THE ONTOGENESIS OF THE HUMAN PERSON: A NEO-ARISTOTELIAN VIEW

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It has now become something of a commonplace among pro-life writers to claim that the question of when human life begins is settled by empirical science. While there is a sense in which this is true, in a broader sense the claim is not quite accurate. Properly speaking, this question belongs not to the empirical sciences, but to ontology. Therefore, a serious answer to the question—while it will certainly have to incorporate the findings of empirical embryology—must come from the branch of speculative philosophy that Christopher Tollefsen has labeled "philosophical embryology."[1]

In what follows, I examine the question of when human life begins from a neo-Aristotelian perspective. In my view, the basic principles of Aristotle's metaphysics inform an account of human life (and the human person) that offers the best explanation of the available phenomena. This account—the substance account of the human person—can fully incorporate the contemporary findings of empirical embryology, while also recognizing the essential uniqueness of rational human nature.

We need an accurate answer to the question of when human life beings to inform our practical reasoning about the ethics of abortion and the treatment of human embryos. However, it is important to recognize that those practical considerations follow from the speculative conclusions and not vice versa. We should not begin from any practical position—including a pro-life position—and attempt to reason back to a theoretical account of the embryo to vindicate that position. Instead, I think we will discover that the best available metaphysics results in a view of the human person that naturally leads to the pro-life conclusion.

While my ultimate goal is to provide the most compelling contemporary account of philosophical embryology, it will be useful to consider the historical question of how Aristotle (and his followers, such as St. Thomas) viewed the embryo in order to forestall certain common

1. Christopher Tollefsen, *Some Questions for Philosophical Embryology*, 85 AM. CATH. PHIL. QUART. 447 (2011).

misconceptions. This defective historical view was the result of combining some of the key principles of Aristotle's metaphysics with a number of now untenable empirical beliefs. While those empirical beliefs should be rejected, the metaphysical principles are severable from them and remain fundamentally viable.[2] Accordingly, I will attempt to articulate a neo-Aristotelian account of the ontogenesis of human life that synthesizes the empirical findings of contemporary embryology with the best available metaphysical principles to show that every human embryo is a full human person from the beginning of its existence as an organism. I will conclude by briefly showing how this neo-Aristotelian view sidesteps some of the most common pro-abortion objections against the full humanity of the embryo.

THE HISTORICAL VIEW

It is sometimes claimed that Aristotle held that early abortion is permissible *simply because* he thought early embryos are not fully human. In a very brief passage in Book VII of the *Politics*, he offers just about his only normative remarks concerning abortion:

> As for the exposure and nurture of infants, let there be a law against nourishing those that are deformed, but if exposing offspring because the number of children one has is prohibited by the customary rule, then a numerical limit must be set upon procreation. But if children are conceived by some of those who have intercourse in violation of this, an abortion must be induced before the onset of sensation and life. For what is holy will be distinguished from what is not by means of sensation and life.[3]

This has led some contemporary commentators to make claims to the effect that "if Aristotle had known what we now know about embryology he would have been opposed to abortion altogether."[4] In general, it seems that such commentators read the passage to say that abortion is "holy" until

2. It must be admitted that this neo-Aristotelian metaphysical outlook is very much a minority view within contemporary philosophy, but of course as in so many things popularity is not synonymous with truth. Nonetheless, this viewpoint does continue to find important defenders including figures such as John Haldane, David Oderberg, Edward Feser and others. Obviously in this context, I cannot attempt to defend Aristotle's metaphysics as a whole. However, others have provided able defenses of many of these fundamental principles against modern critics. *See*, for instance, DAVID S. ODERBERG, REAL ESSENTIALISM (2008).

3. ARISTOTLE, POLITICS: BOOKS VII AND VIII 1335b19–26 (Richard Kraut trans., Clarendon Press 1997).

4. PETER L. PHILLIPS SIMPSON, A PHILOSOPHICAL COMMENTARY ON THE POLITICS OF ARISTOTLE 247 (1998).

the "onset of sensation and life" (a point that other Aristotelian sources place forty or ninety days post conception), but not afterwards. However, this line of thinking goes, on the basis of contemporary embryology we can now confidently push the onset point well back (perhaps all the way to conception), so we should conclude that today Aristotle would be opposed to nearly all forms of abortion.

Unfortunately for the pro-life commentators, and as I have explained at length elsewhere,[5] this represents a misreading of the passage in general and his use of the word *hosios* ("holy") specifically. What Aristotle is actually saying is not that early abortion is permissible (i.e. "holy"), while later abortion is illicit (i.e. "unholy"). Instead, he is marking out the *kind* of wrongness that is involved in abortion in a very certain context (namely, the violation of a relatively rare *religious* norm against infanticide that was then current in a very few Greek city-states, among them Thebes and Ephesus). This is clear from the fact that the entire distinction is relevant only in those places where the exposure of excess children is "prohibited by the customary rule."

For his part, Aristotle does not give any reason to believe that he is opposed to infanticide. Rather, in this passage he is simply accommodating the contingent, historical fact that a few Greek cities happened to have "customary rules" against exposure/infanticide, and so in *those* places (and presumably *only* those places) abortion should be procured early so as to avoid violating the religious principle that human children should not be killed. According to his embryology, the "onset of life and sensation" marks out the point before which one can reliably say that a human being does not exist. In fact, this passage from *Politics VII* offers no real argument on the moral question at all. It merely offers a practical Aristotelian answer to the question: if the killing of a young human being is prohibited (for religious reasons), when (in the course of pregnancy) can abortion be procured so not to involve the killing of a young human being?

In short, this passage from the *Politics* gives little ammunition to the pro-life side precisely because Aristotle calmly seems to accept the customary Greek practice of exposure/infanticide. Given that he does not rule out infanticide, it should come as no surprise that he offers no free-standing normative principle for ruling out abortion.[6] Thus, Aristotle does not hold that early abortion is permissible *simply because* early embryos are not full human beings; rather, he seems to accept the general permissibility of abortion and infanticide in their own right, though he is willing to permit local custom to prohibit them for religious reasons.

5. Mathew Lu, *Aristotle on Abortion and Infanticide*, 53 INT. PHIL. QUART. 47 (2013).

6. Another way of the putting the point is that he seems to be a legal positivist on this question, content to follow the local laws and customs whatever they may be.

At this point, I think we have to conclude that Aristotle himself is not a helpful guide to the specific question of the normative status of abortion. Though there certainly are modern commentators who argue for the permissibility of infanticide, this fortunately remains beyond the pale in most contemporary communities.[7] Accordingly, Aristotle's specific conclusions from the *Politics* are unhelpful in the present context.

On the other hand, later thinkers do have normative resources that Aristotle lacked, which lead them to reject both infanticide and abortion. Saint Augustine and Saint Thomas are representative of the later tradition,[8] in that they both hold the direct impermissibility of abortion.[9] At the same time, however, they generally follow both Aristotle's theoretical embryology and empirical beliefs. So the later tradition offers a more promising direction for finding moral arguments about abortion.

For the later tradition, a significant part of the abortion issue revolves around the question of whether (or when) abortion constitutes homicide. The general view was simply that early abortion (before the "onset of life and sensation") does not constitute homicide, precisely because the early embryo is not a *homo*. It is important to note, however, that there are other evils besides murder, and both Augustine and Thomas would have regarded even early abortion as morally abhorrent for reasons other than its being an instance of murder. Nonetheless, it is true that they held that early abortion did not involve the killing of a human being. To understand why, we have to go to Aristotle's philosophical biology.[10]

These medieval figures held a "delayed hominization" view of (human) embryology derived from Aristotle. On this view, the embryo goes through a hierarchically ordered series of ontologically distinct stages, only the last of which is fully human. Essentially, the embryo begins as the lowest kind of living creature—possessed of a merely "vegetative" nature—before being substantially transformed into an ontologically higher creature—possessed of an "animal" nature—and only some time later being

7. This is apparent in the media reaction to the publication of *After-birth Abortion: Why Should the Baby Live?* Of course, there was nothing really new in the proposal for "after-birth abortion" as figures like Michael Tooley and Peter Singer have been advancing similar arguments in favor of infanticide for decades. Alberto Giubilini & Francesca Minerva, *After-birth Abortion: Why Should the Baby Live?* 39 JOURNAL OF MEDICAL ETHICS 261 (2012).

8. See John T. Noonan, Jr., *Abortion and the Catholic Church: A Summary History*, 12 NATURAL LAW FORUM 85 (1967)

9. Practically speaking, the Christian thinkers are in a similar position as those Greek communities (e.g. Thebes and Ephesus), which did have "customary rules" against exposure. Theoretically speaking, however, the Christian thinkers had the advantage of a system of moral thought that allows for principled rejection of child murder (e.g. the Natural Law), which the Greeks did not. We can see the difficulty just by reflecting on how, exactly, one should explain the wrongness of murder (of any sort) on strictly Aristotelian grounds.

10. I give more details on Aristotle's philosophical embryology in "Embryology: Medieval and Modern," HUMAN LIFE REVIEW 40 (2014). See the notes there for further references.

substantially transformed again into another yet ontologically higher creature—a rational human being. This succession of ontological transformations within the individual human embryo reflects Aristotle's broader conception of animate nature more generally, which he divides into the same basic three categories: vegetative, animal, and rational.

Among living things, the vegetative powers, which include nutrition, metabolism, growth, self-repair, and reproduction, are the ontologically lowest, precisely because they are the minimum necessary for life. Accordingly, these vegetative powers belong to the natures of all livings things. Ontologically higher creatures add other powers to these vegetative ones, including the characteristic "animal" powers of sensation and movement.[11] Indeed, the exact sense in which animals are ontologically higher than plants (and other very simple creatures)[12] is that all of the sorts of vital processes at work within plants are also at work within animals, though not vice versa, as animals alone possess powers related to basic cognition and locomotion. Human beings are essentially rational animals, which means that *qua* animals they possess all the aforementioned vegetative and animal powers but *qua* rational human nature includes the ontologically highest powers involving reason.

While the lower vegetative and animal powers are essentially embodied *organic* powers, the same is not true of the rational powers. The rational powers are fundamentally immaterial, simply because true knowledge is the knowledge of universals, which no *particular* material thing is capable of encompassing. This contrasts with sense perception or feelings like anger that are locatable in specific organs. Accordingly, for Aristotle, there can be no *organ* of rational thought. This is not to deny that in normal cases human thought is dependent on a functioning brain, but thought cannot be *in* the brain the way sense perception is *in* the sense organs.[13]

As noted above, this tripartite division of animate nature is reflected in the development of a specific individual embryo. Aristotle's grounds for holding this successionist view are clearly empirical. In the *History of Animals*, Aristotle writes:

11. We have some difficulty in terminology because the etymological root of the English word *animal* is the Greek *anima*, which means, philosophically, soul-form. So, for Aristotle, not just animals, but all living things—plants, animals, human beings (what I have been calling "animate nature")—are *animated*. What distinguishes material living things from inanimate nature is that living things are partitually constituted by a soul-form that exercises the vegetative powers.

12. Very simple organisms such as bacteria or amoebas, would actually count as "plants" on this Aristotelian schema.

13. This means, among other things, that Aristotle's schema can easily accommodate non-human rational beings, should any exist. Because the rational powers are not, as such, necessarily connected to the organic powers, rationality is (in principle, at least) severable from animality. *See* ODERBERG, *supra* note 2.

> In the case of male children the first movement usually occurs on the right-hand side of the womb and about the fortieth day, but if the child be a female then on the left-hand side and about the ninetieth day. . . . About this period the embryo begins to resolve into distinct parts, it having hitherto consisted of a flesh-like substance without distinction of parts.
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> In the case of a male embryo aborted at the fortieth day, if it be placed in cold water it holds together in a sort of membrane, but if it be placed in any other fluid it dissolves and disappears. If the membrane be pulled to bits the embryo is revealed, as big as one of the large kind of ants; and all the limbs are plain to see, including the penis, and the eyes also, which as in other animals are of great size. But the female embryo, if it suffers abortion during the first three months, is as a rule found to be undifferentiated; if however it reaches the fourth month it comes to be subdivided and quickly attains further differentiation.[14]

This passage is significant because it gives us a good idea of how Aristotle thinks we can empirically identify the physical changes in the embryo that correspond to the first two ontological stages of the delayed hominization theory.[15] Note that the initial vegetative stage is characterized by "a flesh-like substance without distinction of parts."[16] This is important because the "parts" he has in mind are organs (as his examples make clear). It is precisely because the embryo is undifferentiated before forty or ninety days that it cannot possess an animal soul, because animal souls necessarily inform organs.

The reason for this is found in the *Generation of Animals* where he writes, "those principles whose activity is bodily cannot exist without a body, e.g. walking cannot exist without feet"[17] This follows directly from his hylomorphism, insofar as he considers all individual organisms to be composites of form (soul) and matter. In the absence of physical organs, the characteristic powers of the animal soul-form (sensation and locomotion) would have nothing to animate and so could not exist. Because the early

14. ARISTOTLE, History of Animals, in THE COMPLETE WORKS OF ARISTOTLE: THE REVISED OXFORD TRANSLATION 583b3–26 (Jonathan Barnes ed., A.W. Thompson trans., Princeton University Press 1984).

15. Almost all of these empirical observations are inaccurate, of course. Fetal movement is only detectable (by the mother) much later than Aristotle suggests, and a distinction of parts is present in the embryo from conception (because a distinction of parts is present in all cells).

16. ARISTOTLE, *supra* note 14, at 583b3–26.

17. ARISTOTLE, Generation of Animals, in THE COMPLETE WORKS OF ARISTOTLE: THE REVISED OXFORD TRANSLATION 736b24 (Jonathan Barnes ed., A. Platt trans., Princeton University Press 1984).

embryo is undifferentiated and lacks organs it simply cannot possess an animal nature. Therefore, insofar as it is a living thing he thinks it must be merely vegetative.

On the other hand, once it develops parts (i.e. organs), then an ontologically higher animal soul informs the matter of the embryo. It is important to note that this ontological change requires a cause external to the embryo itself, because it involves an increase in reality. That is to say, because an animal soul is ontologically higher than a vegetative soul, then the vegetative soul itself cannot be the cause of that change. Basically, this reflects the fundamental Aristotelian (and common-sense) metaphysical principle that something cannot give what it does not have.[18] An ontologically lower thing cannot be the cause of a change into something ontologically higher than itself. So some external cause must bring about the change, and that is in fact Aristotle's view. He holds that the father's soul is not only the formal and efficient cause of the embryo's initial vegetative existence at conception, but also that the father's soul is the cause of the embryo's ontological transformation from a vegetative creature into an animal. He thinks this occurs through the imparting of a "vital heat" to the mother's "catamenia" that actually persists within her forty or ninety days after conception.

The father's soul, however, is not the cause of the ontological change from an animal into a rational being. As noted above, no material instrument could possibly bring about this change because reason is entirely immaterial. Instead, Aristotle merely cryptically remarks that reason is "divine" and that the cause of this transformation comes from "outside."[19] Further, because reason lacks an organ, there is no physical marker of the last ontological changes. This is why the *Politics* passage counsels abortion before the embryo's transformation into an animal as a kind of cautionary principle: if you destroy the embryo before it is even an animal, then you can be assured that you have not killed a human being.

While there are many further details I have not discussed, but for our purposes this should suffice to understand why I claim that Aristotle holds the successionist view on empirical grounds. He bases his theory of the three hierarchically ordered, and ontologically distinct stages on the presence or absence of specific empirical signs, specifically the differentiation of parts/organs. The absence of organs is a completely reliable sign that no animal soul is present because an animal soul can only be present insofar as it informs matter organized into organs.

Precisely because the successionist view depends on these false

18. In the Thomistic tradition this is often referred to as the "principle of proportionate causality." See EDWARD FESER, AQUINAS (A BEGINNER'S GUIDE) 22–3 (2009).

19. ARISTOTLE, *supra* note 17, at 736b26ff.

empirical views, it is no longer tenable. Instead, the contemporary evidence confirms the presence of parts—and, in Aristotelian terms, "organs"—on an intracellular level even in the zygote. Further, contemporary empirical science also reveals the fundamental continuity of embryonic development. This means there are no plausible ontological inflection points, marked by physical changes, such as the supposed initial presence of parts at forty or ninety days. Without any such ontological inflection points, the successionist view is impossible. Of course there is no way Aristotle himself could have known about any of this new empirical evidence, but had he known, he surely would have reconsidered his overall embryological theory. That said, the new evidence does not significantly impact his overall metaphysical picture. If we have other good reasons to retain it (e.g. because it remains the most conceptually satisfying and explanatorily powerful ontology), then the proper philosophical embryology should seek to synthesize those metaphysical principles with the contemporary science.

ARISTOTELIAN ONTOLOGY AND THE CONTEMPORARY EVIDENCE

Now that we have a very basic picture of the way in which empirical observations informed the traditional delayed hominization embryology, I want to turn to the question of how we might construct a neo-Aristotelian account in light of the contemporary empirical evidence. We will begin by attempting to ascertain the diachronic identity conditions for a human being—i.e., the conditions that allows us to say that the *same* human being persists through time. The most natural approach is to work back towards the beginning by asking: what determines the identity of the self-same human being across any temporally extended period? So, for instance, what makes it the case that I am the same *thing* that I was one year ago, or five, or fifteen? Why am I the same human being as the child born now almost forty years ago? It seems obvious that I am he and he is I, and yet some of the most obvious possible grounds for explaining that identity are almost immediate non-starters.

For instance, the chemical constituents of my body are in a constant state of flux. At the cellular level, the vast majority (though not all) of my cells have been replaced many times over since my birth. From a broader perspective, the overall morphology of my body has changed dramatically over the years.

From a psychological standpoint, things are much the same. My earliest memories only go back to around four years of age. My beliefs and desires have changed greatly over the course of my life, and many of them are also in a state of flux. My cognitive processes and capacities have changed greatly as I achieved the use of language and progressively manifested various other rational powers. Indeed, for quite some time after my birth I

manifested no apparent rational powers.

Yet for all of this, I have remained the same individual across all of these manifold physical and psychological changes. The question remains: what grounds the identity of the human being that persisted across all of these many changes? If the purely material and purely psychological options prove unavailing, the most natural recourse is to make my identity a function of being the self-same living thing. What seems most obviously to persist though all the material and psychological changes is the same living organism. Yet, if we go in this direction, a new difficulty arises: precisely how should we understand a living thing as alive?

The problem of how to define life is extremely difficult. As Michael Thompson has shown, the standard biology textbook definitions are generally unsuccessful insofar as they attempt to offer any kind of reductive explanation of life.[20] Life itself seems to be a basic category of reality, incapable of being further reduced to any simpler reality.

Once we have recognized that life itself is (in some deep sense) a basic feature of reality, we can still ask: what sort of properties mark it out? For an Aristotelian, this is where the powerful idea of immanent causation comes into play. As David Oderberg explains, the powers that are essential to (and definitive of) life are best understood in terms of what "begins *with* the agent and terminates *in* the agent for the sake *of* the agent."[21] A living thing exercises immanent causation precisely insofar as its internal activity is ordered towards its own *good* as such. Because only living things can possess a good, *per se*, outside of animate nature there is only transient causation, that "is the causation of one thing or event (or state, process, etc.) by another where the effect terminates in the former."[22] Of course, the biological activity of living beings involves many instances of transient causation.[23] However, within a living creature, all of its transient causal processes serve a higher end: the end (*telos*) which constitutes its good. So living things, and only living things, are characterized by sets of causal processes that together serve the good of the individual organism.

It is only because individual biological organisms possess a good, and thus that things can go well or badly for them,[24] that it makes sense to think of an individual organism as the subject of a life. What unifies an individual organisms' temporally extended physical (and, in some cases, psychological) processes is the fact that they jointly serve (or, fail to serve)

20. *See* MICHAEL THOMPSON, *Can Life Be Given a Real Definition?*, Chapter 2 *in* LIFE AND ACTION: ELEMENTARY STRUCTURES OF PRACTICE AND PRACTICAL THOUGHT 33–48 (2008).

21. ODERBERG, *supra* note 2, at 180.

22. *Id*.

23. *Id*. (providing examples of transient causation range from intracellular biochemical activity to larger scale activities such as eating).

24. DAVID S. ODERBERG, MORAL THEORY: A NON-CONSEQUENTIALIST APPROACH (2000).

the normative end of a living a good life for the kind of thing it is. That normative end itself is determined by the nature of that organism as a member of a natural kind, which determines the physical (and, in some cases, psychological) conditions for its flourishing (the absence of which lead to its failing as a organism of that kind). This, of course, includes human beings, which possess a nature just as much not of their own choosing as any other living thing.

With all of this in mind, we can now return to the original question: when does human life begin? We will be able to answer this question if we can determine at what point in the normal course of human generation there exists an ontologically unique biological organism with a human nature. At first, this might seem to be simply a question for empirical science. However, unless we beg the question of what an organism is, a full answer requires a philosophical judgment informed by the empirical findings. This is because, given the observations above about the non-reductive character of life, what counts as an *organism* is itself a philosophically loaded question.

In the Aristotelian context already introduced, the question can be re-articulated in terms of immanent causation. When in the course of human development does a proper subject of continuous immanent causation exist?[25] At this point, understanding empirical embryology is essential.

We can begin by working our way backwards from a paradigmatic adult human being, and we encounter no serious problems in recognizing the metaphysical identity of the self-same organism though the conventional stages of adolescence, childhood, and infancy. The enormous changes across even these conventional stages pose no great difficulties because, on this neo-Aristotelian model, what underwrites the relevant continuity is neither strictly material nor psychological. But, of course, the same is true into the prenatal stages as well. Birth involves no intrinsic change in the child, though obviously there are significant extrinsic changes. The fetus is unambiguously the subject of the same kinds of immanent causal processes throughout its growth and development *in utero* that the child is after birth. In fact, the contemporary evidence suggests no plausible break in the continuity of immanent causation of the self-same organism at any point after the development of the primitive streak at approximately fourteen days post conception.

It is at this point that we arrive at our first real potential marker for substantial change, what is sometimes called the twinning point. For reasons that are apparently not well understood, human embryos prior to

25. By "subject" I mean both the linguistic subject of subject-predicate propositions expressing immanent causal activity in Thompson's sense, and also the ontological subject/agent of that activity in the sense of the "for the sake of" in Oderberg's definition of immanent causation.

this point are liable to undergo monozygotic twinning, whereby a single "parent" embryo divides into two genetically identical "daughter" embryos. This can occur as early as the two celled stage, but generally occurs between days five and nine, and must occur before the development of the primitive streak at approximately day fourteen.[26] Various commenters have suggested that the mere possibility of twinning poses a problem for claiming that the pre-fourteen day embryo is a "human individual."

The supposed problem is expressed by Norman Ford:

> It would . . . be more coherent to hold that whilst admitting the zygote is a living individual being, it could not be a human individual on the simple grounds that, given the right conditions, it had the natural active potentiality to develop into an adult. It could, given the right conditions, equally develop into two adult human individuals. It would have to be both one, and more than one, human individual at the same time. This would be absurd. It is necessary, in practice, to abandon this theoretical attempt to show that the potential for identical twinning in human zygotes is compatible with their personal status based on their natural active capacity to develop into adult persons. The conclusion again would seem to be that a human individual could not be present at the completion of fertilization. The human individual would have to begin at some later stage in the development of the multiplying blastomeres.[27]

His central point is that because the early embryo (he specifies zygote, but twinning can occur through the blastocyst stage) has the potential to become two human individuals, then neither of the "daughter" individuals can be ontologically identified with "parent" embryo. Therefore, on this account, the ontological continuity of human development can only be said to begin after the possibility of twinning is past and no "human individual" is present before that point.

This argument has always struck me as rather strange. Why should it be true that just because there is some *possibility* that an individual substance can be split that there can be no ontological continuity in the case in which it *does not actually* split? If I have a banana, it is possible to make a banana

26. These empirical details drawn from Patrick Lee & Robert P. George, *The First Fourteen Days of Human Life*, THE NEW ATLANTIS (Summer 2006). Maureen Condic has suggested to me that these details are perhaps not a clearly established as Lee and George seem to think. Ultimately, it matters little for my overall point.

27. NORMAN M. FORD, WHEN DID I BEGIN?: CONCEPTION OF THE HUMAN INDIVIDUAL IN HISTORY, PHILOSOPHY AND SCIENCE 122 (1991).

split. However, it is surely strange to claim that because my banana *can possibly* be cut in two, it is not the *same* banana if it is not actually divided. It seems to me that the mere possibility that a substance can divide is insufficient to conclude that there is no diachronic identity when in fact it *does not* divide.

Alternately, consider the case in which division does occur, for instance, with an earth worm. If we cut the worm in two at the very center of its length, someone like Ford might claim that there would be no way to say which of the two "daughter" worms is ontologically identical with the uncut worm. There is apparently no non-arbitrary way identify either "daughter" with the "parent," because each of the "daughters" has the same mass."[28] They would be, as Ford claims, "identical indiscernibles, except for their separate concrete existences."[29]

Suppose this is correct and the daughter worms really are "identical indiscernibles." This would imply that we would have no *material* grounds for identifying either "daughter" with the "parent." It would not, however, give us any specific reason for doubting that the original worm was, in fact, a worm. It seems that there are two possibilities here: (1) the original worm continues to exist as a materially smaller worm, while the second (genetically identical) "daughter" worm is an ontologically new organism/substance, or (2) the original worm goes out of existence at the time of the division (i.e. dies) and two subsequent individual worms come into existence, neither of which is ontologically identical to the original (i.e. there are three total individuals). Whichever is the correct description, it remains the case that at least one worm is in existence the entire time.[30]

Of course there is a distinction between the worm and embryo cases in that the original worm is a mature instance of its species. However, this is a distinction without much difference. What is necessary for our purposes is *not* to establish that every living adult human being is, in fact, ontologically identical with some previously existing single celled zygote, or that every

28. *Id*. at 122. Ford explicitly discusses the analogous case: "Since both twins would be identical in every respect after the division of the zygote, it would be impossible to provide adequate criteria to determine which one was [identical with the original zygote]."

29. *Id*. It is perhaps worth noting that, for a Thomist, their "separate concrete existences" would be enough to distinguish them in terms of their individual acts of existence. In principle, the identity of one of the daughters with the parent might be established if it one of the daughters shared the same act of existence as the parent. However, this metaphysical truth of the matter might be epistemologically undiscoverable.

30. In *Fission and Confusion*, David B. Hershenov and Rose Koch-Hershenov have proposed a strange theory in which we should think of the original embryo as possessed of two souls, one of which is inherited by each of the daughters. If this rather outlandish theory were correct it would imply the right reading of the embryo case is analogous to (1). Ultimately, however, it matters little to real question of whether the original embryo is a human being. David B. Hershenov & Rose Koch-Hershenov. *Fission and Confusion*, CHRISTIAN BIOETHICS 12, n.237–54 (2006).

human being comes into existence with fertilization. In the case of identical twins, it turns out to be the case that at least one (and perhaps both) of the twins came into existence as a "daughter" of the original zygote. Nonetheless, even if neither twin is ontologically identical with the "parent" zygote, that does not entail that the zygote itself is not a "human individual" (i.e. an ontologically unique substance with a human nature).

In cases where twinning does occur, we may have to concede we cannot establish the humanity of *that* particular early embryo by demonstrating its ontological continuity with an adult human being. However, by itself that does not show that the early embryo is not a human individual, only that some early embryos are not ontologically identical with a temporally subsequent adult.[31] Furthermore, the continuity strategy does establish the humanity of the early embryo stage of the life-cycle of any non-twinned adult. To show that the early embryo in twinning cases is not a human individual would require showing it is *a different kind of thing* altogether than the embryo that does not twin. However, this is grossly implausible, as it would require one to argue that early embryos that (contingently) do undergo twinning are not human individuals, while embryos that (contingently) do not happen to undergo twinning are human individuals.

Perhaps someone like Ford might seek to take refuge in the difference between induced twinning (or worm cutting), and what he describes as the embryo's putative "natural active capacity to develop into" multiple adult persons. Ultimately, however, this makes little difference. If we consider creatures that reproduce asexually by binary fission (e.g., bacteria, etc.), the fact that the "parent" organism has a "natural active capacity" to develop into multiple "daughters" does not change the fact that the "parent" is an instance of the same natural kind. The "parent" bacterium is still a bacterium, even if it undergoes binary fission, and even if it is not clear (epistemically) whether it is ontologically identical to one of the "daughters."

Furthermore, in the case of human embryos, we simply do not understand the twinning mechanism, so it is far from clear that the embryo even has a *natural active capacity* for twinning. Research *in vitro* seems to suggest that twinning can result from external manipulation. It is conceivable that even in the natural twinning cases, the process is a response to external circumstances and not the expression of a "natural active capacity." At this point, I think we have to allow that we simply do not know enough to make a judgment.

There is another empirical consideration closely related to the twinning

31. But of course many embryos do not survive (e.g. spontaneous miscarriage), and therefore are not ontologically identical with a temporally subsequent adult. But that, by itself, does not suffice to show that they are not human individuals, any more than the fact that some children fail to reach adulthood suffices to show that those children are not human individuals.

issue that also bears consideration. It is sometimes claimed that the blastomeres constituting the early embryo (before cavitation and the development of the inner cell mass) are totipotent. Some empirical evidence seems to show that at least some blastomeres, in the right circumstances, are capable of developing into an independent, genetically identical twin, if separated from the other blastomeres (and placed in the right environment). Certain studies suggest that it might be possible to initiate twinning by external manipulation of early embryos in vitro.[32]

As with the natural twinning case considered above, the mere possibility that totipotent cells might become separate human individuals is taken as a reason for denying that the early embryo is a human individual. My earlier remarks concerning natural twinning are fully applicable here as well. There mere fact that it is possible for a misguided researcher to remove a blastomere from an early embryo, and have an ontologically separate embryo develop from it, does not by itself show that the original embryo was not a human individual. This is even less of a problem than the halving of the worm, because in this case there would be good reason to claim the ontological continuity of the early embryo with the "donor" blastocyst.[33]

Totipotency raises yet another potentially troubling issue concerning the early embryo for some commentators. They argue that the blastomeres that make up the early embryo do not constitute an organic unity and therefore that the blastocyst is a not a single living biological organism.[34] For instance, David Hershenov and Rose Koch-Hershenov offer as the "biological basis for [their] claim that the early embryo taken as a whole is not alive [the claim] that the cells of the embryo don't cooperate for the benefit of the whole in the way that is typical of a multicell organism."[35] Instead, they claim the early embryo is merely a composite of multiple independent living organisms analogous to the way "the cheerleader

32. See the discussion of these studies in Rose Koch-Hershenov, *Totipotency, Twinning, and Ensoulment at Fertilization*, 31 J. MED. PHILOS. 139–64 (2006) (arguing, "that current biological data on the human embryo does not provide sufficient evidence for the totipotency of human embryonic cells" *Id*. at 143.). Ultimately, this is an empirical question, not a philosophical one, and best left to the empirical sciences. Maureen Condic has brought to my attention additional research that suggests that only some of blastomeres manifest anything like totipotency (see her contribution to this volume).

33. That reason, of course, it that it shares all of the same cells except one. If a particularly energetic researcher were to separate a multi-celled blastocyst into each of it component blastomeres and foster the development of each of them into a separate embryo, then we would be in a situation similar to the worm case. Perhaps, in such a case, we would be particularly inclined to assume worm possibility (2) is operative (i.e. that the original embryo was destroyed). As in the twin case, however, it does not make much of a difference.

34. The thought is largely based on the idea that, metaphysically speaking, each totipotent blastomere is like a zygote. So the blastocyst is like a collection of "zygotes" rather than a single organism.

35. Hershenov & Koch-Hershenov, *supra* note 30, at 247.

organisms composing [a cheerleader] pyramid can be in contact, communicate, and coordinate themselves without composing a giant organism."[36]

If the early embryo is not a single organism, then it could not be a human individual. As we saw, the basis for this rather strange judgment is the empirical claim that the blastomeres do not "cooperate" in the ways that the cells of a proper multicellular organism do, specifically by functioning "as a unit, maintaining homeostasis, metabolizing food, excreting waste, assimilating oxygen, maintaining its boundary, etc."[37] This empirical claim is contested by other commentators such as A. A. Howsepian who asserts "there is ample physiological evidence for the existence of dynamic chemical interactions taking place between the blastomeres"[38] and that "a study of blastomeric cleavage patterns appears strongly to indicate that the collection of cells we have been calling the two-celled preembryo functions as a biodynamic unit and thus is . . . a continuing homeodynamic event which constitutes a single life"[39]

There is obviously a serious disagreement here about how to read the available empirical evidence, and perhaps further research will give us better grounds for adjudicating it. However, because there are also disagreements here about the philosophical question of what constitutes life, even further empirical evidence may not be fully dispositive on the question.

In my view, the composite object hypothesis seems largely unfounded regardless of whether further empirical evidence can be adduced concerning intercellular interaction between the blastomeres. This is because there is a stark disanalogy between the early embryo and the Hershenovs' cheerleader pyramid analogue, namely that the blastomeres—and not the cheerleaders—are teleologically ordered to the generation of a specific kind of thing. They attempt to deny this by allowing

> that the early embryo has a telos for when in the proper circumstances it develops into an organism. The cells behave as if that is their goal. But our cheerleaders too can have a goal of constructing their pyramid in a certain way without that aim transforming them into a giant organism.[40]

Unfortunately, this is just a misunderstanding of what it means to say

36. *Id*. at 248.
37. *Id*. at 247.
38. Howsepian, A. A., *Who or What We Are?*, REVIEW OF METAPHYSICS 45, no. 3 (1992): 483–502, 490.
39. *Id*. at 491.
40. Hershenov & Koch-Hershenov, *supra* note 30, at 248.

that the early embryo has a *telos*. The mistake lies in conflating the cheerleaders' "goal of constructing their pyramid" with the teleological ordering of the embryo towards further development.[41]

The cheerleaders' goal is (presumably) the result of their practical reasoning. Their goal is a psychological plan to bring about some state of affairs in response to other psychological and/or moral considerations (e.g. desires, promises, etc.). Obviously, the embryo has no such psychological "goal." Unlike the cheerleaders, it makes no choices. Indeed, given the right conditions, it cannot help but develop towards its proper *telos*. In contrast, constituting pyramidal human structures is in no way the *telos* of any of the cheerleaders, though it might be something they want and decide to do. This is because the relevant sense of *telos* is not a psychological end, but an Aristotelian final causality belonging to an individual solely in virtue of his or her nature.

Not only does the cheerleader pyramid analogy collapse on closer inspection, the importance of this teleological ordering of the embryo cannot be overstated. It is not an accident that early embryos develop in fetuses, babies, children, and adults. The reason it is not an *accident* is precisely because the *telos* of an early embryo is a reflection of its nature as a human organism.

Aristotelian final causes have long been continually misunderstood and misrepresented. At the heart of Aristotle's insistence on the primacy of final causation over the sorts of causation typically thought definitive in modern science (i.e. material and efficient), is the simple but deeply important point that in the absence of final causality there is no explanation for the regularity of nature. Forms of reductive materialism were familiar to Aristotle—e.g. the atomism of Democritus—and in the *Physics II* he "shows that an opponent who claims that material and efficient causes alone suffice to explain natural change fails to account for their characteristic regularity."[42]

The key idea is that while efficient and material causation might be adequate to explain *some* empirical phenomenon in a given case, alone they are not adequate for explaining why certain phenomena regularly recur. Aristotle's example in the *Physics* regards the regular shape of teeth (i.e. the sharpness of the incisors and the flat grinding surfaces of the molars). While material and efficient causation might explain why a given individual has teeth shaped in such a way, those two causes are not adequate for explaining why nearly all creatures of the same kind (whether horses or human beings) have teeth shaped in more or less the same way. In fact, as

41. *Id*.

42. Andrea Falcon, *Aristotle on Causality*, THE STAN. ENCYLOPEDIA OF PHIL., *available at* http://plato.stanford.edu/archives/win2012/entries/aristotle-causality/ (last revised Oct. 15, 2012).

Edward Feser points out, ultimately "we cannot make sense of efficient causality without final causality."[43] As Feser goes on to note, the reason for this goes to the heart of Humean skepticism about the capacity of induction to establish universal laws of nature. The irony, of course, is that Humean skepticism just unwittingly demonstrates Aristotle's exact point: without final causality there is no real explanation of causal regularity in nature.

For our purposes in thinking about the embryo, the regularity with which zygotes develop along a continuous path into infants is exactly what requires explanation. It is not as if some human embryos develop into giraffes and some into peanuts and some into infants. Rather, insofar as they develop properly, all human embryos develop into mature instances of the natural kind human being. Of course, this is not to deny that many *actual* embryos do not survive or properly develop for a variety of reasons. It is also not to deny that some of the ones that do survive suffer various defects. But the key point is that, conceptually as well as ontologically, those defective individuals are *defective* precisely insofar as they fail to instantiate some important aspect of human nature.[44]

Of course, this is exactly where the finality of an individual natural kind comes into play. Human embryos regularly develop into infants, and not into giraffes, because they are teleologically ordered to do so in virtue of possessing a human nature. Once we see this, we can recognize that immanent causality, which we saw above as definitive of life, itself involves an appeal to finality insofar as the immanent causal processes are ultimately directed to the good of the individual to which they belong. Furthermore, that individual's good is itself determined by its nature as an instance of a particular natural kind.

We can now bring together a number of loose threads. By any remotely plausible standard, the zygote is a single-celled living being, ontologically unique, and the agent/subject of a variety of immanent causal processes. Furthermore, from the beginning of its existence,[45] many of those immanent

43. FESER, *supra* note 18, at 18.

44. *See* THOMPSON, *supra* note 20, at 68 (explaining that it is important not to confuse a "natural-historical judgment"—statement about the kind of regularity that arises out the nature of some natural kind (his example is "Man sheds his teeth")—with a universally quantified statement (For all X, if X is a man, X sheds its teeth), or even a claim about statistical likelihood (most human beings shed their teeth). Rather such statements reflect something deeper about (in this case) the form of life of a particular kind of living thing and the life-cycle characteristic of living creatures possessing a particular nature. Whether or not any actual given human being (or even a majority of human beings) actually shed their teeth is irrelevant to their truth of the statement "man sheds his teeth" or (as an Aristotelian might say), "human beings by nature shed their teeth.").

45. There is, in fact, some controversy about when in the process of fertilization we can say the zygote exists. *See* Maureen Condic, *When Does Life Begin? A Scientific Perspective*, WESTCHESTER INST. FOR ETHICS & THE HUMAN PERS. (2008), http://bdfund.org/wordpress/wp-content/uploads/2012/06/wi_whitepaper_life_print.pdf. Ultimately, for the purposes of the moral

causal processes are fundamentally directed towards a continuous and unbroken path of development towards the mature condition of its natural kind (i.e. an adult). Precisely in virtue of this fundamental continuity, any kind of successionist model involving substantial change—such as we saw above with the historical view—is ruled out.

Obviously, in individual cases, development can be frustrated and there is no guarantee that in any individual case a given zygote will result in a viable fetus, infant, child, adult, etc. But we do know it will not result in a giraffe or a peanut. The explanation for this is nothing other than the fact that the zygote possesses a human nature. Accordingly, the zygote is, and can be nothing else than, a human individual, fully possessed of the exact same nature as any other human individual at whatever level of development.

Furthermore, as possessed of a human nature, all the essential properties of that nature necessarily belong to it, including rationality. Of course, that does not mean that the embryo *manifests* any of the actions that typically characterize rationality, such as abstract thought or use of language, etc. Rather, the embryo possesses its rationality in potency. But the key point is that it has the potential to manifest rationality only because it is an instance of the natural kind *human being*, to which rationality belongs as an essential property. On this Aristotelian model, "for something to have some feature potentially entails a kind of directedness to the actualization of that potential."[46] Again, the causal power of human nature is required precisely to explain the regularity with which human embryos mature into rational agents.

THE NEO-ARISTOTELIAN ACCOUNT AND SOME PRO-ABORTION OBJECTIONS

With all of this in mind, we can close with a brief application of this metaphysical picture to the abortion question in particular. As I noted at the start, I have intended this as a work of philosophical embryology, and not as specifically addressed to the normative question of abortion. Nonetheless, the moral implications of the metaphysical view developed here are clear.

First, if the wrongness of murder consists in the killing of an *innocent* human being, then the killing of the embryo, from conception, is an instance of murder. Indeed, even if we prefer to specify the wrongness of murder as the unjustified killing of a philosophically defined person (as opposed to a human being) the embryo still qualifies. For even if we cannot easily give an account of exactly what properties are sufficient for a

evaluation of abortion, it does not make much difference so long as it occurs relatively quickly.

46. FESER, *supra* note 18, at 18.

substance to count as a moral person, if a normal adult human being counts as a person, then so does the embryo.

This follows simply from the reasonable assumption that what makes a normal adult human being a person is some aspect of his or her human nature. Thus, anything that shares that nature would also have to count as a person. The most natural suggestion is that personhood has something essentially to do with rationality. Accordingly, any being that is rational by nature would count as a person.

Of course, the standard claim of abortion advocates is that immature human beings are "pre-rational" and hence do not count as persons and so *cannot* be the victims of murder. By contrast, on the neo-Aristotelian model developed here, no human being is ever "pre-rational." *All* human beings are always already rational, though it is true that in particular cases their rational powers might be in potency.[47] The key Aristotelian metaphysical grounds for this is simply that no power can be in potency except insofar as it belongs to the nature of the kind of thing that has that potential power. In other words, all human beings, including the immature and incapacitated, as well as those who are in some way "defective," are always already rational simply because all human beings *qua* human beings instantiate a human nature that is essentially rational. Furthermore, this is true even if those individuals will never manifest the rational powers (e.g. an anencephalic infant).

In short, on this view the set of human beings is, at minimum, a complete subset of the set of moral persons understood substances of a rational nature. In principle at least, there might also be non-human moral persons, though we have no natural knowledge of such, and it is ultimately irrelevant for present purposes. Now it should be clear why many pro-abortion commenters are wrong to claim that those advocating the pro-life position are constrained to say that embryos (and, indeed, infants) are merely *potentially* rational.

This confusion is repeatedly demonstrated in the pro-abortion literature, manifest in important commentators such as Michael Tooley and Daniel Boonin. Tooley, for instance, has spent the last forty years trotting out the same lame argument about the pro-life appeal to potentiality.[48] For instance, largely rehashing his famous kitten argument from 1972,[49] he has recently

47. This is true not only of *immature* human beings, but also those that are sleeping, in comas, or even incapacitated by injury or congenital defect.

48. *See* Michael Tooley, *Abortion and Infanticide*, 2 PHIL. & PUB. AFF. 37, 37–65 (1972) [hereinafter Tooley, Abortion and Infanticide]; MICHAEL TOOLEY ET AL., ABORTION: THREE PERSPECTIVES (2009) [hereinafter TOOLEY ET AL.]. I suppose, to be fair, that it is conceivable that there are pro-life commentators who offer the argument Tooley criticizes. However, it never seems to occur to him that the pro-life appeal to potentiality can be understood in the Aristotelian way.

49. There, Tooley asks us to imagine that some special chemical that if injected "could

claimed that the pro-life argument is best understood as involving an appeal to this principle: "1*. The extent to which an entity possesses a given right *R* is related to the extent to which the things into which it may develop possess right *R*, taking into account the relevant probabilities"[50] But, Tooley claims,

> [I]f one considers the case of a kitten that will, if there is no interference, be injected with a chemical that will transform its brain so that it will have the capacities for thought and self-consciousness, and hence, presumably, a serious right to life, it is clear that (1*) is false, since the kitten, before the injections does not have a serious right to life.[51]

The mistake, of course, is that on the neo-Aristotelian substance ontology model, the pro-life argument for the moral value of the embryo (including its "rights" if we wish to use that language[52]) does not depend on an appeal to the moral value of "the things into which it may develop."[53] On this model the embryo has moral value for what it always already is, (in virtue of instantiating a rational human nature), not because of what it might become (in the future, "taking into account the relevant probabilities").[54] In other words, contrary to the expectations of the pro-abortion advocates, the pro-life appeal on this model is *not* some form of the following defective argument:

(1) Embryos are potential persons.
(2) Persons have a right to life.
(3) Therefore, embryos have a right to life.

Rather, on this model, embryos are *always already* persons, because

initiate a causal process that would transform a kitten into an entity that would eventually possess properties" such as rationality. Such a kitten, he argues, would be a potential person, but would not (prior to achieving rationality) have an actual right to life. Tooley, *Abortion and Infanticide*, *supra* note 48, at 60. Of course, on the neo-Aristotelian model this is not only a ridiculous example, even if it were somehow possible it would just mean that the kitten had undergone a substantial change into a substance of a rational nature, and therefore *would* have the same rights as any other instance of that category of beings.

50. TOOLEY ET AL., *supra* note 48, at 41.

51. *Id*.

52. For reasons relating to the fundamental ambiguity of their metaphysical grounding I am wary of speaking of "rights," but since that is a common mode of expression in these contexts I am willing to make my points in those terms for the sake of convenience. Ultimately, wherever I advert to the "rights" of embryos, etc, I should be read as asserting a conditional; something on the order of: if anything (e.g. a normal adult human being) has a "right to life," then so do embryos.

53. TOOLEY ET AL., *supra* note 48, at 41.

54. *Id*.

what it means to be a person is simply to be a substance of a rational nature, and any possessor of human nature qualifies. A particular creature either entirely possesses a human nature or entirely lacks one. Thus, it is nonsensical to speak of the embryo as a "potential person." In short, the pro-life position is best captured in an alternative premise that embryos are always already persons (in virtue of possessing a human nature). From which, assuming that persons have a right to life, the pro-life conclusion clearly follows.

Daniel Boonin demonstrates a similar confusion when he writes:

> One could, I suppose, characterize [an anencephalic] fetus as a person whose capacity for thought simply happens to be "blocked" by a continent fact about its head. But then it is difficult to see why we should not also call the spider crawling up my window a person. If he were able to develop a big enough brain, he too would be able to function as a person, so he is simply a person whose capacity is blocked by the fact that he will never have a large enough brain . . .[55]

But, of course, this is nonsense. It is proper to say that the anencephalic fetus' "capacity for thought" is "blocked" because, owing to a birth defect, that fetus is *contingently* incapable of realizing one of the potencies that *essentially* belongs to it as an instance a human nature.[56] This is parallel to the case of an infant born without legs. That legless child is still properly called a bipedal creature simply because it is a human being, all of whom are bipedal by nature—even those that will never actually walk. Boonin just fails to understand what it means to say that "human beings are rational by nature," which is related to a Thompson-style "natural-historical judgment" that cannot be falsified by the failure of any given human being to manifest rationality.[57]

Obviously, it is not proper to say that the spider's "capacity for thought" is "blocked" by anything, because arachnid nature does not, in any respect, include the rational powers. There is no sense in which the spider's development is *blocked*, precisely because that implies an orientation towards rationality that it simply does not have. And, of course, we know this simply because human infants *regularly* do mature into children who manifest the rational powers, while spiders *never* do.

Neither does this involve a fallacious attempt to derive an "actual right

55. DAVID BOONIN, A DEFENSE OF ABORTION 24 (2003).

56. *Id*.

57. *See* THOMPSON, *supra* note 20. Strictly speaking, the relevant natural-historical judgment would be something like "human beings think abstractly" or "human beings use language."

to life" from a "potential right to life." On the neo-Aristotelian model, the embryo does not have a "potential right to life;" it has exactly as much of a right to life as any other human individual. If one assumes that all persons have a "right to life," the embryo, as an instance of rational human nature, has such a right.

Of course, all of this is a consequence of conceiving of a human being as a substance of a rational nature. On the neo-Aristotelian model, *nothing* can come to manifest the rational powers (and remain the same substance) unless rationality already belongs to it by nature. Tooley, Boonin, and others fail to even countenance this possibility. Perhaps needless to say, if they did take the time to understand the model, they would likely reject it and the Aristotelian metaphysical principles on which it depends. However, as I have attempted to show above, without something like this analysis, especially including an appeal to the teleological ordering of nature in general, and human nature in particular, we find ourselves unable to explain even very simple facts, such as that human embryos regularly mature into individuals who manifest rational activity, while kittens and spiders never do.