# ARISTOTLE’S THEORY OF POTENTIALITY

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Aristotle’s theory of potentiality plays a large role in his metaphysics and philosophy of science. In some ways, it is insightful and prophetic, for (as I shall argue), it introduces a model of explanation by functional analysis, which is still standard in some of the cognitive (and arguably) the life sciences. In other ways, it is outmoded, for explanation by functional analysis is not, as Aristotle thought, applicable to *all* the sciences.[[1]](#footnote-1) In this essay, I review some major features of the theory. My aim is to explore, in a tentative manner, how an Aristotelian should think about questions concerning the beginning and end of life.

I want to make it clear at the outset that since I am interested (here) in how Aristotle’s ideas impact contemporary controversies, historical accuracy is not my only concern. It is of no special interest to be told that Aristotle’s theory has such and such a consequence for the question of when life begins, if one is inclined to reject the theory out of hand. It serves both history and philosophy to make a plausible argument using Aristotelian ideas, even if in order to do so, one is obliged to interpret these ideas with one’s eyes somewhat more fixed on contemporary philosophical applications than historians generally find appropriate. I shall be concerned, therefore, to advance an interpretation that is flexible enough to accommodate contemporary questions and concerns.

How does a suitably reconstructed version of Aristotle’s theory apply to issues concerning the beginning and end of life? Here, it is even more urgent to distinguish this question from the one about how Aristotle himself would have spoken about life. As we shall see, Aristotle had some morally objectionable beliefs about how to assess the moral entitlements of humans with regard to life. So we should ask how an Aristotelian theory of *potentiality* affects issues concerning the beginning and end of life, given a more acceptable position on the moral entitlements of humans.

1. Potentiality and Nature in Aristotle’s Physics
2. Kinēsis and Potentiality

In Aristotle’s system (Physics III 1-3), a *kinēsis* is an agent-initiated change that has well-defined starting and ending termini. (The term ‘*kinēsis’* [plural ‘*kinēseis*’]is sometimes translated “motion,” sometimes “change”: both are sometimes misleading. Here, I leave it transliterated as a term of art.) Standard examples are building a house and teaching a lesson. These *kinēseis* begin, respectively, when an agent—a builder or a teacher—begins to act purposefully upon materials from which the house is to be constructed or an ignorant student who is to be taught. They *must* end—there is not way for them to be extended—when the house has been built, and when the student has learned the lesson. These changes contrast with activities such as hammering or sawing, or speaking to students. There is no natural point at which these activities end, no point at which it is impossible for them to be further extended.

*Kinēsis* always has an agent and a patient (or thing acted upon)—the builder acts upon building materials or unfinished houses; the teacher acts upon ignorant students. This is where potentiality comes in. The causes of *kinēsis* are not properly the agent and patient themselves, but an active potentiality in the agent and a matched passive potentiality in the patient. The builder has a capacity to turn the building materials into a house; a house comes to be because she comes into contact with building materials that can be made into a house, and having come into contact with them, exercises her capacity on them. Analogously with teacher and student—a student comes to know something because a teacher comes into contact with something able to be taught.[[2]](#footnote-2)

As said before, the agent initiates the *kinēsis*. When the house has been built, or the student has learned the lesson, the passive potentiality in that thing has disappeared, for then there is nothing further for the builder or teacher to do. Both potentialities are essentially self-limiting, though in different ways. The patient changes, and thereby loses its passive potentiality. Once the student learns his lesson, he is no longer ignorant and cannot be instructed (in this lesson). The teacher, however, does not change. Her teaching potential has done its job, and stops, but she retains the active potentiality.

1. Nature and Self-Initiated Change

A *kinēsis* occurs *by nature* when both active and passive potentials belong to a single substance in virtue of the kind of substance it is. Growth is natural *kinēsis*. Over the period of a year, a newborn infant might triple its birth weight. (Of course, this is just part of a larger natural *kinēsis*, which terminates naturally when the individual is full-grown.) Though growth requires feeding by the mother, an outside source, the potentiality to convert food into bodily mass is intrinsic to the infant. (More about this in a moment.) That is, some part or aspect of the infant (its “nutritive soul”) carries an active potential to transform another part or aspect (its body) by metabolizing nutriment. (Note that even self-initiated self-directed *kinēseis*—i.e., natural changes such as growth by metabolism—conform to the apparatus of active and passive potentialities. This will be important in what follows.)

Sometimes, it is tricky to identify the substance that contains these matched capacities. Penelope and Odysseus had a bed that was shaped from a live olive tree. The bed and the olive tree are not one and the same—the tree predates the bed, and the bed could be destroyed without the olive tree being destroyed. So there are two substances here. Now, what should we say when the olive tree sprouts? Is it the bed or the tree that is naturally changing? The obvious answer is that it is the olive tree that sprouts by nature, not the bed. It is the tree, and not the bed, that has a nutritive soul matched to its body in virtue of the kind of thing it is. The bed sprouts, but only because it coincides with the tree.

It is crucial here that the active and passive potential responsible for growth by metabolism are *essential* parts of the baby—parts of the baby by virtue of the kind of thing it is. A doctor too can act upon herself. That is, she can heal herself—her medical skill is the active potentiality, and her ailment constitutes a passive potentiality in her body; both are in her, and she acts on herself by virtue of them. However, this is not a natural change, for medical knowledge does not inhere in her as a consequence of the kind of thing (i.e., substance) she is (namely, a human).

*Life* consists (among other things) in the capacity to metabolize *naturally*, i.e., by means of active and passive potentialities that belong to a thing because of the kind of thing it is. This indicates the difference between the mother’s act of feeding and the baby’s act of metabolizing. The first is other-directed and hence *non-natural*; the second self-directed by nature. The second defines the baby as living; the first is merely made possible by the life of the baby, but not constituted by it. (Note that “non-natural” here means “not by nature”; it does *not* mean“against nature”.)

It should now be clear why the self-contained agent-patient *kinēsis* that constitutes an embryo’s nutritive soul is different from the mother’s potentiality to nourish it *in utero*. The former is constitutive of the embryo’s capacity to act on itself; the latter is not an exercise of the mother’s self-acting capacity. The embryo’s dependence on the mother as a source of nutriment does not gainsay its standing as a self-acting metabolizer. At least as far as Aristotle is concerned, Jason Eberl is right, elsewhere in this volume, to write “The form of external assistance a uterus provides is analogous to an astronaut’s spacesuit or an underwater explorer’s submarine.”

Modern science does not, however, support the position that from the moment of fertilization onward, the embryo possesses a natural potential for metabolism. (Actually, it’s not clear that Aristotle believes this either.) Early in its development, an embryo is dependent on the mother for metabolism. For in the moments after fertilization, the embryo is nothing more than a fertilized ovum. It does not, at this point, possess a metabolic system. Or to put it in Aristotelian terms, it does not, immediately upon fertilization, possess a “nutritive soul.” When exactly it comes to possess a nutritive soul cannot be decided *a priori*.The best way to look at the matter is that Aristotle provides us with a criterion for the beginning of life—life begins when the embryo is able to metabolize nutriment on its own, without relying on the assistance of the mother’s metabolic system.

This criterion is evidently very difficult to apply. For one thing, an embryo cannot be simply given adult food; it cannot, for instance, metabolize milk or eggs. So the mother needs to convert what she eats into a form suitable for the embryo to metabolize. What counts as merely providing nutrition fit for an embryo to metabolize for itself, and what counts as metabolizing by the mother for the embryo? That is, to with respect to what kind of nutriment is it appropriate to regard the embryo as a self-acting metabolizer? Again, only science can answer such questions, or even decide whether they have a definite answer. For what it is worth, it seems that there *is* a distinction. For metabolism consists of producing energy for one’s own activities, and matter for one’s own growth. Regardless of what nutriment is used for producing these things, one can ask whether it is the embryo’s body that performs the relevant transformation or the mother’s that does so. And there is clearly a point (or interval) of time at which the embryo’s body has begun to do so. This is the point at which the embryo has begun to be alive.

One important point that comes out of this discussion is that the crucial question for Aristotle is when the embryo is able to sustain its own metabolic activities. The question is *not* when it is possible for it to grow into an organism capable of performing characteristically human activities. This distinction cuts two ways. On one hand, the crucial determinant is *not* whether a fertilized ovum can ultimately perform human activities. The question is rather whether it can sustain its own metabolic processes. And clearly there is a period of time during which it is capable ultimately of performing human activities, but not capable of sustaining its own metabolism.

On the other hand, it is also irrelevant whether or not it is *possible* for it to develop. It could be that unfavorable circumstances make it impossible for the embryo to get nutrition, though it has already developed the capacity to metabolize this nutrition. For instance, the mother might have developed some kind of illness that makes it impossible for her body to convert the food she eats into nutriment suitable for the embryo to metabolize. This situation is, as Eberl rightly suggests, analogous to that of an astronaut in a malfunctioning spacesuit. The astronaut is self-sustaining despite the fact that the malfunction makes it impossible for her to get the external materials needed to sustain herself. Nonetheless, the astronaut is still alive.

We should keep in mind that the genesis of a nutritive soul may not constitute the right kind of life to be worthy of moral standing. (I’ll return to this question in section IV.) But *if* possessing a nutritive soul is regarded as constituting moral worth, then unfavorable external circumstances would not abrogate its rights. Abandoned and exposed by its parents, a baby cannot find food for itself, and would die without external intervention. Though it is not, in this sense, self-sustaining, it retains its natural capacity to metabolize and whatever moral standing it has in virtue of (this form of) life. Like the astronaut in the tragically malfunctioning spacesuit, it is still alive.

1. Potentiality and Functional Analysis
2. Coincident vs. Proper Potentialities

The potentiality theory is sometimes attacked for being vacuous. Moliere’s character Tartuffe pretends to wisdom by saying that opium puts people to sleep in virtue of its “dormative power.” Yet, he sheds no light on the matter by so saying: dormative power is trivially the cause of sleep. At times Aristotle sounds like Tartuffe, but there is a more fruitful line of explanation behind the appearance of vacuity.

In *Physics* II 3, Aristotle says:

In investigating the cause of each thing it is always necessary to seek what is most precise . . . thus man builds because he is a builder, and builder builds in virtue of his art of building. (195 b 21-24)

And, a little earlier:

All causes, both proper and coincident, may be spoken of either as potential or as actual; e.g. the cause of a house being built is either *house-builder* or *house-builder building.* (195b4-6)

These passages seem to describe explanatory potentialities in the same words as the effect that is being explained. They appear to echo the vacuity of Tartuffe’s *vis dormativa*: this house came into being because a house-builder actualized his house-building skills on materials that could be turned into a house. This suggests that Aristotle had no more to say than that if a house came into being at a certain time, there was, earlier, the possibility of there being a house. The contemporary philosopher of science will object: this possibility is implied by but does not imply the actuality. How then can it *explain* the actuality?

This impression of vacuity is incorrect. Throughout this chapter, Aristotle talks about “coincident” causes. Here is what he says:

Another mode of causation is the coincident and its genera, e.g., in one way *Polycleitus*, in another *sculptor* is the cause of a statue, because *being Polycleitus* and *sculptor* are coincident.

To understand some of the implications of this passage, imagine an interlocutor who says:

The statue was made by the action of the chisel on the stone. The sculptor’s action was not necessary, since the very same chisel movements coincidentally applied would have had the same result.

To this interlocutor, Aristotle would reply first that without the skill of the sculptor, the sequence of chisel motions would have been a massively improbable random sequence without any explanation.[[3]](#footnote-3) There is nothing *impossible* in a non-sculptor executing the sequence by throwing a bucket of chisels at some marble, but he could do so only by virtue of an extremely improbable *accident*, as when a monkey banging away randomly at a typewriter manages to produce a coherent sentence. But there are many statues in the world—they cannot all have come to be by accident. According to Aristotle, the frequency of statues can only be explained if in most of them, there is an overarching coordinating cause—something that ensures that the chisel strokes are executed rightly and in proper order. (See Matthen 1989 for an account of this argument.) The skill of the sculptor is canonically this cause. The sculptor ensures the correctness of the sequence by coordinating it in accordance with her skill. So, to say that the skill of the sculptor is responsible for the statue is *not* vacuous; minimally, it is to say that there is something that so coordinates chisel strokes as to bring about the genesis of the statue non-accidentally. Obviously, the sculptor’s skill serves this role in the production of statues.

The “coincident” causes are bearers of these and other necessary conditions of production. Non-vacuous explanation resides in them. In the particular case of Polycleitus’s statue, the sculpting-skill was coincident with being-Polycleitus—which is to say that the sculpting skill has come to reside in the person who is Polycleitus (though not in virtue of the sort of thing he intrinsically is, which is why it is merely coincident). The consequence is that this person is able reliably to execute the right chiselling actions in the right way. By identifying “the being of Polycleitus” as coincident with the sculptor’s skill, we identify the efficient cause of the statue. It was by being coincident with the being of Polycleitus that the sculpting skill had its effect.

1. Functional Analysis

Aristotle’s strategy of proper and coincident causes is reminiscent of “functional analysis” (Cummins 1975). Suppose you want to explain how an adding machine adds. First, you first specify what “adding power” (or *vis addens*)is: it is the potentiality in the adding machine that ensures that when you sequentially press the keys ‘x’, ‘+’, ‘y’, and ‘=’ (for any numerical values of x and y), you get a display of the numerical expression that stands for the sum of x and y. To explain this power of the machine, you need to cite the physical properties of the electronic circuit buried inside the adding machine; you have to show how these properties yield the correct output when a given input is entered. The crucial success condition of your explanation is that the sequence of events set off in the machine by the key presses should be provably equivalent to *adding*. In short, you must show how the power to add decomposes into simpler powers, and you must show how these simpler powers transform the key-presses ‘7’, ‘+’, ‘4’, and ‘=’ lead to the display ‘11’ (and similarly, for all values of x and y). This is the *sine qua non* of functional analysis.

Plausibly, this is the kind of analysis Aristotle had in mind when he spoke of coincident causes. The “proper cause” is identified in terms that are logically proximate to the description of the target phenomenon: *house-building* for houses built, *teaching* for learning, *sculpting* for statues, etc. But then you produce another logically more distant description to show how the logically proximate cause comes to be instantiated in the case under consideration. Thus consider what he says about a wall in *Physics II* 9:

[One should not] suppose that the wall of a house comes to be because what is heavy is naturally carried downwards and what is light to the top, wherefore the stones and foundations take the lowest place, with earth above because it is lighter, and wood at the top of all as being the lightest. Whereas, though the wall does not come to be *without* these, it is not *due* to these, except as its material cause: it comes to be for the sake of sheltering and guarding certain things. (200a 1-7)

This suggests a functional analysis of wall-building.

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| --- | --- | --- |
| Goal | Definition | What is needed |
| To build a house | House = Stable shelter-providing structure | Weight-bearing walls to support sheltering roof |
| To build a wall | Wall = Stable weight-bearing structure | Upper parts of wall should be supported stably by lower parts |
| To build structure in which lower parts stably support upper parts | Stable support 🡺 upper parts should not disturb position of lower parts on which they rest | Upper parts light in order to exert less pressure on lower parts; lower parts strong and heavy to support upper parts |
| Strong and heavy lower part of wall. | 🡸 coincides with 🡺 | Stone |

Thus, the art of house-building will seek stone for the lower part of the wall, and the potentiality to stand stably will be actualized by the stone below.

The arts that govern the matter and have knowledge are two, namely the art that uses the product and the art that directs the production of it. That is why the using art also is in a sense directive; but it differs in that it knows the form, whereas the art which is directive as being concerned with production knows the matter. For the helmsman knows and prescribes what sort of form a helm should have, the other from what wood it should be made and by means of what operations. (*Physics II* 2, 194b1-6)

The success condition of a more distant description being the correct explanation is that the “proper cause” should “coincide” with it. The capacity to provide stable shelter coincides with structures that have stone below. Similarly, the adding potential coincides with the underlying electronic operations, not with the whine of the machine. And sculpting capacity explains the sequence of chisel strokes, and it coincides with Polycleitus, not the chisel he wields.

Bringing this back to natural *kinēsis*, it is relatively vacuous to be told that a baby grows because it has within it an active potential to convert nutriment into bodily mass. To provide a more explanatory theory, Aristotle must cash this out in terms of coincident causes. He must, in other words, show how the baby is so put together that it is able to metabolize food. There are places where he takes a stab at doing something like this, but obviously his science was not up to this task. However, Max Delbrück (1971)—a Nobel Laureate and James Watson’s teacher at CalTech—provides a brief appreciation of the progress Aristotle made toward delineating the parameters of such a functional analysis. According to Delbrück, Aristotle realized that:

The form principle is the information stored in the semen. After fertilization, it is read out in a preprogrammed way; the readout alters the matter on which it acts, but does not alter the stored information, which is not, properly speaking, part of the finished product. (54)

There is a long distance, and many centuries, to go before this analysis could be taken to its ultimate conclusion; nevertheless, Delbrück suggested that “if that committee in Stockholm, which has the unenviable task of pointing out the most creative scientists, had the liberty of giving awards posthumously, I think they should consider Aristotle, for the discovery of the principle implied in DNA.”

1. Potentiality and Possibility
2. Possibility Insufficient for Potentiality

I have gone into some detail concerning Aristotelian potentialities in order to make three points about them.

First, Aristotle’s attributions of potentialities are tied to functional analysis. Thus, the potentialities are not merely vacuous verbal re-descriptions. In fact, Aristotle here anticipates an important explanatory tool in modern cognitive science—functional analysis. One should not, however, exaggerate his prescience here. Aristotle’s use of functional analysis is ubiquitous—he defines the elementary building blocks of the Universe functionally. For example, in the *De Caelo* Book I, he defines earth, which is an element in his system, in terms of its power to actualize itself at the centre of the Universe. But we have seen that functional analysis is ultimately dependent on an analysis of powers in terms of other kinds of properties. Aristotle’s over-use of functional analysis robs his system of the causal foundation it requires.

Second, Aristotelian potentialities are *causes*, not merely earlier possibilities of later realities. When Aristotle says that this building material has a potential to be made into a house, he is not merely saying that it is *possible* for the material to be worked on so as to yield a structure that affords shelter to people. In the first place, even if the possibility of *p* is materially equivalent to the potentiality in something of *p*, potentialities are causally efficacious attributes and reside in substances; possibilities are not.

Third, and crucially for my argument, the possibility is *not* even materially equivalent to the potentiality. Consider water and cement powder. It is possible for this stuff first to be made into cement blocks and then to be made into a house, so it is possible for the water and cement powder to be worked into a house. However, water and cement powder do not have the potentiality to be made into a house. This is, first, because water and cement powder do not have the appropriate potentialities—they do not, for instance, keep their shape when subjected to pressure. In order to get things with the appropriate potentialities from cement powder and water, these things must be mixed together and allowed to set. (This supplements the point I made toward the end of section I, namely that the point of interest is when embryo comes to acquire the potentiality to metabolize. This potentiality is more than a possibility.)

Plausibly, the *new* potentials that mixed-and-set concrete blocks possess indicate that some new thing has come to be from cement powder and water. This would suggest that these materials must first go out of existence and cement blocks must come to be from them. If this is correct, the house-building potentiality cannot be exerted on cement powder and water as such. It must be exerted on cement blocks.

This makes for a complicated link between *x*’s potentialities (where *x* is a substance) and possibilities *for x* (Krizan 2006). Aristotle says: “a thing is capable of doing something if there is nothing impossible in it having the actuality of that which it is said to have the capacity” (*Met*. 1047a24-26). Water and cement are not actually present in the material of a house. Hence, *they* do not have the relevant potentiality. (Remember, though, that even if water and cement *were* present in the house, as modern chemistry would have it, they do not have the potentiality to support weight except when thoroughly mixed together.) On the other hand, it is possible for the cement blocks to have the actuality of being parts of a house. So, it is a possibility for them. It is on the basis of similar reasoning that Aristotle says that the possibility *for x* to be made into a house implies the potentiality to be made into the house.

Possibility

Cement + water ——> Cement blocks ——> House

T

Potentiality

1. Possibility Unnecessary for Potentiality

Possibility is not *necessary* for potentiality either. (Here I am indebted to John Lizza for probing questions.) Consider an embryo whose mother dies during pregnancy. This embryo possesses a natural capacity to metabolize nutriment and develop into an adult. However, it is now not possible for this embryo to develop into an adult, because it cannot get nourishment. For at least a short time after the mother dies, the embryo retains the natural *potentiality* for development, though there is, in fact, no possibility of it developing any further.

This situation contrasts with that of a genetically or developmentally defective embryo. Embryos sometimes suffer a catastrophic developmental event, which causes them to be born without a skull, or even a brain. (This is known as anencephaly.) Such embryos lack the innate potentiality to develop into intellectually functioning adults. In Aristotle’s way of looking at things, this is very different from the situation where the embryo *has* the potential but lacks the possibility for development because of the absence of external sources of nutriment.

If *natural* (i.e., self-acting) potentiality is the basis for moral standing, then the embryo whose mother has died has moral standing, and the anencephalic baby lacks it.

1. Genesis and Nature

In the case of the arts, it is, to some extent, arbitrary how potentialities are assigned. Consider a stone quarry. It is not a builder’s job—not part of his art—to cut stone from a quarry and make it into blocks suitable for building. Consequently, the stone in the quarry does not have the potential to be made into a building; a builder could not work on it (though he would have a say, as the last quotation above shows, in the form that the cut stone would take). But (whether Aristotle took this into account or not) the division of labour between the quarry-man and the builder is contingent. If it had been considered part of the builder’s job to excavate and cut stone, then the rock in the quarry would have had the potential to be fashioned into a house.

Things are different with natural substances. The *kuēma*, or fertilized union of male and female genetic material, develops more or less spontaneously into a mature organism. But this does not mean that either the male or the female genetic material has the potential to become a mature human being all by itself. Left alone, neither will develop. First they must be made into a *kuēma* (see below) and then this spontaneously develops. There are (at least) two *kinēseis* here, the second one of which is natural.

This is an important point, for as Alfonso Gómez-Lobo (2004) reports, some have argued as follows:

The potentiality argument is understood as moving backwards in the following way: if a human person deserves respect, then a potential human person . . . also deserves respect. But. . . by virtue of the transitivity of potentiality, . . . the sperm and ovum also deserve respect. [But this is] “a position almost no one finds plausible,” to quote an elegant understatement by Professor [R. M.] Veatch. (200)

Of course, Gómez-Lobo is right. Nothing of the sort follows. Potentials are not transitive in the way that the “moving backwards” argument assumes. The ovum is not a potential human being *at least* until fertilized. And in Aristotelian science, similarly, the genetic material of each parent does not have the potential to develop naturally into a mature human by itself.

1. Soul: The Capacities That Define Human Life

We are now ready to consider some questions about the beginning of life. According to Aristotle, sexual intercourse leads to pregnancy when male and female genetic material intermingle and join in such a way that the form of the male can work on the matter provided by the female. At this point, we have a *kuēma*,or fertilized union of male and female genetic material; this is the very first stage of the embryo. Embryonic development, or ontogenesis, is the natural *kinesis* that results in the baby born nearly forty weeks later. (It is possible to regard this *kinesis* as terminating a couple of decades later, when the child becomes a man.) Aristotle’s account of ontogenesis is thus an application of his theory of *kinēsis*.

Several questions can now be posed:

1. At what stage does the embryo become a human being?
2. At what stage is the embryo a *potential* human being?
3. At what stage is the embryo *alive*?

First, in agreement with Gómez-Lobo above, fertilization is, on anybody’s account but especially Aristotle’s, the very earliest point at which there could be said to be a new life or new being. (As I argued earlier, the Aristotelian account probably implies that life, or natural metabolism, starts later.) Prior to fertilization, the active potential of ontogenesis, the human form provided by the father is not in contact with the matter provided by the mother. Consequently, though there is the *possibility* of the female matter being part of a continuous process that culminates in a mature human being, this genetic material lacks the potentiality to become a mature human being *naturally*.[[4]](#footnote-4) And as we have seen, possibilities and potentialities are quite different conditions.

Of course, Aristotle would allow that the both the female and the male genetic material had the potentiality to interact with one another to become first a fertilized ovum and ultimately a mature human being, in the way that stone and builder have potentialities to interact with one another to produce a house. There are two reasons why this is irrelevant. First, there is no *particular human being* it will produce: both male and female genetic material require something of the other kind, but prior to fertilization, there is no particular thing of the complementary kind that provides the potentiality to produce the offspring.[[5]](#footnote-5) Thus, there is, before fertilization, no substance that is potentially human or potentially alive. Second, and perhaps more importantly, there is not, prior to fertilization, anything that can initiate change within itself—and as we have seen, this is the hallmark of life. Thus, alluding to a more modern notion of “respect” or “regard,” there is, as Gómez-Lobo says, no plausibility in thinking that sperm and ovum deserve respect. In answering questions 1-3, we should, therefore, consider only stages of the embryo, and nothing earlier.

Embryonic development is the acquisition of some *capacity* that defines life. (We’ll come in a moment to what capacity this might be. I am assuming for now that “capacity” and “potentiality” are interchangeable, though as we’ll see this is too simple.) The acquisition of the life-defining capacity takes place in something, *X*, that did not possess it at the start of the process. Does this mean that *X* (whatever it is) has the potentiality to be alive? Or is some new thing, *Y*, created in the process (in the way that cement blocks were created out of cement powder and water), such that *Y* is alive—but is not the same as *X*? If *Y* is a new thing, it would be wrong to say that *X* is potentially alive simply in virtue of the fact that *X* becomes, or becomes a constituent of *Y*. Thus:

1. If *X* did not initially have the life-defining capacity, but only later came to have it, is *X* potentially alive at the start of the process (in virtue, perhaps, of potentially possessing the life-defining capacity)?
2. If a thing that has life (e.g., *X* above) is necessarily distinct from that which does not have life (*Y*), then could *X* be one and the same as *Y*?

These difficult questions are crucial to any determination of the starting point (and end-point) of life for a human. They are not explicitly dealt with by Aristotle, but one can speculate as to what his answers might be.

In order to answer these questions, I turn now to Aristotle’s conception of life. In Aristotle’s system, as in most modern ones, life is defined by certain capacities: that is, a living thing is defined as one that is capable of certain activities (e.g., metabolism). As we have noted, capacities or potentialities inhere in substance. So the capacities that define life inhere in living things. This thing lives in virtue of having certain capacities. It does *not* live in virtue of the presence in it of a separable soul (as Plato had it in the *Phaedo*). In Aristotle’s ontology, souls depend for their existence on the living substances in which they reside, not the other way around. Soul is a capacity in virtue of which its possessor is alive; but this capacity would not exist but for the thing in which it inheres.

Aristotle’s conception of soul is of particular interest because he defines *three kinds* of living. All living things, including plants, are capable (i) of metabolizing nutriment and growing. This capacity is sometimes known as the “nutritive” soul. Animals have a nutritive soul, but in addition they are capable (ii) of perception and self-movement; this is the “sensitive” soul. Finally, humans have both a nutritive and sensitive soul, but are, in addition, capable (iii) of thought and reason. This is the rational soul.

Now, in modern ways of thinking about life, the emphasis is on what is common to *all* living things. If Aristotle had followed this line of thought, he would have identified life (hence, soul, which is the principle of life) with the nutritive soul. This, however, is *not* how he proceeds. He says:

Living is *spoken about in different ways*. And should even one of these belong to something, we say it is alive: reason, perception, motion and rest with respect to place, and further the *kinesis* of nourishment, decay, and growth. (*De Anima* II, 413a22-25)

Here, Aristotle acknowledges that we *say* of anything at all that it is alive if it merely nourishes itself. However, he says that life is spoken about in different ways. The same word is used, but it is used to describe different kinds of thing. Plants, which have only nutritive soul, have a different kind of life than animals, which have nutritive as well as sensitive soul. (Notice that this kind of position would support subsuming respect for animals to respect for the kind of life that animals possess. Respect for animal life would not automatically imply that respect be paid to plants.)

Aristotle’s idea here is, I believe, something like this. Plants nourish themselves statically: they stand still and draw up nutriment from the earth and air around them. Animals can sense and move, and they use these capacities to find food. The very activity of self-nourishment is modified by the manner in which animals engage in it. Thus, it is (according to Aristotle) in a way true, and in a way false, to say that plants and animals share a life-defining capacity. Plant and animal self-nourishment are different in kind. In a similar vein, one might note that humans use reason (among other things) to get food. This fundamentally modifies their way of going about an activity that, viewed from a certain perspective, they share with plants and animals.

Christopher Shields (2009) puts this point well. He contrasts two models of the human soul. There is first the “layer cake” model, with the nutritive soul forming a distinct layer under the sensitive soul, which in turn is separate and distinct from the rational soul. The second model emphasizes the unity of life-activities.

A being with a rational soul has a perceptual capacity neither more nor less than a being with a perceptual soul. Still, the manner in which the perceptual faculty is present is distinct. A rational soul is not formed by the layering of a rational faculty upon the top of *an actually existing perceptual faculty*. Rather, a rational soul subordinates a perceptual faculty to its own ends, thereby integrating it into a unified, single soul. (*ibid*, 306; emphasis added)

The italicized words above are significant: the point is that the “perceptual faculty” is not, as such, sitting there deep in our souls, a separate entity that is the same as what animals possess. Rather, we have faculties that, *but for their integration with reason*, would be an animal perceptual faculty, pure and simple. Given this integration, our perceptual faculties do not constitute a separable animal soul.

This explains Aristotle’s words:

What holds in the case of the soul is similar to what holds concerning figures: for both figures and the ensouled, what is prior is present as a capacity in what follows in the series, for example, the triangle in the square, and the nutritive in the perceptive. We must investigate the reason why they are thus in a series. For the perceptive faculty is not without the nutritive, though the nutritive is separated from the perceptive in plants. (414b28-415a3)

Triangles are present in squares, but not as actual triangles—they are only *potentially* present awaiting their generation from the square by the division of the latter. Similarly, the plant soul is present in us, but not as actual. We say that things are alive because they engage in “nourishment, decay, and growth”: nevertheless, we speak of life in different ways when we do so.

Aristotle’s notion of the human soul, then, is something like this: it is the capacity to self-nourish and to perceive in ways that are subordinate to reason. Now, God has reason, but does *not* have self-nourishment or motion, and therefore does not have a human soul. It is not very much noticed in the literature that because humans are unique with respect to the kind of soul they possess, Aristotle’s discussion of soul in the early parts of *De Anima* II actually provide a definition of our species. This is a bit of a surprise, and it is germane to question 1, above. The question is: “At what stage does the embryo become a human being?” The answer is: “When it becomes capable of rational thought.”

When is something *capable* of rational thought? Is an embryo capable of rational thought when it is at its very earliest stage of male genetic form united with the female genetic matter? To understand this, we have to take Aristotle’s notion of a *first actuality* into account. Consider a sleeping adult. She is capable of thought and speech, but is not exercising this capacity. This is a *first* actuality; the *second* or complete actuality is present in somebody only when they are *actually* speaking. Now, Aristotle posits a potentiality that is prior to the first actuality. Babies are in this stage with respect to speech. That is, babies are *not* like sleeping adults who are capable of speaking when they awake. There is something they have to acquire in order to be capable of speaking. Babies, however, are unlike puppies because they will (in quite short order) acquire the capacity to speak. They have a “first potentiality”. The first potentiality to speak and think marks them as human, even though they are still not, in the sense of the sleeping adult, capable of speaking and thinking.

|  |  |  |
| --- | --- | --- |
| First potentiality | Second Potentiality/First Actuality | Second Actuality |
| Baby (to speak): must learn language to move to second potentiality | Asleep adult (to speak) | Adult giving a speech |
| *HYPOTHETICALLY:* Embryo (to think): what must happen to move to second potentiality? Is a new entity created? | Asleep adult (to think) | Adult actively thinking |

The question remains. Is it the first potentiality or the first actuality that bestows upon an embryo the status of a human? Or to put it another way, when does *human* life begin, this being conceived as a different question than that concerning life as such. Here it should be noted that Aristotle’s notion of human rationality is even more demanding than we have encountered so far. When a person reasons something out—for example, the solution to a math problem or a difficult course of action—she is not engaging in the highest form of rationality. Reasoning something out, whether in the practical or the theoretical realm, is a *kinēsis*. One starts with some premises, and arrives at a conclusion. Once one has arrived at the conclusion, the reasoning terminates. When God thinks, however, It does not engage in *kinēsis*. God simply thinks; this is a so-called *energeia*, a non-goal oriented activity without a natural terminus. God thinks in a non goal-oriented way; Its potential to think does not disappear when the goal is achieved. (This is the reason why I said earlier that potentiality and capacity might not be exactly the same: we have a capacity for non-goal-oriented thought, but not a potentiality, as I have explained the latter, i.e., relative to *kinēsis*.)

Now, according to Aristotle, it is part of human essence to emulate God in this form of non-goal-oriented, non-terminating thinking, and though (of course) humans cannot achieve it, it is (as we learn in *Nicomachean Ethics* X), the highest good for them. Here, it is perhaps helpful to contrast the rotational movement of the stars with the movement of the sublunary elements to their natural places. The latter kind of motion is *kinēsis*: it terminates when an element such as earth reaches its natural place at the centre of the universe. Similarly, solving a problem has a natural terminus, but thinking *per se* does not.

This throws some doubt on Jason Eberl’s approach elsewhere in this volume. Eberl writes:

I follow Aquinas in contending that *all that is required for something to be a person is for it to have at least an active potentiality to perform self-conscious rational operations*. The actual performance of such operations is accidental to a person’s existence.

This would be correct if human life was defined as the first actuality of thinking. My point here is that there are places in the corpus, notably in *Nicomachean Ethics* X and *Metaphysics* XIII, where Arisototle suggests that it is a failing not to be actually in a state of thinking.

This is an extremely powerful and telling result. It implies that human life is defined by an activity that the apparatus of potentiality and actuality does not perfectly fit. Eberl (footnote 5) helpfully lists a number of attempts to say what activities define human life, and concludes “they all include the criterion of either *rationality* or *self-consciousness*.” He goes on to say: “any being who possesses the capacity for both would undoubtedly qualify as a person.” This is dubious. It could be argued that it is essential to humans that they are always *actually* self-conscious, and that a cessation of such self-consciousness was a cessation of life itself. Of course, much depends on how self-consciousness is defined—for example, whether it is to be understood in such a way as to include sleep. I do not want to deny that Eberl has strong considerations on his side. My point here is merely that Aristotle may well not agree. The cessation of self-conscious thought is *eo ipso* a failing with regard to human essence.

Put non-*kinetic* reason, i.e., non-goal-oriented thinking, to one side. There is another reason why Eberl’s position is too undemanding. Aristotle defines *full* reason as the capacity to set goals, not merely work toward them. (Thus understood, full reason is *kinetic*.)If humans lack full reason, he says, they are deficient. And in his most explicit consideration of moral standing, he asserts that deficiencies in this regard *rob humans of their right* to autonomy. To illustrate the point, think of the morally repugnant conclusions he draws about slaves in *Politics* I 5:

For he who can belong to another (and that is why he *does* belong to another), and he who participates in reason so far as to apprehend it but not so far as to possess (for the other animals obey not reason but feelings), is a slave by nature. The use made of them differs little; for from both—slaves and tame animals—comes bodily help in the supply of essentials. (1254b20-26)

The passage occurs in the context of a justification of slavery. Slaves are deficient in reason, Aristotle says, and this is why it is right to treat them as instruments, or tools. Further:

Tame animals are by nature better than wild, and it is better for all of them to be ruled by men, because it secures their safety. Again, the relationship of male to female is that the one is by nature superior, the other inferior, and the one is ruler, the other ruled. And this must hold good of all mankind. (1254b10-15)

It is reasonably clear, then, that Aristotle identifies human living with some quite demanding conceptions of reason, and argues that those who (as he thinks) are deficient with respect to reason are also deficient with respect to being human. Such deficient humans lose their moral entitlements, for they are subject to being used, ruled, and owned by others. Inasmuch as embryos are similarly deficient with respect to the activity that defines human life, they too do not have a right to respect. Very much the same holds for those who suffer irreversible loss of cognitive faculties.

Apparently, then, Aristotle’s notion of potentiality and natural change combined with his own notion of the human soul leads to a very negative answer concerning the beginning of human life, at least in its full form. His answer sanctions infanticide and euthanasia for people with irreversible senile dementia (and not just for those in a persistently vegetative state). And this is not merely a projection of his arguments. Given his position on slavery and the position of women, there is no good reason to think he would have rejected the position that I have attributed to him.

1. Pulling Back

Let me now briefly consider some ways of pulling back from the harsh consequences of Aristotle’s position.

One might drop the idea that rationality is the threshold for moral regard. I offer two very brief comments.

1. First, one must do this in a way that preserves a reason for moral regard. That is, we should not be content simply to identify some beings as worthy of moral regard and others as not. This identification should, in addition, rest on some relevant difference between beings of the first sort and those of the second. We do not accord animals the same moral regard as we accord humans. One might ask: what do a-rational humans possess that is deserving of moral regard? How are they different from the animals from which we withhold regard? I am not suggesting that this question be answered by saying “Nothing.” I simply observe that it poses a problem. Second, this is an utterly un-Aristotelian path, and lies beyond the scope of my remit.
2. One might drop the idea that rationality defines the human species. In general, the idea that any intrinsic characteristic defines a species is suspect today. (See Ereshefsky and Matthen 2005 for an up-to-date version of the argument.) The quick reason is that according to contemporary Darwinian biology, species display variety, both synchronic and diachronic. Consequently, many have adopted a relational notion of species. One example of such a notion is the Biological Species Concept, which (to simplify greatly) implies that the offspring of two members of any species belongs to that species regardless of what characteristic it might have. This conception pulls us back from the worst in Aristotle’s theory: it accords human status to slaves and women, and pushes back against the idea that being a human is a matter of degree. However, because such species concepts undermine the idea that certain capacities define the human species, it also casts doubt on the idea that humans are worthy of moral respect because they have certain potentialities. Thus, it gives us no help with the questions posed at the start of the last section. We are left in the dark with regard to when an embryo deserves moral respect.

To sum up. Aristotle’s notion of natural *kinēsis* implies that we should not treat the entity at the beginning of embryonic development as human, or indeed as the same as the one that is born. This leads us to ask: When does the embryo turn into a human? Aristotle’s own answer to this question is very harsh. Bracketing the views that lead to this harsh answer, his theory of *kinēsis* still gives us reason for searching for a replacement answer. Aristotle’s own work unfortunately gives us no help in finding this answer.

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1. It goes seriously wrong in physics, for example, where it requires the motion of the sublunary elements to be defined by reference to a fixed point in space, namely the center of the Universe. (See Matthen and Hankinson 1993 for discussion.) [↑](#footnote-ref-1)
2. In this case, too, something comes to be, namely the student’s knowledge. But this thing is not a substance. (See Matthen 1983.) Thus, the house-building *kinesis* is a coming-to-be *proper*, the coming-to-be of a substance, but the teaching is not. [↑](#footnote-ref-2)
3. In *Physics* Book II, chapter 8, he says that a rainstorm during the “dog days” might, but frequent rain in winter cannot, be the result of “chance and spontaneity.” This looks like a response to an interlocutor who argues along the lines indicated in the text—perhaps Empedocles, who is referred to a few lines earlier as holding (what strikes the modern reader as) a well-worked out theory of chance generation and natural selection. [↑](#footnote-ref-3)
4. Sagan and Singer suggest, elsewhere in this volume, that *in vitro* embryos are different from naturally produced ones because the former have to be sustained in certain ways from the outside. On my interpretation of Aristotle, this is not the crucial difference. Rather, we must ask whether the embryo is able to perform the activities characteristic of life by nature—whether it requires outside intervention to acquire the materials for self-sustenance is not important. (See my comments on Eberl’s astronaut-and-spacesuit analogy.) [↑](#footnote-ref-4)
5. John Lizza asks whether intracytoplasmic sperm injection (ICSI) would challenge this point. After ICSI, as he points out, it is already determined which sperm conjoined with which egg produced the embryo. My position on ICSI is of a piece with what I say at the end of section I and in note 3. In Aristotle’s theory, the *origin* of the embryo, and the source of its nutriment, are not the important points. Rather its current status determines its status. Are its life-functions performed by nature? If they are, then it has whatever moral standing is concomitant upon this kind of life. [↑](#footnote-ref-5)