the laws of nature, and all equally perfect.

Put a slightly different way, Descartes rejects the idea that our natural desires can
coherently be said to be in error using only the language of natural philosophy. Whether a
clock is badly made or not, whether it tells the right time or not, it is merely and always an
instance of extension, necessarily governed by the constraints on body to body interaction. In
the long passage from Meditation Six Descartes extrapolates from the example of the clock to
the rest of the physical world. Thus, from the point of view of Descartes’ natural philosophy,
the human body and the animal alike are just bodies, essentially no different from what a clock
turned out to be. There simply is no evaluative judgment deriving from the nature of the
human or animal body that would allow us to call the process of a human or animal body
causing its own demise corrupt or unnatural. In other words, given only the resources
provided by the nature of body, there is no room for characterizations of health and illness.
The prospects for a metaphysical foundation for Descartes’ ontology of natures, however necessary to Descartes scientific practice, look quite dim at this point. If anything, in Meditation Six Descartes has acknowledged a plurality of natures only to deny that such natures exist. And what Descartes goes on to say in the long passage only seems to confirm this conclusion: for animals, the human body, and even clocks, assigning them a nature that allows us to talk as though they are supposed to be like something, or supposed to do something, is to project a purpose onto them that they otherwise do not have. It is to use “nature,” he says, as an “extrinsic denomination.”

As clear as Descartes is on this point, he is equally clear that something more should be said about the nature of the union. Continuing on exactly where the long passage leaves off, Descartes adds:

However, with respect to the composite, that is, the mind united with this body, what is involved is not a mere denomination, but a true error of nature, namely that it is thirsty at a time when drink is going to cause it harm. (AT 7, 85, CSM 2, 59)

In the case of the “composite,” there exists a nature and so an intrinsic norm or standard that can be used to judge the changing states of the human being. And it is because human beings need a human body that can support union with the soul that Descartes assigns a purpose to the human body. In all of Descartes’ natural philosophy, this appears to be the only instance in which a body is not arbitrarily assigned something in addition to its nature as a body governed by body to body interactions. In other words, the human body looks to be the only place in the
natural world where we can legitimately apply norms or standards to a body, and where talk of
a corrupted nature, or “errors of nature,” is appropriate.  

In light of this conclusion, we have to conclude that the term “human body” is
ambiguous. On the one hand, “human body” refers to a complex object of natural
philosophical study that is just a body that obeys the laws of nature. On the other hand,
“human body” refers to the body of a composite of mind and body, what should be called, I
propose, a person’s body. Descartes seems committed to the view that it is a person’s body
that falls ill, but that the human body, understood without a connection to the nature of the
union, cannot. It is the person’s body that ages and dies, but the human body does not.

Can there really be a distinction between a person’s body and a human body as I have
just suggested Descartes’ work implies? Let us judge this by what Descartes himself says in a
letter to Mesland written after the Meditationes:

First of all, I consider what exactly is the body of a man, and find that this word
‘body’ is ambiguous. When we speak of a body in general, we mean a
determinate part of matter, a part of quantity of which the universe is
composed…. But when we speak of the body of a man, we do not mean a
determinate part of matter, or one that has a determine size; we simply mean the
whole of the matter which is united with the soul of that man…. And we know
that this body is whole and entire so long as it has in itself all the dispositions
required to preserve that union. (AT 4, 166, CSMK, 242-243).
Descartes here explicitly embraces the implication of his view from the *Meditationes*. The human body and a person’s body are individuated by different criteria; one is a complex of bits of matter disposed in a certain way, and the other is *essentially* the body of a person. Only the latter can appropriately be said to get sick, etc.

6. DESCARTES’ METAPHYSICAL BIOLOGY

We are now ready to discuss the problem inherent in Descartes’ natural philosophical study of living things and then to reflect on the ontology of natures needed to support his biology. Recall, that he believes studying the “animal in general” prepares the way for medicine, just as Aristotle, Galen, Aquinas and Eustache did before him. This we saw in Section 4. Yet, the animal body and the human body do not have the right kind of nature to aid in medicine. This we learned in Section 5. The only sort of knowledge that will help Cartesian medicine is knowledge of a *person’s* body, which may be corrupted. But we have also seen that this is not simply knowledge of a human body. It is not knowledge available to the Cartesian natural philosopher. The gap might be put like this: if we are going to learn how to heal our bodies, how to preserve life, and how to regulate our life functions, we need to know the conditions under which these functions are upset. Learning about animals strictly from the point of view of natural philosophy, as I have characterized it thus far, will never provide us with knowledge of the causes of health and illness because natural philosophy is blind to such distinctions.

It might help here to think of a phenomenon like perspiration and the end-state of a consistent or regulated body temperature. The end-state defines the function of perspiration and when the mechanism fails to produce the end-state, we can say it is malfunctioning. We can do this because the end-state provides a norm or standard that can be used to judge the
mechanism’s performance even when it does not actually regulate our body temperature. Descartes’ natural philosophy sees things differently. Instead, the body is merely disposed to regulate body temperature. When it fails to do this, it is simply disposed to do something else; in the language of the *Principia* cited in Section 3, it simply produces a different “observable effect.” In fact, when the disposition changes there is reason to believe the mechanism itself changes, at least with respect to the functions it once had, unless the nature of body can provide criteria of identity distinct from a body’s actual dispositions. But this is not something the nature of body allows. Such criteria are completely external to bodies governed by the laws of body to body interaction. For this reason, the Cartesian natural philosopher lacks the resources to introduce talk of corruption, health, or illness. This is the gap standing between Descartes’ natural philosophy and his medicine, and I am suggesting that there is no possibility of producing an adequate medicine from the vantage point of Descartes’ natural philosophy so defined. What Descartes needs is a science somewhere between medicine and natural philosophy. What he needs is a biology. And to have a biology what he needs is an ontology of natures that cannot be reduced to the nature of body and body to body interaction.

This is an anachronistic way of making the point, so let me describe it another way. The only theoretical philosophy Descartes seems to accept is a natural philosophy or physics studying bodies and body to body interactions.29 Medicine, by contrast, is a part of practical philosophy for Descartes, as attested to by its goal of preserving and, if necessary, reestablishing health. Putting this together with what I have argued above, what Descartes needs is a middle ground, a theoretical science of life not limited to the resources provided by extension, which is both inert and uniform. But of the natures Descartes explicitly recognized, only a person’s body, conceived relative to the union, could guide such a science. In other
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words, if Descartes is going to be able to make sense of the life sciences and their role in supporting medicine, he must rely on the union and the interactions and “errors of nature” it makes possible. That is the touchstone for his study of living things.³⁰

I believe Descartes indicates as much when he criticizes the errors of other natural philosophers. In the *Objections and Replies* he notes:

> When people take a fall, and stick out their hands so as to protect their head, it is not reason that instructs them to do this; it is simply that the sight of the impending fall reaches the brain and sends the animal spirits into the nerves in the manner necessary to produce this movement.... [O]ur own experience reliably informs us that this is so.... [A]ll the actions of the brutes resemble only those which occur in us without any assistance from the mind. And we shall be forced to conclude from this that we know of absolutely no principle of movement in animals apart from the disposition of their organs and the continual flow of the spirits.... We [thought otherwise] because we failed to distinguish the two principles of motion just described [in us]; and on seeing that the principle depending solely on the animal spirits and organs exists in the brutes just as it does in us, we jumped to the conclusion that the other principle, which consists in mind or thought, also exists in them. (AT 7, 229-231, CSM 2, 161-162).

Our views in biology are informed by the knowledge we have about ourselves. From experience we learn that there are two principles or causes of motion in us: the mind and the
body. These are instances of mind to body and body to body interaction, knowledge of which is acquired as a result of body to mind interaction. Effectively, the distinction Descartes is drawing is between conscious and automatic behavior and, looking beyond ourselves, we notice that “the actions of brutes resemble ours.” We will be misled by this fact so long as we fail to distinguish conscious and automatic behavior.

This passage emphasizes that animals, and really all other living things, behave as they do because of body to body interactions. But there is more to it than that, because the living things Descartes discusses are presumed to have a nature distinct from their nature as bodies. Notice, first, that the abstraction that sets up the comparison between us and animals is an abstraction from the person’s body to the human body, all of whose actions are caused by body to body interaction. Yet Descartes’ point of departure remains the person’s body. Fundamentally, Descartes’ biology involves (1) using what we know about the person’s body and then (2) abstracting to the human body—that it has certain sense organs, behaves and moves in certain ways, etc.—(3) to identify analogs in the world—those things with a similar shape, sense organs, behavior and movements—and then (4) to attribute causes to those analogs given what we know about the human body—that it is caused to move because of body to body interactions.

My proposal is that the person’s body sets the agenda for Descartes’ biology and that Descartes’ practice commits him to the view that the living bodies in the world have a nature similar to the person’s body. In other words, Descartes’ ontology of natures is not an ontology of de facto physical natures, as argued by Hatfield (2008) and Detlefson (2013) but, rather, an ontology of projected natures. The human body and animal bodies have natures that cannot be reduced to the nature of body given that they are identified through an abstraction from the
person’s body. Just as the person’s nature can be corrupted and “true errors of nature” can occur, by projecting our nature onto other living things we enable ourselves to find analogs to the “true errors of nature” we initially identified in ourselves.

This proposal has its limitations, but what Descartes does is not wholly arbitrary. Returning to the long passage from Meditation Six for a moment, the strategy I have just assigned to Descartes does not escape the charge of attributing natures to other living things that are, in truth, extrinsic denominations. But it is essential to see the rationale for these denominations of “nature.” There is something objective about the process. It is, for example, not at all arbitrary that we have the nature that we do and that “errors of nature” occur in us. Nor do we make up the fact that animals “have eyes, ears, tongues and other sense-organs like ours” (AT 5, 277, CSMK, 365). It may not literally be true that animals have a corruptible nature, but it is true nonetheless, by analogy. This is how we should understand Descartes’ ontology of natures and the biological study it makes possible.

So what we know is this: comparative studies in the life sciences, those that bring together animals and human beings, are supported by the fact that we are dealing with a group sharing a nature. In the Aristotelian case, forms serve to unify the natural world as well as the living-world. In Descartes’ case, comparative study is still thought to be essential, but what looks like it could allow for fruitful comparisons is a shared bodily nature. Yet, as we have seen, this emphasis on bodily nature denies Descartes the ability to discuss corruption or to attribute norms or standards for health so essential to medicine. Even a comparative anatomy in terms of structure alone fails to provide what the medical practitioner is looking for because what is needed is a comparative physiology emphasizing corruptibility. The alternative I advocate, building on Descartes’ views from Meditation Six, is to see the living-world as
sharing in the nature of a person’s body, though only by a projection of our nature onto the bodies that already exist in the world. Descartes needs the theoretical science of life to inform his medicine, and he needs the person to inform the theoretical science of life.33

7. CONCLUSION
Locating the human being, mind to body, as well as body to mind interaction, at the center of the life sciences might be thought so common as not to really require comment, let alone so many pages of discussion. After all, anthropocentrism is prominent in the life sciences as far back as Aristotle (Lloyd 1983, 26-43; cf. Lennox 2001, 259-279). This may help explain why the anthropocentrism unique to Descartes has passed by without notice. But, in addition, there is a reason specific to Descartes’ philosophy that might help explain the lack of emphasis on Descartes’ biology and the anthropocentrism found there. Though it is not exactly the puzzle of mind to body and body to mind interaction, it is the related puzzle of how we can understand the union of mind and body in light of substance dualism.

Since I first broached the topic of ontology in Section 1, I have tried to steer clear of talk of “substance.” This might appear a failing inasmuch as Descartes is known today primarily as a substance dualist, but I have had an agenda in avoiding “substance.” Substance ontologies emphasize a hierarchy of ontological dependence, where substances are the base level of reality, with accidents, modes and qualities identified as less real because they depend for their existence on the existence of substances. Descartes’ own substance dualism fits within this traditional substance ontology. But the union does not. So long as we are in the grips of Descartes’ substance dualism, we will always have trouble recognizing the union or countenancing his ontology of natures, as Descartes himself seems to indicate at one point (AT
3, 693). In other words, we will be left with a puzzle about how to understand Descartes’
biological practice.

Instead of rejecting or ignoring Descartes’ biological practice because of this difficulty,
I think we should allow it to lead us to appreciate another strategy Descartes employs when
discussing ontology. Perhaps, an ontology of natures is what Descartes envisioned when, in
writing to Elisabeth, he reminds her “I distinguished three kinds of primitive ideas or notions,
each of which is known in its own proper manner and not by comparison with any of the
others: the notions we have of the soul, of body, and of the union between the soul and body”
(AT 3, 691, CSMK 226). Notice here that we need not endorse the idea that primitive ideas or
notions refer us to substances. How promising and coherent a Cartesian ontology of natures
may be, and how well it can be integrated with his substance ontology are important questions
that cannot be answered here. It suffices to say, however, that Descartes does endorse an
ontology of natures in his biology and in doing so he is applying what we know to be true about
the union between mind and body.

One final thought. So long as we emphasize Descartes’ biology, we can see an
explanation for why Descartes does not say more about the union or abandon it in the face of
his substance dualism. Without the human being, and the presumptive intelligibility of mind to
body and body to mind interaction, a life confined by the nature of body is all that would be
possible. This, however, was too barren a life even for Descartes to have accepted. His
unwillingness to see any need to elaborate on the union may be an outgrowth, at least in part, of
this fact about his biology. How can you explain something that is itself so basic an
explanatory category? The answer is that you cannot. This helps us understand why Descartes
did not, and to this extent I think the discipline of biology helps solve one philosophical
problem, even if it raises many others.
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Broaching the topic of Descartes’ biology requires a word about its non-existence. According to the *Oxford English Dictionary*, the word “biology” appears for the first time in English in Stanfield’s *Biography* of 1813, but by this time the French and German term “biologie” had already surfaced in Lamarck’s *Hydrologie* of 1802 and the same year in G. R. Treviranus’ *Biologie oder Philosophie der Lebenden Natur für Naturforscher und Arzte*. An earlier
attestation of the Latin “biologia” is in Michal Hanov’s 1766 *Philosophiae naturalis sive physicae dogmaticae: Geologia, biologia, phytologia generalis et dendrologia*, although I believe it is first used by Carl Linnaeus earlier in the eighteenth century (I have unable to locate the reference). In any case, no one in the seventeenth century, not even Descartes, would have recognized a self-standing theoretical discipline dedicated simply to the study of life and its various manifestations. Nevertheless, there is something distinctive about the metaphysical foundation for Descartes’ study of the living world and this is the clue to justifying talk about “Descartes’ biology.”

2 For discussion of de Roy, see Gariepy (unpublished); Bos (2002); Verbeek (1992), (1994), Bitbol-Hespériès (1993); Manning (2008); for de Raey, see Ruestow (1973, 61-72); Verbeek (1992); for Schuyl, see van Ruler (2007); Wilkin (2003); Zittel (2011); for Hoffwenius, see Kallinen (1995); for De le Boe, see Debus (1977/2002, 519-530); Ragland (2012).

3 The Bologna affair is mentioned in Alderman (1966, 56) and discussed in more detail in Busacchi (1967) and especially Manning (2013).

4 The belief that Descartes cannot account for or would otherwise deny the existence of distinctively living things is held by early modern readers such as Isaac Barrow (cited in Steward 2000, 75ff), perhaps influenced by his teacher Henry More (AT 5, 243). Even contemporary scholars have been attracted by such interpretations. For example, Philip Sloan believes the “body was a lifeless mechanism operating by physical laws” according to Descartes (1977, 17), Marjorie Grene refers simply to Descartes’ “denial of life” (1985, 104), Dennis Des Chene explains that Descartes’ “animal-machine does not grow; matter accretes to it.... [n]or does it see; rather light and the machine interact in a certain way” (2001, 16), and
Lilli Alanen concludes “Descartes in fact eliminated the very concept of life as a kind” (2008, 472).

5 When citing Descartes I adhere to the standard practice of using “AT” to refer to the original language edition of Adam and Tannery, followed by volume and pagination. I have generally relied on the Cambridge translations of Descartes’ work, and refer to them as “CSM 1” or “CSM 2” for the first two volumes, respectively, and CSMK for volume three, followed by volume and pagination.

6 Descartes’ emphasis on matter as extension in often contrasted with the principles of Aristotelian natural philosophy, and this contrast is enlightening here as well. Speaking generally, rejecting the Aristotelian principles of matter and form—prime matter and substantial form—Descartes replaces them with extension. Without Aristotelian substantial forms there are no final causes, as expressed in (1), and nor can individual bodies be more than accidental entities, which eliminates the chain of being and natural kinds, as expressed in (2).

To be clear, the accusation is that as a result of (1) Descartes blinds himself to the relationship of organic parts to wholes as well as the otherwise manifest growth and development of organisms. If this were not bad enough, as a result of (2) he prevents himself from noticing the uniformity of function among the parts of living things, which in turn destroys the practical value of, among other things, comparative study.

7 Hatfield correctly points out that even outside of the biological context Descartes’ physics assumes the existence of “unified entities” and “kinds” in order to, for example, study, outline and discuss things like “vortexes, suns, planets, magnets, minerals, metals, and so on” (2008, 416). Although my discussion, and the majority of Hatfield’s own discussion, is about
Descartes’ biology, the stakes are, as he notices, much higher. I believe the approach I take to Descartes’ biology can be extended to the rest of his physics, but I cannot substantiate such a claim in this paper. But for an attempt at such an extension, see Manning (2012).

8 Such a conclusion is not wholly unprecedented, but when similar interpretations have been defended they rely on an analysis of Descartes’ laws of nature and the fact that these laws derive from God’s relationship to his creation. Key to these arguments is a late letter to Henry More, where Descartes confesses “that the only idea I can find in my mind to represent the way in which God or an angel can move matter is the one which shows me the way in which I am conscious I can move my own body by my own thought” (AT 5, 347, CSMK, 375). Since no adequate account of change in the physical world can make do without appealing to the laws of nature, and since the laws of nature are, for Descartes, manifestations of God’s action in the world, it follows that the conditions for understanding God’s action in the world will be conditions for understanding change in the physical world. One such condition, as the letter to More would seem to indicate, is our being in possession of the idea of mind to body interaction. Thus, a condition for understanding physical change is our being in possession of the idea of mind to body interaction. For such an argument, though in not quite as short a version as the one just presented, see Garber (2001, 168-188).

9 It must be admitted that the relations Descartes is referring to in this passage are body to mind relations of sense experience. Nevertheless, I believe the same argument applies in the other direction of mind to body interactions. If this were not the case, then I do not see that Descartes could claim even sense experiences were “most frequently conductive to the preservation of the healthy man” unless he meant that all self-preserving activity prompted by
sense experience is automatic and non-cognitive. But he cannot mean that, because the whole reason the body to mind interaction is optimal is because it effects the mind in a specific way.

Whether the “substantial union” Descartes talks about actually creates a new thing in the world, and so a new substance—where once there were two there is now only one—is a contentious issue in Descartes scholarship. The possibility that a union only amounts to a specific pattern of interaction, such as the same physical cause always producing the same mental effect, suggests to some that a human being is always and forever two things, namely, a mind and a body, and never a substance. Anyone hoping to defend a three part ontology must also contend with the issue of whether the mind and the body are themselves altered once joined in a union. The question here is: are the body and the mind outside the union the same mind and body when united, or does their essence change? I will go on to suggest that the essence of body does change, so that the human body is not just a body, but whether it is the same body in some other sense I will not try to answer. Surely, however, there is something that is the same, the question is just what the sameness consists in. I will return to this puzzle briefly in my concluding remarks, but for a flavor of the controversy in the literature look at Cottingham (1985); Hoffman (1986); Schmaltz (1992); Voss (1994); Chappell (1994); Rozemond (1998); Des Chene (2001). For discussion specifically related to the complex ontological status of the human body, see Brown (2007); Normore (2011); Rozemond (2011).

This is also the conclusion endorsed in Aucante (2006). I am choosing to ignore what in the seventeenth century was the very real concern of demonic causes of illness. To pronounce on these causes would have required some knowledge of (d), mind to mind interaction.
The evolution of Descartes’ medical views has been a subject of interest among a number of distinguished French scholars. Gueroult (1985); Mesnard (1937); Dreyfus-Le Foyer (1937) all try to account for Descartes’ changing therapeutic advice, which ranges from emphasizing body to body interactions to noting psychosomatic cures (AT 4, 201); for a more recent discussion of these issues, see Romano (2002); Aucante (2006). For the reception of Descartes’ different therapeutic strategies among a cohort of later German physicians, see the exceptional Trevisani (2011).

Clarifying the sense of “nature” in “natural world” is as complicated as contemporary efforts to clarify the sense of “nature” that informs “naturalism.” As a hint to the complexity, note that the famous seventeenth-century lexicon of Gloclenius cites no fewer than 10 meanings of “natura.” Descartes designates at least four meanings for “nature,” three of which we have already seen. For more on the complexities of “nature” in the sixteenth and seventeenth-centuries, see Des Chene (1996, chapter 7). For the diverse uses of “nature” in Descartes, see Hatfield (2000); Manning (2008).


Some may object to my use of “life sciences” here on the grounds that the phrase was not used in the early modern period and therefore misrepresents early modern categories of knowledge. So as to avoid misunderstanding, in this paper, whenever I use “life sciences,” I only mean to refer to medicine and natural philosophy.
For discussion of the medieval distinction, see Ottosson (1984, 88-89); Cunningham (1986); for subsequent developments, see Joutsivuo (1999, 98-105).

The complications in the sixteenth century relate to the growing belief, strongly advocated by Giambattista da Monte, that the theory or medicine and the practice of medicine were interdependent. For discussion, see Bylebyl (1991); Mikkeli (1999, 32-40); Maclean (2001, 68-69).


For an illuminating discussion of medicine’s subalternation to natural philosophy in the medieval period, see French (2000), and for the persistence of subalternation in the sixteenth century, see Schmitt (1985).

As cited in Bullough (1958). I was led to this work, and the following two examples in the text above, by Deer (unpublished, 33).

As cited and translated, with slight modification, in García-Ballester (1995, 127-128). The original reads: “ad naturalem philosophum pertinet inuenire prima et universalia principia sanitatis et infirmitatis; particularia autem principia considerare pertinet ad medicum, qui est artifex factius sanitatis... [medici] non solum experimentis utentes sed causas [sanitatis et egritudinis] inquirentes ... et hec est ratio quare medici bene artem prosequentes a naturalibus incipient.”
Reflecting back on *Le Monde* and *L’Homme* in the *Discours*, Descartes describes his progress, “from the description of inanimate bodies and plants... [to] animals, and in particular man” (AT 6, 45, CSM 1, 134).

In the *Discours* written some ten years earlier, we can discern the same position: “We could use this knowledge – as the artisans use theirs – for all the purposes for which it is appropriate, and thus make ourselves, as it were, the lords and masters of nature. This is desirable not only for the invention of innumerable devices... but also, and most importantly, for the maintenance of health, which is undoubtedly the chief good and foundation of all the other goods in this life…. It is true that medicine as currently practiced does not contain much of any significant use; but... we might free ourselves from innumerable diseases, both of the body and of the mind, and perhaps even from the infirmity of old age, if we had sufficient knowledge of their causes and of all the remedies that nature has provided” (AT 6, 62-3).

A similar assertion appears in the *Principia*: “It is no less natural for a clock constructed with this or that set of wheels to tell the time than it is for a tree which grew from this or that seed to produce the appropriate fruit” (AT 8A, 326).

Descartes’ readers would have recognized in his talk of "denominatio extrinseca" a common element of Scholastic vocabulary. Specifically, a "denominatio" is the labeling or denomination of a given thing with the name of another thing, often because of some cause effect relation between the two. Thomas, for example, distinguishes between extrinsic and intrinsic denominations in book two of the *Contra gentiles* and in *De veritate*. In the latter, at q.21, a.4, he specifically notes, “urine is called healthy in relation to the health of the animal... [and] in such cases, what is... denominated does not receive its name from a form inherent in it,
but from something extrinsic to which it is related.” (See the glossary in Gracia (1982) for more on *denominatio* and for references beyond the two from Thomas which I cite.) It is because the characteristics of urine are related to the animal body that it can be denominated as “healthy” or “unhealthy” on analogy to the health of the animal. Examples such as these are prevalent in the medical tradition as well, where health is assigned to the animal or human body as an intrinsic denomination, and derivatively to something else. Descartes’ claim in Meditation Six that health is extrinsic even to the animal body is remarkable in this regard, and suggests the seriousness with which he is making his claims in Meditation Six. For further discussion of these issues, with specific emphasis on the meaning of “extrinsic denomination,” see Manning (2012).

26 It is worth pointing out that it is relative to the union that Descartes gives sensation a practical value of informing us about what is harmful and beneficial to us. For an excellent account, in English, see Simmons 2001.

27 What I call here the “person’s body” I have, in previous work, labeled the “physician’s body” in order to reach similar conclusions (Manning 2008, 452-453). It may be worth adding that, strictly speaking for Descartes, we must worry that no body exists for more than an instant because the matter collectively making it up is in constant flux (see, e.g., AT 11, 247).

28 As noted in Grene (1991), this passage is often brought out as evidence that Descartes endorses the view that the soul is the only remaining “substantial form,” all others having been rejected as superfluous. The effort to understand the human soul as the substantial form of the body is bolstered by remarks Descartes makes in the objections and replies to the *Meditationes* and in his letters to Regius (AT 7, 227-8 and AT 3, 503-8 respectively). The fundamental
problem with this interpretation is that Descartes indicates that the human body can be
described as a living body without reference to the soul, which would conflict with the thought
that the soul is the substantial form of the body, the form making it the living body that it is
(e.g., AT 11, 119-120). Whether this means that for Descartes there are two distinct
conceptions of a living thing, one having to do with the nature of body alone, and the other
having to do with the union, is a question I do not try to answer here. I do, however, imply that
only the latter would seem to allow for normative ascriptions of health, and I concede the
oddity in suggesting that there might be a notion of life in Descartes that does not make room
for health and illness (and I suppose even death).

29 Metaphysics is a branch of theoretical philosophy in the seventeenth-century sense of the
term as well, but whether Descartes’ own metaphysics should be identified as a distinct branch
of theoretical philosophy is another question. I am tempted to say it is not. Mathematics
would also have been thought of as a theoretical science, but its status in Descartes is not
entirely clear, as noted in Gabbey (1993).

30 From what I have already said in previous sections, it should be clear that the Aristotelian
scholastics bypass this difficulty. The scholastic physician can study natural philosophy and
exploit its principles precisely because there is no difference between a human body and a
person’s body on his account. Form and matter are present in both, just as in everything
studied in medicine. To this extent, the analysis required for studying animals and human
beings, or the human body and a person’s body, is the same, especially if we emphasize the fact
that they are one and all living things. The simplest functions of natural bodies as well as
distinctively human capacities exist along a continuous hierarchy, and though the scholastic
view is not without its difficulties, it does not share in the Cartesian problem I have been laboring to articulate here in Section 6.

31 This is especially clear in the opening of *L’homme*: “These men will be composed, as we are, of a soul and a body. First I must describe the body on its own; then the soul, again on its own; and finally I must show how these two natures would have to be joined and united in order to constitute men who resemble us” (AT 11, 119-120, CSM 1, 99) The point of departure is the union and the person’s body.

32 The division between anatomy, as the study of structure, and physiology, as the study of function, is foreign to the early modern period and before. In almost every case the two were pursued in tandem, and this only serves to reiterate the inadequacy of a natural philosophy concerned solely with body to body interaction. For discussion of the history of physiology and the proper meaning of the term “physiologia,” see Nutton (2012). Interestingly, Descartes himself never used “physiologia” when discussing his own work.

33 The alternative at this point is to argue that the ontology of natures that supports Descartes’ biology, while not justified by the nature of body, mind, or the union, is *de facto* incorporated into his natural philosophy. This, you will recall, is the view endorsed by Hatfield (2008) and Detlefsen (2013). As Hatfield explains it, these natures are not “substantial,” and I would agree, but he adds that they arise “only through motion” (2008, 417). In this last claim Hatfield has Descartes on his side:

> Any variation in matter or diversity in its many forms depends on motion.... And what they mean by ‘nature’ in this context is what causes all corporeal things to
take on the characteristics of which we are aware in experience. (AT 8A, 53, CSM 1, 232-233)

Judging from this passage, it looks as though Descartes’ ontology of natures refers to just the nature of body and the “configurations of matter in motion” (Hatfield 2008, 417). And it is not hard to imagine that recognizing repeated instances of the same configuration of matter we might proceed to create “a standard set of effects” we would then expect to find whenever we identify an instance of the original configuration of matter (Idem.).

However, with purely physical natures like these, the prospect of corruption is entirely a matter of our psychological expectations. We have come to expect that the particles of matter that happen to exist in a certain region of space will interact in such a way that they will produce certain effects, and when this does not happen the nature of the body in that region of space has been corrupted. But whereas my account of the ontology of natures traces back to “true errors of nature” the same cannot be said here. I believe the two accounts can be reconciled—indeed my account presumes that matter is differentiated into forms—but only the person’s body can be used to give a metaphysical grounding for Descartes’ ontology of natures.