

Olson's Embryo Problem

I. Introduction

Any theory that maintains a mind of some sort is essential to our survival is labeled a “psychological account of personal identity” by Eric Olson. He argues that psychological accounts of personal identity have a “fetus problem.”¹ The problem is that if psychological continuity is essential to our identity across time then we would appear to possess persistence conditions that rule out any of us ever having existed as a mindless fetus.² This position puts the supporters of the psychological account of identity on the defensive because it is biological common sense that we were each once a fetus in our mother’s womb.³

¹ Olson, Eric T. *The Human Animal: Personal Identity Without Psychology*. (Oxford: Oxford University Press, 1997), pp. 73-89.

² The onset of sentience occurs no earlier than twenty weeks after fertilization. So unless the advocates of the psychological approach to personal identity start adding epicycles to their theory, their assumptions entail that five months into the pregnancy is the *earliest* that anyone could have come into existence. If some mental attributes more sophisticated than mere sentience are needed for personhood, and one is a person essentially, then one does not originate until the later development of those capabilities. For example, if one adheres to a self-consciousness criterion for personal identity, then one may never have even been a newborn!

³ Olson, *op. cit.*, pp. 81-88.

Olson considers and rejects two attempts to defend an asymmetrical account that would allow us to have existed prior to the acquisition of a mental life but unable to survive its loss. One strategy is to defend disjunctive persistence conditions: we could exist before the onset of sentience *or* when in possession of a psychology, but we couldn't survive the loss of mentation. The problem with the disjunctive approach is that the organism which is the mindless fetus appears to be the very same organism that is later in a permanent vegetative state or irreversible coma. So we can't assert that the person is identical to the mindless fetus but not the irreversibly noncognitive organism unless we are willing to accept the relativization of Leibniz's Law to a time and the abandonment of the transitivity of identity. The second strategy for identifying the fetus and the person, but not the person and the irreversibly noncognitive organism, is to claim that the fetus has the *potential* to acquire the capacity of thought while the organism in the permanent vegetative state or irreversible coma does not. However, by imagining that we could lose cerebrums and grow new ones in the manner in which snakes shed their skins, readers can see that any appeal of distinguishing fetuses from the comatose and vegetative isn't due to the potential of the former. In such a scenario, we would have the potential to become a thinking being again after a period of existing without an upper brain and mental life.⁴ Since readers would find it difficult to identify and care about the being with a new cerebrum in the skull

⁴ The potential argument is Olson's. The transitivity argument is mine. I added it because it supports Olson's position more effectively than the arguments he does give against the disjunctive approach. He claims the disjunctive solution, which he calls "trick," is ad hoc and renders trivial Wiggins's principle of sortal individuation that everything which exists must do so under a sortal. *Op. cit.*, pp. 85-89.

where their old one was, it would appear that the potential for thought is not what was making the fetus/vegetable asymmetry acceptable.⁵

⁵ Perhaps the phenomena has an explanation somewhat similar to that which accounts for our asymmetrical attitudes to nonexistence before our conception and after our death.

After Olson shows that the psychological account of identity can't avoid bestowing upon each of us a later origin than commonly assumed, his next move is to ask the advocates of this account to explain what happens to the fetus that preceded the arrival of that sentient creature that we call a person. The fetus is an organism and surely no organism's existence is threatened by the development of cognitive capacities. If the human organism doesn't cease to exist with the onset of personhood, and if it cannot be considered identical to the person for it has a historical property the latter lacks, then it must come to be spatially coincident with the person. But this will give rise to a number of problems. One difficulty is explaining how it is that physically identical creatures have different persistence conditions, dispositions and modal properties.⁶ Another problem is accounting for the sortal differences: why one of the spatially coincident creatures is a person and not an organism, while the other is an organism and not a person despite their each having the same physical basis for the biological and psychological properties of the other. A third difficulty is to avoid having to admit the existence of two spatially coincident *thinking* entities since the organism and the person share the same brain.⁷ If one could use the brain to think, it would seem the other could as well. And if there are two spatially coincident *thinking* entities, there seems to be little reason for any of us to maintain that s/he is the organism rather than the person or vice versa.

⁶ In a clever thought experiment in which the organism and the person are created at the same time, Olson shows that appealing to historical and relational properties won't help with these dilemmas. *Op. cit.*, pp. 98-99.

⁷ *Ibid*, pp. 80-81,100-101.

In his constructive philosophy, Olson tries to avoid positing the existence of spatially coincident entities by making a case that we are essentially organisms, each of whom once existed without a mind early in life, and then with some bad luck may be mindless again late in our life. A person is not a distinct substance, but just a stage of an organism. In Wiggins's language, "person" is a phase sortal.⁸ The person and the organism are the same entity, it is just that the term "person" refers to the organism in virtue of psychological properties that are not essential to the organism. None of us is a substance that has the persistence conditions of a person. Positing only one substance where the psychological approach to personal identity must admit two, Olson's biological approach to personal identity avoids the problems that spatially coincident entities present, such as there being more than one thinking being in the reader's chair.⁹

⁸ Wiggins, David. *Sameness and Substance*. (Cambridge: Harvard University Press, 1980), pp. 24-27.

⁹ Shoemaker believes that Olson's account still has a "too many thinkers" problem because Olson maintains that we cease to exist at death rather than persist in a dead state. If we would not be identical to a corpse, and this dead body was earlier a live body, then the body and the organism would have before been spatially coincident and if one could think, so could the other. Shoemaker, Sydney. "Eric Olson: The Human Animal." *Nous*, vol. 33, No. 3, (1999). Olson's response is to deny that there is any such thing as a corpse; where there is thought to be a corpse, there is really only the remains of the organism and these remains don't compose any individual substance. I believe Olson's position can be defended, and more can be said in favor of it than he himself provides, but it would be too much of a digression to here present or supplement Olson's views.

While Olson has persuaded me that the biological account of identity is the most promising approach to personal identity, nevertheless, I think that his version of the theory has its own fetus-like problem. I will call this the “embryo problem” instead of the “fetus problem” because the dates of the onset and cessation of the biological capacities in question are different from those that cause trouble for psychological accounts of identity.¹⁰ The problem for Olson is that he insists that we cease to exist when our brainstem fails. But he gives an account of our origins that have us existing prior to the development of a functioning brainstem. Although it is somewhat ironic, Olson’s defense of asymmetrical persistence conditions provokes a question similar to that which he posed for the psychological approach of personal identity. Instead of inquiring “How is it that we could be a mindless fetus but not a permanently unconscious unconscious vegetable?,” we are compelled to ask “Why is it that we could exist as a brainless fetus dependent upon our mother’s body but couldn’t survive in a brain-dead state dependent upon a hospital respirator?” This problematic asymmetry is not peculiar to Olson’s philosophy, but also causes trouble for Peter van Inwagen’s biological approach to identity.¹¹ In fact, the problem is not limited to esoteric metaphysics. It plagues virtually all of the legislation that identifies the death of a human being with the death of the whole brain and brainstem.¹² Only

¹⁰ “Embryo” is technically applied from two weeks to eight weeks after fertilization. “Fetus” is the name for the conceptus from eight weeks to birth.

¹¹ Van Inwagen, Peter. *Material Beings*. (Ithaca: Cornell University Press, 1990), pp. 153-4.

¹² Widely accepted in the U.S. is the *Uniform Declaration of Death Act* proposed by the President’s Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research in their July (1981) publication “Defining Death: Medical, Legal and Ethical

those philosophers and legislators who defend the traditional cardio-pulmonary cessation account of death avoid this problem - or at least avoid it without introducing epicycles.

II. Asymmetrical Persistence Conditions

Olson claims that the human organism goes out of existence at the moment that its brainstem ceases to function. He writes “I have suggested that your brainstem, as the organ that is chiefly responsible for directing your life-sustaining functions, is essential to you, for without it there is no

Lockean life and no living human organism at all.”¹³ The brainstem is the control center of the organism. Olson claims that even if the replacement of your brainstem with an organic or mechanical substitute took just a fraction of a second, you would be dead “for there is no self-directing event that coordinates the activities of your parts in the unique way that biological lives do...for a thousandth of a second there is no living organism there, but only a corpse so fresh that its heart is still beating.”¹⁴ Olson is thus an advocate of the dominant school of legal and medical thought that identifies whole brain and brainstem death with the organism’s death.¹⁵ But the result of this is a problematic asymmetry which parallels that which troubled the psychological approach to identity. The unwelcome asymmetry is that Olson’s account of our origins has it that we all existed once not just as a mindless fetus but as a brainless and brainstemless one. If an asymmetry could be defended in the manner of disjunctive persistence conditions, then Olson would be able to avoid the charge of inconsistency in claiming the functioning brainstem is essential to the organism. However, this

¹³ Olson, *op. cit.*, p. 140

¹⁴ Olson, *ibid.*, p. 141.

¹⁵ This view of death is opposed to accounts that define death in terms of cardio-pulmonary cessation or with the permanent loss of consciousness due to the destruction of the upper brain. The latter account would deny that one could ever exist in a permanent vegetative state for such a condition involves being irreversibly noncognitive. It is popular with philosophers who defend some kind of psychological approach to personal identity. See Lockwood, Michael. “When Does a Life Begin?” in *Moral Dilemmas in Modern Medicine*. (Oxford: Oxford University Press, 1985)

disjunctive approach would fail here for the same reason that it did when the psychological approach resorted to it. The disjunctive account would violate the transitivity of identity for the brainless embryo would appear to be the same organism as the brain-dead creature hooked up to a hospital respirator.

Absent from Olson's work is some other account of why his insistence upon the essentialism of the brainstem is not inconsistent with his claim about our origins. He locates our origins around 14-17 days after fertilization. Olson writes: "the multicellular zygote or preembryo that results when the fertilized ovum divides, however, does not seem to be an organism; no multicellular animal is present until the primitive streak forms, some two weeks later."¹⁶ During this period, the development of a primitive streak provides the emerging individual with a body axis and bilateral symmetry which makes it possible to declare that the differentiating cells have migrated to their future bodily location. At this time, twinning becomes no longer possible as cell differentiation begins. About a week later, the heart begins to beat and circulate blood and nutrients to the different

¹⁶ Olson, *op. cit.*, p. 92. Before that time there were just a bunch of totipotent cells held together by an outer membrane. Pull them apart and you get twins. So Olson does not have a zygote problem nor a blastocyst, morula or gastrula problem. (These are names for the immediate descendants of the zygote.) The division of a zygote and its descendants is analogous to the fissioning of an amoeba. The original amoeba does not survive as a two-celled amoeba. Likewise, the zygote does not become a two-celled organism but goes out of existence when it splits and two new organisms come into being. Each cell was an organism but they didn't together compose a larger organism. See Brogaard and Smith's "16 Days" forthcoming in *The Journal of Medicine and Philosophy* for an excellent discussion of twinning and related matters.

cells of the organism. Before the nascent heart began to function, the cells were completely dependent upon the internal resources present in the original ovum. There was division but no growth. The blastomeres (individual cells) become smaller with each division. Olson writes:

Many embryologists believe that a genuine human embryo - the multicellular organism that later becomes a fetus, an infant and an adult - comes into being about sixteen days after fertilization, when the cells that develop into the fetus (as opposed to the placenta) become specialized and begin to grow and function in a coordinated manner.¹⁷ They develop bilateral symmetry around the 'primitive streak', the ancestor of the spinal chord. At this point, twinning is no longer possible...Only at this point do we have a multicellular organism and not merely a mass of living cells stuck together.¹⁸

¹⁷ Providing further reason for not believing that we existed in the first week following fertilization is that after the first few cleavages following that of the zygote, approximately half of the resulting cells will become part of the placenta and other supporting extra-embryonic structures. Since the placenta is not part of the embryo proper, this suggests that if there was an entity during the first week following fertilization, it would soon fission out of existence. It would be utterly arbitrary to maintain that it survived as either the placenta or the eventual embryo.

¹⁸ Olson, *op. cit.*, p. 91. Philosophers such as Olson, Barry Smith, Berit Brogaard, and Norman Ford, all of whom claim that the development of a primitive streak and body axis mark our origins, should reflect upon the fact that corpses have a body axis. Unless it is maintained that one can survive death as a dead body, a position that Olson, Smith, Brogaard explicitly reject, then the primitive streak and resulting body axis shouldn't be taken to demarcate our origins, or at least

couldn't be a sufficient condition. I think the four philosophers are all off by about a week concerning the timing of our origins. It is at the end of the third week that the operation of a primitive heart and circulatory system indicates the systematic interaction characteristic of an organism. See Smith and Brogaard *op. cit.*, and Ford's *When Did I Begin? Conception of the Human Individual in History, Philosophy and Science*. (Cambridge: Cambridge University Press, 1988)

Notice in the above passage that not only is there no mention of consciousness at this time, but there is also no talk of a functioning brain or brainstem. In fact, there is not a single mention of the brainstem in the entire section of Olson's book where he deals with these issues. And this portion of his book is entitled "When Did I Begin?"¹⁹ I think it is quite appropriate to ask how is it that an organism which could not survive the loss of a brainstem - even if ventilators, IV drips and other modern medical marvels take over the functions of the brainstem- could once exist, albeit with the help of its mother's body, without a brainstem? One would think that if a brainstem is necessary for all of us to continue to exist, it should also be required at the time of our origins. Olson does mention the primitive streak which becomes the neural tube which is the ancestor of our spinal chord and lower brain. But Clifford Grobstein, an author that Olson himself draws upon, points out that there are no neurons in the neural tube until five or six weeks after fertilization. And even then the number of synapses is quite limited so there may be no neural activity until a few weeks later.²⁰

¹⁹ See chapter 4 section V "When Did I Begin?" of Olson's *The Human Animal*. pp. 89-93.

For a similar lacunae in van Inwagen, *op. cit.*, pp. 178-179.

²⁰ Grobstein, Clifford. *Science and the Unborn: Deciding Human Futures*. (New York: Basic Books, 1988), p. 48.

For the sake of argument, let's assume a brainstem is necessary for a *human* organism to exist. This means that there was not a *human* organism before the development of a functioning brainstem. But then what happens to the creature that Olson admitted existed at 14-17 days after fertilization? Surely it didn't go out of existence with the development of a brainstem. So why doesn't the forementioned brainless creature develop a brainstem and become spatially coincident with the human organism that originates with a brainstem? This would give us two spatially coincident organisms for while we are assuming a brainstem is necessary for a *human* organism, it isn't a necessity for *all* organisms.²¹

²¹ Olson himself believes that even one-celled creatures are organisms, so a brain is obviously not necessary for some kinds of organisms to exist. And when discussing what it takes for an organism to persist, Olson says he is interested in the life sustaining functions that distinguish humans, oysters, cabbages, rosebuds and earthworms from nonliving things. This list of our fellow *living* creatures suggests that our having brains may *not* be essential to our lives being sustained. Olson, *op. cit.*, pp. 112, 123, 127.

How might Olson respond? He could, of course, rescind his claims about the origins of human beings, and instead insist that we each come into existence later in a pregnancy when a brainstem has developed. And Olson could just deny that there was an organism or any other kind of entity before that time, thus avoiding the abrupt ending of one entity and its replacement with another or having to accept the existence of spatially coincident entities. However, his theory of personal identity would lose one advantage over its psychological rival in that it could fit what has come to be biological commonsense that we were once early embryos. And this position would not be easy to argue for since with the onset of a circulatory system the previous cluster of cells has come to function as a unit which suggests that an organism exists. Norman M. Ford, whose book on our origins Olson praises and whose timetable for our origins he accepts, argues that the onset of circulation, approximately 21 days after fertilization, is *sufficient* for our origins.²² Ford writes:

It is not essential that all organs be present and functioning. It would be a sufficient, but probably not a necessary, condition for an individual human being to exist that it be a living body with the primordium of at least one organ formed for the benefit of the whole organism. The fact that nutrients are received now directly from the mother and enable the embryo as a whole to grow signifies that a new on-going living ontological individual has been formed.²³

I would maintain that an organ existing for the benefit of the whole organism isn't just a sufficient condition but a necessary one. Thus in human beings, it is only when the heart forms and the primitive circulation begins that the clump of cells forming for the past three weeks constitute a

²² Olson, *op. cit.*, p. 91.

²³ Ford, *op. cit.*, p. 170.

biological system. However, whether we come to exist at the end of two or three weeks, really isn't the main issue of this paper. The important point is that we exist before the development of a functioning brainstem.

Instead of arguing that there is not an organism before a functioning brainstem, perhaps Olson could defend his asymmetrical position without changing the date of our origins or endings. One move Olson might make is to claim that there is a human animal in existence two to three weeks or so after conception, and it is devoid of a brainstem, but that the vital systematic biological functions that exist at this earlier time are taken over by the brainstem which emerges later. So our persistence conditions are that of a biological system throughout, and there is no need to resort to disjunctive persistence conditions in order to explain how we can get by without a brainstem early in life but not later. What happens is just that there is a change in which biological structures keep the essential organic processes operating. That which was once accomplished without the direction of the brainstem, comes to function at the brainstem's command. What is important is just the continuous biological functioning constitutive of an organism. As long as there is a "system that functions as a unit, sustaining itself by taking materials and energy through a self-maintaining interface or boundary," it does not matter that a new organ has come to control the system and this system would now fail if that organ does.²⁴

²⁴ Olson appears to like the quoted definition of "organism" that he takes from the biologist Clifford Grobstein and reprints in Olson, *op. cit.*, pp. 131-132.

But a little reflection reveals that this answer is not that attractive because if we once could survive as a biological animal without a brainstem, why can't we do so again? In fact, the heart, which as we noted earlier was the only organ functioning for the benefit of the entire embryonic mass of cells three weeks after fertilization, can continue to operate for weeks after brain death if a respirator provides oxygenation and associated medical treatments regulate essential plasma components and blood pressure. The heart will beat, despite the loss of brain functions, just as it did much earlier before the prenatal development of a brainstem, when it was the only functioning organ serving the entire organism.²⁵ In fact, the heart's functioning was never completely brought under the control of the brainstem that Olson finds so important. Cranford and Smith note that a heart beat can continue for 5-60 minutes after a patient is pronounced dead using accepted criteria for brain death and the respirator is discontinued.²⁶ Clinicians have also observed that patients who satisfy the tests for brain death have showed a significant increase in both heart beat and blood pressure when the transplant team makes an incision into their body.²⁷ This would seem to indicate the systematic, integrated functioning characteristic of a living organism.

²⁵ The President's Commission, *op. cit.*, p. 16.

²⁶ Cranford, Ronald E., and Smith, Harmon L., "Some Critical Distinctions Between Brain Death and the Persistent Vegetative State." *Ethics in Science and Medicine*. 6, (1979), pp. 201-202.

²⁷ Truog, Robert D. "Is it Time to Abandon Brain Death?" *Hastings Center Report*, vol. 27, no. 1, (1997), pp. 29-37. See also Randall C. Wetzel et al. "Hemodynamic Responses in Brain Dead Organ Donor Patients." *Anesthesia and Analgesia*. 64, (1985) pp. 125-128.

Given the independence of the heart from control by the brainstem, and our early existence without as a mindless embryo, why insist, as have Olson and other advocates of the brain death account of organism death, that an individual without a functioning brainstem would be just the “ventilated remains of an organism?” Why can’t machines at such a time do for each of us what our mother’s body once did? Is there a metaphysically important difference between being dependent upon machines rather than a mother’s body? One is flesh and blood and has *biological* ties to and mutual influences with the fetus that the other does not. And Olson does argue that neither a bullet in one’s leg or a pacemaker in one’s chest is a part of oneself. These instead are to be considered foreign bodies, not truly belonging to the human animal.²⁸ However, if this mechanical/organic distinction was thought to be defensible, it would mean that in a scientifically advanced future, removing the early embryo from the mother’s womb to a mechanical incubator would be the destruction of the embryo despite the apparent continuation of normal growth and development. Anyway, I don’t see how the organic or inorganic nature of life support is important for I would think that in both cases we are going to maintain that the life support is provided by an entity that is not part of the supported being nor the latter a part of it.²⁹

²⁸ Olson, *op. cit.*, pp. 134-135.

²⁹ Some readers might contest this claim about the fetus not being a part of the mother. They may think the brainstem criterion can avoid the charge of asymmetry because the fetus is not an independent entity. Death occurs when an *independent* being’s brainstem ceases to function. The fetus isn’t yet an organism, because it doesn’t exist independently of the pregnant woman. Independence *and* brainstem functioning are each necessary conditions for being alive, thus the loss of either would be a sufficient condition for the destruction of the organism. Although this

Why doesn't Olson recognize that he is positing asymmetrical persistence conditions? Perhaps he is misled by the existence of the primitive streak which is the ancestor of the spinal chord and brainstem. He may think the emergence of the primitive streak two weeks after fertilization provides the needed symmetry. But the primitive streak isn't a functioning brainstem, only its distant ancestor, no more a brainstem than an acorn is the tree from which it develops.

approach secures symmetrical persistence conditions, I find it terribly implausible. It suggests that the mere loss of independence could be the destruction of the organism. This would entail the absurd conclusion that a loss of independence, one as trivial as being dependent for a brief period upon an IV or respirator (and conscious throughout), would be death. A more comprehensive response would have to explain why the fetus is not a part of the mother. Readers interested in this should peruse Barry Smith's account of how a niche (the pregnant woman) and its tenant (the fetus) differs from the part/whole relationship. See Smith, *op. cit.*, sections X-XII.

Having just engaged in a bit of speculation, I ask the reader to indulge me in some further hypothesizing about why Olson overlooks another truth about the ontological unimportance of our brains. Olson may not recognize that we could exist in a brain dead state because of his belief that a decapitated head would be an organism, the same organism that was moments earlier much larger.³⁰ Let's grant that Olson is correct that a severed head would be an organism, though a debilitated one, and without mechanical support, a very short-lived one. This doesn't mean that the headless body could not also be an organism - if attached to mechanisms that would take over the functions of the missing brainstem. Since Olson judges the brainless body to be just the remains of an organism, it isn't surprising that he treats a brain-dead being in the same manner.³¹ What Olson has overlooked is

³⁰ Olson argues that in the detached whole brain, vital biological functions would still be operative, and the controls and coordination mechanisms of many other functions would be intact, though there wouldn't be anything for them to control. (If suitable mechanical support was added, the organism could survive for a considerable time.) Within this debilitated organism, there still would be sleep-wake cycles, a metabolic rate, retention of muscle tone, pupils would open and close according to the amount of light hitting the retina, etc. Olson, *op. cit.*, pp. 133-134. Van Inwagen shares this view. *Op. cit.*, pp. 173-179.

³¹ While Olson makes much of the claim that a decapitated human body is devoid of life, while the head with an intact and functioning brain goes through a dying process, there is plenty of evidence from the animal kingdom of the decapitated likewise alive but undergoing dying processes. While all readers have heard of chickens running around with their heads cut off, they may find LeGallois's study of rabbit fetuses and pups quite informative. LeGallois observed that if these animals were decapitated above their pneumogastric nerve, their bodies remained alive for

that the decapitation could be a case of fission, the result being two organisms. We could even grant Olson's assertion that the brain has a better claim than the headless body to be the same organism that previously had a body and a brain. However, the pressure to decide which cellular mass following the decapitation is the original organism need not lead us to bestow the predicate "is alive" on only one.³² While this fissioning is not the standard halving of matter that we are familiar with from cell mitosis, it still could be a form of division which gives rise to a pair of living organisms. If Olson had considered the removal of a functional whole brain and brainstem as a kind of fissioning, the result being one brainless organism and a second organism composed mostly of a brain, then he would have been less likely to view a brain-dead patient in a hospital's intensive care unit as just the remains of an organism. Instead, the brain-dead would be seen as the same organism that previously had a functional brainstem.

III. Abandoning the Brain-Death Criterion

a period equivalent to the time it would take to suffocate them if they had not been beheaded. The experiments are described in Solomon Diamond's *Roots of Psychology*. (New York: Basic Books, 1974), pp. 41- 44.

³² That it is this very pressure which can lead to error is quite clear in James Bernat's discussion of whether a detached brain or headless body attached to a respirator is Mr. A, the original pre-decapitation organism. Bernat concludes that it wouldn't be the murder of Mr. A if the headless body was disconnected from its respirator. He then uses this as evidence that the brain-dead aren't alive. James Bernat "A Defense of the Whole-Brain Concept of Death." *Hastings Center Report*, vol. 28, no. 2, (1998) p. 19.

My attack on the importance of the brainstem in the criterion for the death of a human being differs from that of other critics. Unlike the advocates of the psychological approach to personal identity, I don't think the problem is that we are essentially psychological entities and could cease to exist even if our brainstems are still operational. My skepticism of the brain-death criterion is also different from those critics who emphasize that the present tests for whole brain and brainstem death are inaccurate.³³ Much recently has been written of isolated electrical activity and especially hormonal production in individuals whom are brain-dead according to the standard apnea and brainstem reflexes tests. There have been a large number of patients who meet the brain death tests but maintain free water homeostasis through the neurologically mediated secretion of arginine vasopressin. This was indicated by serum hormonal levels and the absence of diabetes insipidus. Since the brain is the only source of this hormone, the tests for brainstem death would appear to be unreliable signs of the loss of total brain functions. This has created a debate within the ranks of those who theorize about death from a biological perspective. The charge that the brain-death criterion and its tests are inadequate has been met by a reformulation of the brain-death criterion. Bernat argues that individuals are dead when their *critical* brainstem functions have ceased.³⁴ Scattered electrical activity and hormone production are not critical brain activities and thus no more serve as evidence for the survival of an organism than does hair and nail growth on a corpse.

³³ Truog, " *op. cit.*, See also Randall C. Wetzel et al., *op. cit.*; S. H. Pennefather et. al., "Haemodynamic Responses to Surgery in Brain-Dead Organ Donors," *Anaesthesia* 68, (1993), pp. 1034-38; D. J. Hill et. al., "Haemodynamic Responses to Surgery in Brain-Dead Organ Donors," *Anaesthesia* 49, (1994), pp. 835-36.

³⁴ See Bernat " *op. cit.*, pp. 14-23.

However, my objection to the brain death criterion avoids the reach of the reformulation because it emphasizes our being able to exist as brainless embryos.³⁵

³⁵ Unfortunately, the correct definition and criterion of death leave us in an ethically uncomfortable position. If death doesn't occur until cardio-pulmonary cessation, the chances of procuring viable organs for transplantation drops precipitously. If we want to keep the supply of viable organs at the current rate, we will have to abandon the "dead donor" rule. This rule states that vital organs should only be taken from the dead. Hopefully, we can make the necessary adjustments. Nevertheless, even if the account of death advocated here leads to a loss of viable organs, a drain on resources, and a delay in the onset of the grieving process in relatives of the brain-dead, we can't let such considerations determine the definition and criterion of death. These are issues to be decided solely upon metaphysical and biological grounds.

My recommendation is *not* that we tinker with the brain-death criterion, nor that we abandon a biological account of identity, or reluctantly accept the existence of a pair of spatially coincident entities - one an entity that has a brainstem essentially, the other a slightly older entity that has such an organ contingently. Instead, we should maintain that our persistence does not depend upon the brainstem performing an irreplaceable role. Just as we once existed without a brain and brainstem, albeit with the help of our mother, so we could exist again without an operating brainstem with the help of inorganic machines that are not part of us. What matters is that the human animal functions as a unit that metabolizes food, excretes waste, assimilates oxygen, and maintains homeostasis in order to sustain itself. It can survive the loss or absence of any organ that is responsible for one of these vital functions. A respirator can breathe for us, a dialysis machine can function as our kidney, and someday an artificial heart may replace our heart. What is important is that the macromolecular system of reciprocally dependent processes continues to function as a unit and not that the brainstem direct this functioning.³⁶ We could survive being reduced to a single organ system such as circulation, just as we once existed without a functioning brainstem as a 21 day old embryo. This would preserve symmetrical persistence conditions.³⁷

³⁶ This is the view of Becker, Lawrence C. "Human Being: The Boundaries of a Concept" *Philosophy and Public Affairs* vol. 4, no. 4, (1973), pp. 335-59. Green and Wikler, though advocates of the psychological approach to personal identity, defend this account of *organism* death in their "Brain Death and Personal Identity" *Philosophy and Public Affairs*, vol. 9, no. 2, (1980), pp. 105-133.

³⁷ I would like to thank two anonymous reviewers for helpful comments.

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