

WHY THE THOMISTIC DEFENSE OF “BRAIN DEATH”
IS NOT THOMISTIC: AN ANALYSIS FROM THE
PERSPECTIVES OF CLASSICAL PHILOSOPHY AND
CONTEMPORARY BIOPHILOSOPHY

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THE ONGOING DEBATE on “brain death” (BD)—also known as the neurological standard for the determination of death—reached its half-century mark in 2018. In August 1968, the Ad Hoc Harvard Committee introduced “irreversible coma as a new criterion for death.”¹ Despite intense controversy, and the lack of both a conceptual rationale and scientific validation, the Harvard BD criterion gained widespread medical and legal acceptance, especially the endorsement by the 1981 President’s Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research.² The

¹ Ad Hoc Committee of the Harvard Medical School, “A Definition of Irreversible Coma,” *Journal of the American Medical Association* 205, no. 6 (1968): 337. The opening paragraph of the Harvard report mentions two main reasons for introducing the BD criterion: (1) to alleviate the burden which patients in irreversible coma pose to themselves, their families, and hospital resources, and (2) to free up hospital beds occupied by these patients. The manuscript drafts of the Harvard report, however, reveal a close link between the need for transplantable organs and the introduction of BD. For instance, in the manuscript draft of June 3, 1968, it is written: “With increased experience and knowledge and development in the field of transplantation, there is great need for the tissues and organs of the hopelessly comatose in order to restore to health those who are still salvageable” (cited in Mita Giacomini, “A Change of Heart and a Change of Mind? Technology and the Redefinition of Death in 1968,” *Social Science & Medicine* 44, no. 10 [1997]: 1475).

² President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research, *Defining Death: A Report on the Medical, Legal and Ethical Issues in the Determination of Death* (Washington, D.C.: U.S. Government Printing Office, 1981).

Commission also gave BD its first conceptual justification, which was essentially the thesis of James Bernat and his colleagues,³ according to which: (1) the brain is the central somatic integrator “necessary for the functioning of the organism as a whole,” and (2) consequently, a brain-dead (BD) patient on life support is merely a collection of artificially maintained, unintegrated organs and subsystems.⁴ Bernat’s emphasis on the centrality of the brain, especially with respect to the vegetative functions of a human person, is explicitly stated in the following passage:

It is primarily the brain that is responsible for the function of the organism as a whole: the integration of organ and tissue subsystems by neural and neuroendocrine control of temperature, fluids and electrolytes, nutrition, breathing, circulation, appropriate responses to danger, among others.⁵

The intervention of the President’s Commission did not suppress the BD controversy, however. Instead, the controversy has expanded to involve the Catholic Church and cause divisions among Catholics, especially following John Paul II’s 2000 Address to the 18th International Congress of the Transplantation Society.⁶ Since the mid-1980s, medical evidence has repeatedly falsified the above thesis of Bernat and the President’s Commission.⁷ As a result, in 2008, the

³ James L. Bernat, Charles M. Culver, and Bernard Gert, “On the Definition and Criterion of Death,” *Annals of Internal Medicine* 94, no. 3 (1981): 389-94. Bernat has remained one of the staunchest BD defenders ever since. Even when, under the weight of irrefutable medical evidence, he has had to admit the many serious flaws of the BD paradigm, he nevertheless continues to insist that BD remains a sound concept and optimal public policy. See James L. Bernat, “The Whole-Brain Concept of Death Remains Optimum Public Policy,” *Journal of Law, Medicine & Ethics* 34, no. 1 (2006): 35-43; idem, “Whither Brain Death?,” *American Journal of Bioethics* 14, no. 8 (2014): 3-8.

⁴ Bernat, Culver, and Gert, “On the Definition and Criterion of Death,” 391.

⁵ James L. Bernat, “The Definition, Criterion, and Statute of Death,” *Seminars in Neurology* 4, no. 1 (1984): 48.

⁶ John Paul II, “Address to the 18th International Congress of the Transplantation Society (29 August 2000),” http://www.vatican.va/holy_father/john_paul_ii/speeches/2000/jul-sep/documents/hf_jpii_spe_20000829_transplants_en.html; Doyen Nguyen, “Pope John Paul II and the Neurological Standard for the Determination of Death: A Critical Analysis of His Address to the Transplantation Society,” *Linacre Quarterly* 84, no. 2 (2017): 155-56.

⁷ The best work in this regard is that of D. Alan Shewmon, showing the untenability of BD, at both the empirical and conceptual levels. Shewmon collected

President's Council on Bioethics formally rejected "the false assumption [of] the brain [as] the 'integrator' of vital functions."⁸ Nevertheless, the council sought to rescue BD with another conceptual justification—the "fundamental vital work" rationale,⁹ according to which a living human organism is defined by its "self-preserving commerce with the world,"¹⁰ that is, by the presence of spontaneous breathing and/or consciousness.¹¹

Because of its overt deficiencies, the "fundamental vital work" rationale has not elicited much interest among BD supporters.¹² Moreover, from the Catholic perspective, to accept the council's rationale would also amount to saying that embryos and fetuses *in utero* are not living human beings since they lack both spontaneous breathing and

175 well-documented cases of brain-dead (BD) patients who, because they were not taken for organ harvesting within 24-48 hours of admission, continued to survive for weeks and months, or even years—a survival well beyond the maximum possible "few days" claimed by BD proponents. The record survivor was declared BD at age four but continued to live on with evidence of normal physical growth for 19½ more years, despite a flat electroencephalogram, and no evidence of intracranial blood flow by magnetic resonance angiography. See D. Alan Shewmon, "Brainstem Death, 'Brain Death' and Death: A Critical Re-Evaluation of the Purported Equivalence," *Issues in Law & Medicine* 14, no. 2 (1998): 125-45; D. Alan Shewmon, "The Brain and Somatic Integration: Insights into the Standard Biological Rationale for Equating 'Brain Death' with Death," *Journal of Medicine and Philosophy* 26, no. 5 (2001): 457-78.

⁸ President's Council on Bioethics, ed., *Controversies in the Determination of Death* (Washington, D.C.: U.S. Government Printing Office, 2008), 60.

⁹ *Ibid.*, 60-65.

¹⁰ *Ibid.*, 62.

¹¹ As acknowledged by the council itself, there is a very close similarity between the "fundamental vital work" rationale for the defense of whole BD and the rationale of Christopher Pallis for the justification of the "brainstem death" standard practiced in the United Kingdom and former British colonies. According to Pallis, the "irreversible loss of the capacity for consciousness and irreversible loss of the capacity to breathe [constitute] a valid definition of death." See Christopher Pallis, "On the Brainstem Criterion of Death," in *The Definition of Death: Contemporary Controversies*, ed. Stuart J. Youngner, Robert M. Arnold, and Renie Schapiro (Baltimore: Johns Hopkins University Press, 1999), 96; President's Council on Bioethics, ed., *Controversies in the Determination of Death*, 65-67.

¹² For details on the deficiencies of the "fundamental vital work" rationale, see D. Alan Shewmon, "Brain Death: Can It Be Resuscitated?," *Hastings Center Report* 39, no. 2 (2009): 20-22.

consciousness.¹³ For this reason, pro-life, pro-BD Catholic scholars have endeavored to develop new arguments to justify the BD paradigm. The most recent rationales—the only two currently in use within the Catholic tradition in defense of BD—are (1) Patrick Lee and Germain Grisez’s “substantial change” rationale, according to which BD patients are no longer humans (and therefore dead) because they have lost the radical capacity for sentience even though they remain somatically integrated;¹⁴ and (2) the rationale advocated by Melissa Moschella and Maureen Condic, according to which BD patients are dead because they have lost the root capacity for self-integration, as evidenced by the loss of the capacity for spontaneous breathing and the loss of the capacity for sentience.¹⁵

The point of this article is to determine whether these rationales cohere with the Catholic Church’s understanding of human nature based on Aristotelian-Thomistic hylo-morphism. My argument is that they do not, and that they also contradict the contemporary holistic biophilosophical understanding about life and organisms.

I. CRITICAL ANALYSIS OF LEE AND GRISEZ’S RATIONALE

In a way similar to the 2008 President’s Council, Patrick Lee and Germain Grisez also acknowledge that the medical evidence presented by Shewmon has disproved the thesis of the brain as central somatic integrator, and that BD patients are living beings with somatic integration. Nevertheless, Lee and Grisez argue that the BD standard remains valid because “what is alive after total brain death is neither the individual whose brain died nor a whole member of the human

¹³ In utero, the embryo/fetus is totally dependent on the placenta for its survival. Among its many functions, the placenta plays a role analogous to the ventilator and feeding tube.

¹⁴ Patrick Lee and Germain Grisez, “Total Brain Death: A Reply to Alan Shewmon,” *Bioethics* 26, no. 5 (2012): 275-84; Patrick Lee, “Total Brain Death and the Integration of the Body Required of a Human Being,” *Journal of Medicine and Philosophy* 41, no. 3 (2016): 300-314.

¹⁵ Maureen L. Condic, “Determination of Death: A Scientific Perspective on Biological Integration,” *Journal of Medicine and Philosophy* 41, no. 3 (2016): 257-78; Melissa Moschella, “Deconstructing the Brain Disconnection–Brain Death Analogy and Clarifying the Rationale for the Neurological Criterion of Death,” *Journal of Medicine and Philosophy* 41, no. 3 (2016): 279-99.

species.”¹⁶ Lee reaffirms the same assertion, stating: “even if some brain-dead bodies are organisms, or complex entities of some sort, they are not human organisms.”¹⁷ Philosophically speaking, Lee and Grisez’s rationale takes its starting point from the classical Aristotelian-Thomistic concept of man as a rational animal. The core of their argument reads as follows:

A human being is a rational animal. . . . To be a rational animal, an organism must be an animal; [this means that] it must have either the capacity for sentience, or the capacity to develop the capacity for sentience . . . [since] rational functions presuppose sensory functioning. . . . A mammal’s sentience requires either a brain capable of functioning or the capacity to develop a brain. But a totally brain-dead individual neither has a brain capable of functioning nor the capacity to develop a brain. It follows that any mammalian individual that undergoes brain death is no longer a sentient being, and thus not an animal, and thus not a rational animal. . . . [In other words,] a substantial change has occurred: the human being has passed away, and although the remains include a large living entity, that entity is not a human organism, and so it is not the individual who suffered total brain death.¹⁸

Although Lee and Grisez’s insistence on sentience coheres with the classical Aristotelian-Thomistic understanding that sensible images are the necessary starting point for human abstract thinking and acquisition of knowledge,¹⁹ their assertion that “the loss of the capacity for consciousness is death”²⁰ is problematic at both the empirical and conceptual levels. Such emphasis on consciousness comes to the fore when Lee refines the above argument by specifying that

¹⁶ Lee and Grisez, “Total Brain Death: A Reply to Alan Shewmon,” 277.

¹⁷ Lee, “Total Brain Death and the Integration of the Body,” 301.

¹⁸ Lee and Grisez, “Total Brain Death: A Reply to Alan Shewmon,” 278-79. The same argument is reiterated by Lee, who says: “A human being is essentially a rational animal, and so must have a radical capacity for rational operations. For rational animals, conscious sensation is a pre-requisite for rational operation. But total brain death results in the loss of the radical capacity for conscious sensation, and so also for rational operations. Hence, total brain death constitutes a substantial change—the ceasing to be of the human being” (Lee, “Total Brain Death and the Integration of the Body,” 301).

¹⁹ See Aristotle, *Metaphysics*, 1.980a-982b (trans. Hugh Tredennick [Cambridge, Mass.: Harvard University Press, 1933]); *De Verit.*, q. 2, a. 3, arg. 19 (trans. Robert W. Mulligan [Chicago: Henry Regnery Company, 1952]).

²⁰ Lee and Grisez, “Total Brain Death: A Reply to Alan Shewmon,” 283.

sentience refers strictly to “conscious sensory awareness,”²¹ and that the “higher animal (rational) . . . [is] an animal that has the capacity for conscious sensation.”²²

Conscious “awareness is a deeply private matter, inaccessible to observation by third parties,” however.²³ If this is true about consciousness itself, how much truer would it be about the capacity for consciousness? “The fact that a patient has lost the capacity for consciousness is extremely difficult to establish beyond reasonable doubt.”²⁴ Having admitted this fact, Lee and Grisez nevertheless uphold their thesis of substantial change: the BD patient has changed into a nonhuman large living entity; such an entity may have a soul, but “it is a vegetative soul, not a rational soul or animal soul,” that is, not a soul that can be identified with the soul of that patient prior to the BD diagnosis.²⁵ Re-affirming their thesis, they state: “Evidence of sentient functioning after a mammalian organism underwent total brain death would falsify our thesis.”²⁶

The well-publicized case of Jahi McMath challenges this.²⁷ This complex case—the object of a protracted legal

²¹ Lee, “Total Brain Death and the Integration of the Body,” 304. In Lee and Grisez’s earlier article, the adjective “conscious” occurs six times, but never paired with the term “sentience,” which occurs twenty-two times; the expression “conscious sensation” is absent. In contrast, in Lee’s article, “conscious sensation” occurs forty-two times (in the abstract and text), and “conscious sentience” (or “conscious sentient”) appears eight times.

²² *Ibid.*, 302.

²³ Adam Zeman, “What Do We Mean by ‘Conscious’ and ‘Aware?’,” *Neuropsychological Rehabilitation* 16, no. 4 (2006): 371. That a comatose patient does not respond to stimuli does not necessarily mean that he or she lacks consciousness; the patient may have perceptual awareness but is unable to produce a motor response to the stimuli. For additional detailed critiques of Lee and Grisez’s overarching emphasis on sentience, see Nicanor Pier Giorgio Austriaco, “The Brain Dead Patient Is Still Sentient: A Further Reply to Patrick Lee and Germain Grisez,” *Journal of Medicine and Philosophy* 41, no. 3 (2016): 315-28; Doyen Nguyen, *The New Definitions of Death for Organ Donation: A Multidisciplinary Analysis from the Perspective of Christian Ethics* (Bern, Switzerland: Peter Lang, 2018), 163-74.

²⁴ Lee and Grisez, “Total Brain Death: A Reply to Alan Shewmon,” 283. See also Lee, “Total Brain Death and the Integration of the Body,” 311.

²⁵ Lee and Grisez, “Total Brain Death: A Reply to Alan Shewmon,” 282.

²⁶ *Ibid.*, 282-83.

²⁷ The following synopsis is derived from the sworn declarations of the four neurologists (Drs. Alan Shewmon, Calixto Machado, Charles Prestigiacomo, and Ivan Mikolaenko) who reviewed Jahi McMath’s clinical and laboratory data

battle—can be summarized succinctly as follows: Jahi, who in December 2013 fulfilled all the criteria of BD diagnosis and, as a result, was declared dead on the basis of the neurological standard, had from Spring 2014 until June 22 2018 demonstrated intermittent periods of responsiveness during which, as stated by Shewmon in his 2017 declaration, she was “*capable of understanding a verbal command and barely capable of executing a simple motor response.*”²⁸ This was not a case of misdiagnosis of BD, since at the time of the

around September 2014. Jahi was a teenage girl who, in December 2013 when she was thirteen years old, met all the criteria for the determination of BD (according to the widely accepted pediatric and adult guidelines for BD), including the absence of brain electrical activity documented on four different encephalograms (EEGs) and the absence of cerebral blood flow documented on a radionuclide scan and a SPECT scan. She was declared dead in California according to the BD criteria by three different neurologists, including the pediatric neurologist Paul Fisher from Stanford University. From 2014, however, it had been documented that Jahi (who was relocated to New Jersey where she was legally alive) could move (with great effort) her hands and feet in response to her mother’s verbal requests, and that her heart rate changed in response to the mother’s voice. Jahi had also undergone sexual maturation, a physiological phenomenon which indicates a functioning hypothalamus. In September 2014, laboratory tests demonstrated the following: (1) low voltage true EEG activity, (2) intracranial blood flow on magnetic resonance angiography, and (3) magnetic resonance imaging showing structurally preserved cerebral cortex, cerebellum and basal ganglia, but major damage to the corpus callosum and the brainstem. All four neurologists affirmed that Jahi did indeed fulfill all the criteria for BD in December 2013, but that subsequently she no longer fulfilled the criteria for BD, as proven by the above-mentioned clinical and laboratory evidence in 2014. The sworn declarations are available at Thaddeus Mason Pope, “Jahi McMath—A Dispute over Brain Death,” <http://thaddeuspope.com/jahimcmath.html>. See also John M. Luce, “The Uncommon Case of Jahi McMath,” *Chest* 147, no. 4 (2015): 1144-51; Celeste McGovern, “Top Neurologist: Jahi McMath Is ‘No Longer’ Dead,” National Catholic Register, <http://www.ncregister.com/daily-news/top-neurologist-jahi-mcmath-is-no-longer-dead>; Phillip Matier and Andrew Ross, “Videos Show Mom Coaxing, Jahi McMath Moving,” <http://www.sfgate.com/bayarea/article/Videos-show-Mom-coaxing-Jahi-McMath-moving-5797622.php>; Rachel Aviv, “What Does It Mean to Die,” *The New Yorker*, <https://www.newyorker.com/magazine/2018/02/05/what-does-it-mean-to-die>; Wesley J. Smith, “Justice for Jahi,” *First Things*, <https://www.firstthings.com/web-exclusives/2017/09/justice-for-jahi>; Thaddeus Mason Pope, “Brain Death Forsake: Growing Conflicts and New Legal Challenges,” *Journal of Legal Medicine* 37 (2017): 265-324, at 302-7. Jahi McMath died on June 22 due to excessive hemorrhage following an abdominal surgery. See <http://www.foxnews.com/health/2018/06/28/jahi-mcmath-girl-at-center-brain-death-debate-has-died-after-surgery-family-says.html>.

²⁸ Declaration of D. Alan Shewmon 2017, http://www.thaddeuspope.com/images/Shewmon_Decl_12-2017.pdf.

original diagnosis the patient objectively met all the criteria of BD.²⁹ That *post hoc* philosophical rationales have been put forth to defend BD, insisting that BD is death (in the full sense of the term), necessarily rests on the assumption that the BD paradigm provides adequate moral certainty in determining that the patient has indeed truly died. The case of Jahi challenges the validity of the BD paradigm,³⁰ as well as its associated *post hoc* philosophical rationales.

From the medical perspective, a major difficulty with Lee and Grisez's thesis that the BD individual is a nonhuman large living entity and no longer a human organism is the following: How is it possible "that the so-called non-human organisms harbor organs composed of matter perfectly well-disposed for transplantation into humans,"³¹ or that these nonhuman large living entities continue to perform vegetative activities in a human way, including pubertal development or the gestation of a human baby to the stage

²⁹ See note 27. According to the guidelines of the American Academy of Neurology (AAN), the criteria for the determination of BD are: (1) unresponsiveness to noxious stimuli, (2) absence of brainstem reflexes and, (3) absence of a breathing drive proven by the apnea test. In the United States, laboratory tests for brain electrical activity (EEG) and cerebral blood flow are considered ancillary and therefore optional. See Eelco F. M. Wijdicks et al., "Evidence-Based Guideline Update: Determining Brain Death in Adults: Report of the Quality Standards Subcommittee of the American Academy of Neurology," *Neurology* 74, no. 23 (2010): 1915-16. Note, however, that according to the AAN guidelines the presence of reflexes and spontaneous movements (including the complex movements of the Lazarus sign) do not invalidate the diagnosis of BD. See Eelco F. M. Wijdicks, "Determining Brain Death in Adults," *Neurology* 45, no. 5 (1995): 1007. This particular guideline is problematic for Christian believers since it contradicts the Christian understanding of death, in which it is impossible for an inanimate lifeless corpse to produce movements or reflexes, since the presence of any movement would indicate that the soul is still present in the body, and therefore that the patient is still alive, however close to death he or she might be.

³⁰ It is not within the scope of this article to discuss the adequacy of the "brain death" paradigm as a criterion for the determination of death. For a treatment of this topic, see, e.g., Nguyen, "Pope John Paul II and the Neurological Standard for the Determination of Death," 164-65; Mike Nair-Collins, "Death, Brain Death, and the Limits of Science: Why the Whole-Brain Concept of Death Is a Flawed Public Policy," *The Journal of Law, Medicine & Ethics* 38, no. 3 (2010): 667-83; Baruch A. Brody, "How Much of the Brain Must Be Dead?," in *The Definition of Death: Contemporary Controversies*, ed. Stuart J. Youngner, Robert M. Arnold, and Renie Schapiro (Baltimore: Johns Hopkins University Press, 1999), 71-82.

³¹ Michel Accad, "Of Wholes and Parts: A Thomistic Refutation of 'Brain Death,'" *Linacre Quarterly* 82, no. 3 (2015): 228.

when it can be delivered and survive after birth?³² This lack of concordance between the factual biological reality and Lee and Grisez's "substantial change" rationale raises the further question: is this thesis in accord with a substance view of human nature taught by the Catholic Church, founded on Aristotelian-Thomistic philosophy?

A) Analysis in Light of the Notion of the Soul as Substantial Form

In Lee and Grisez's own words, BD brings about a substantial change in which "the remains [of the once living patient] include a *large living entity*, [but] that entity is *not a human organism*."³³ In other words, the post-BD entity is a "large living non-human organism." The arguments that will be presented below are directed at this thesis.³⁴

The notion of substantial change invoked by Lee and Grisez necessarily entails a discussion of the soul. The

³² For a nonexhaustive list of the human operations performed by BD patients, see Shewmon, "The Brain and Somatic Integration," 467-69.

³³ Lee and Grisez, "Total Brain Death: A Reply to Alan Shewmon," 279 (emphasis added).

³⁴ An anonymous reviewer of an earlier draft of this article suggested that these arguments do not accurately reflect Lee and Grisez's position, because Lee has stated verbally to him that "in BD, you have . . . a non-rational human organism . . . [informed by] a human non-rational soul," i.e., an entity similar to that which Aquinas posited in his (now archaic) theory of delayed hominization. If Lee indeed currently holds this viewpoint, then either he has changed his mind or he is contradicting his own writing, since a large living entity that is not a human organism is certainly not the same as a "non-rational human organism." (In schools of thought in which the definition of personhood rests on consciousness and rational or cognitive functions, a "non-rational human organism" is also known as a "non-person human organism," or "non-person human being." Such beings are not bearers of moral rights and their lives are considered dispensable.) If Lee has in fact changed his mind he would have no need to appeal to the concept of substantial change for his argument, since the post-BD entity (in this latter view) is still of human nature. Moreover, his argument would fit squarely with the "higher BD" view which holds that BD individuals are "non-person human organisms" and which "accepts the irreversible loss of consciousness and every other mental function as the criterion for determining our death" (John P. Lizza, "Defining Death: Beyond Biology," *Diametros* 55 [2018]: 3). Neither the Catholic Church nor any state legislation has accepted the "higher BD" position, however. Since Lee has not publicly confirmed in writing the thesis of a "non-rational human organism," the discussion presented below is about Lee and Grisez's thesis of "large living non-human organism" as formally recorded in their writing.

classical hylomorphic account of the body-soul union rests on the distinction between potency and act, and the distinction between matter and form. As John Wippel points out, Aquinas distinguishes two kinds of matter, which he correlates to two kinds of existence and two kinds of change.³⁵ The first kind of matter (prime matter) is that which “is in potency to substantial existence [*esse simpliciter*]”; it is the matter from which something comes into being *simpliciter* when a substantial form is introduced.³⁶ A substantial change occurs in two instances: (1) introduction of the substantial form, or (2) loss of the substantial form. The second kind of matter is that which “is in potency to accidental existence [i.e.,] the matter in which something inheres.”³⁷ As such, it is not matter properly speaking, but the substantial subject (*subiectum*, a substance already composed of matter and substantial form) which, during the course of its existence, undergoes accidental changes with the acquisition or loss of accidental forms. Thus, in terms of actuality, the substantial form is prior to the *subiectum*, and the latter is prior to accidental forms.³⁸ The corollary to Aquinas’s distinction is twofold: (1) the union of the soul and body corresponds to that of the substantial form and prime matter,³⁹ and (2) “there cannot be more than one substantial form in any one thing. . . . It is one and the same substantial form that makes a man a particular thing or substance, and a bodily thing, and a living thing, and so

³⁵ The discussion which follows is derived from John F. Wippel, “Thomas Aquinas and the Unity of Substantial Form,” in *Philosophy and Theology in the Long Middle Ages: A Tribute to Stephen F. Brown*, ed. Kent Emery, Russell L. Friedman, and Andreas Speer (Leiden: Brill, 2011), 117-20; John F. Wippel, *The Metaphysical Thought of Thomas Aquinas: From Finite Being to Uncreated Being* (Washington, D.C.: The Catholic University of America Press, 2000), 296-320; *De Princip.*, <http://dhspriority.org/thomas/DePrincNaturae.htm>.

³⁶ Wippel, “Thomas Aquinas and the Unity of Substantial Form,” 118. An example is the substantial change from a nonhuman being (i.e., sperm and ovum) into a human being (a zygote).

³⁷ *Ibid.*

³⁸ See *STh* I, q. 77, a. 6 (trans. Fathers of the English Dominican Province [New York: Benziger Bros, 1947]). The substantial form actualizes prime matter, thereby giving existence to the subject, which in turn gives existence to accidents.

³⁹ See Wippel, “Thomas Aquinas and the Unity of Substantial Form,” 117. Because prime matter is pure potency, it can never exist by itself without a substantial form. It can only exist in reality in a matter-form composite.

on.”⁴⁰ A living thing manifests a diversity of life activities which Aristotle groups into three broad categories—vegetative, sensitive, and intellective—each corresponding to the respective generic category of “soul.”⁴¹ This does not mean that in humans there are three souls, however. The human soul is numerically one, the one substantial form by which “we live, perceive and think.”⁴² Because the human soul is named after its highest “part,” it is also referred to as the “rational soul” or “intellectual soul.” Just as the vegetative soul is subsumed into the sensitive soul of animals, in man both the vegetative and sensitive souls are subsumed into the human rational soul.⁴³ This explains why the vegetative and sensitive functions are performed in a human way, and not in the way they are implemented in animals or plants.⁴⁴ Put differently, the one human soul encompasses three fundamental powers—vegetative, sensitive, and intellective—which are hierarchically related to one another in strict ontological order, in which the lower powers are prerequisites for the existence of the higher powers. Both the intellective and the sensitive need the vegetative as a prerequisite, but not vice versa.

While hylomorphism has remained the most coherent account for explaining stability and changes in living things, one aspect of the Aristotelian-Thomistic philosophy of nature which has become obsolete, when we correctly apply Aquinas’s philosophical principles to modern embryology, is the theory of delayed hominization. According to this theory, the embryo is first animated only by the vegetative soul, then by the sensitive soul until the body possesses the required material structure to be disposed to receiving the

⁴⁰ II *De Anima*, lect. 1 (trans. Kenelm Foster and Sylvester Humphries [New Haven, Conn.: Yale University Press, 1951]).

⁴¹ See Aristotle, *De anima* 2.413a20-414a13 (*De Anima: Books II and III [with Passages from Book I]*, trans. David W. Hamlyn [Oxford: Clarendon Press, 2002]).

⁴² Aristotle, *De anima* 2.414a13. See also *STh* I, q. 76, a. 1.

⁴³ See Aristotle, *De anima* 2.414b28-32. See also *STh* I, q. 76, a. 3. Here, Aquinas writes: “the intellectual soul contains virtually whatever belongs to the sensitive soul of brute animals, and to the nutritive souls of plants.”

⁴⁴ In other words, the vegetative and sensitive souls—which are more properly called the vegetative and sensitive powers, respectively—are specific to the human species. Thus, the human sensitive “soul” is different from the sensitive soul of a dog or cat.

rational soul infused by God.⁴⁵ Delayed hominization thus necessarily presupposes that the vegetative and sensitive souls are of the human species. As Daniel Ols has pointed out, if we adopt this archaic position, it is plausible to think that in BD a symmetrical process takes place, whereby the rational soul departs and is replaced by the sensitive soul—which, when it departs, is replaced by the vegetative soul—and the departure of the rational soul is made manifest by the cessation of the functioning of the brain, the material basis for consciousness and cognitive functions.⁴⁶ Such a scenario is known as “early dehominization.” Could this scenario, which is just as implausible as delayed hominization,⁴⁷ correspond to Lee and Grisez’s thesis? There are two reasons why this is unlikely. First, Lee and Grisez advocate immediate hominization and not delayed hominization, since according to the latter the embryo is a nonrational human being, and therefore early abortion, even though a grave sin, is not considered a homicide. Thus, in order not to be self-contradicting, Lee and Grisez cannot hold “early dehominization.” Second, the vegetative and sensitive souls in early dehominization must be of the human species just as they are in delayed hominization. This would indicate that no change in human nature (no substantial change) has taken place in the individual who has suffered BD.

⁴⁵ See *STh* I, q. 118, a. 2, ad 2; *ScG* II, cc. 86-89 (trans. James F. Anderson [Notre Dame, Ind.: University of Notre Dame Press, 1975]). It does not lie within the scope of this paper to discuss the untenability of the theory of delayed hominization. For details on the issues of delayed hominization versus immediate hominization, see, for instance, Benedict Ashley, A Critique of the Theory of Delayed Hominization, in *An Ethical Evaluation of Fetal Experimentation*, ed. Donald G. McCarthy and Albert S. Moraczewski, O.P. (St. Louis: Pope John XXIII Center, 1976), 113-33; Nicanor Austriaco, “Immediate Hominization from the Systems Perspective,” *National Catholic Bioethics Quarterly* 4, no. 4 (2004): 719-38.

⁴⁶ Daniel Ols, “Assertions dogmatiques que doit prendre en compte la réflexion sur la transplantation d’organes,” in *Working Group on the Determination of Brain Death and Its Relationship to Human Death, 10-14 December 1989*, ed. Robert J. White, Heinz Angstwurm, and Ignacio Carrasco de Paula (Vatican City: Pontificia Academia Scientiarum, 1992), 150.

⁴⁷ For further detailed discussion see Nguyen, *New Definitions of Death*, 292-301.

According to classical Aristotelian-Thomistic philosophy, a substantial change occurs at death when the substantial form (the human soul) is no longer united to the body. Lee and Grisez's application of the concept of substantial change to BD individuals necessarily implies that the human soul is no longer in the BD body, but has been replaced by some unknown type of substantial form, which transforms the former human patient into a nonhuman large living entity of an unknown species. What is puzzling, however, is that although the human patient no longer exists, the very same corporeal features which are characteristic of the human species and specific to that particular patient endure in the new nonhuman entity, both structurally and functionally (e.g., the identical organization of bodily organs working together in an integrated human way). In Scholastic language, this is a situation in which the original *subiectum* has disappeared, yet its proper accidents still persist in existence. In other words, in defense of their thesis of substantial change, Lee and Grisez must provide a coherent metaphysical account to explain how "certain accidents might be kept in existence . . . even when their original and proper subject no longer exists."⁴⁸ According to the Aristotelian-Thomistic tradition, such a phenomenon in the natural order is metaphysically impossible. The one and unique instance in which a substantial change occurs and yet the original accidents remain belongs to the supernatural order: the case of Eucharistic transubstantiation. In order to explain transubstantiation without doing violence to the nature of accidents, Aquinas had to appeal to divine intervention.⁴⁹

B) Analysis in Light of the Distinction between the Soul and Its Capacities

Lee and Grisez's terminology of "radical capacity" corresponds to what Aristotle refers to as active potentiality.

⁴⁸ Wippel, *Metaphysical Thought of Thomas Aquinas*, 229.

⁴⁹ See IV *Sent.*, d. 12, q. 1, a. 1, <http://www.corpusthomicum.org/snp2016.html>; and *STh* III, q. 77, a. 1. Aquinas's explanation comes down to the fact that because God is the First Cause of all that exists, whereas the *subiectum* is only the secondary cause of its proper accidents, God can maintain accidents in existence without their proper *subiectum*.

Active potencies include not only capacities that can be readily exercised, but also those natural capacities that require further development before becoming fully actualized.⁵⁰ The principle for such actualization is intrinsic to the living being itself; it is none other than the soul. In *De anima*, Aristotle speaks of the soul as the first *entelechia* (actuality) of the body,⁵¹ that is, the principle that actualizes matter to become the body of a living being of a particular species, and the principle from which “flow” the capacities for the different functions of that being. In other words, in man, radical capacities (active potencies) are ontologically grounded in human nature. Nature is thus distinct from capacity (including radical capacity). Therefore, human nature remains unchanged regardless of whether the capacity for certain functions (such as perception and/or consciousness) is not or cannot be actualized.⁵²

The same issue can be looked at from a different angle. That the soul is the substantial form of the body means that the soul-body union is not mediated by any intermediary element, be it power, function, disposition, or corporeal organ.⁵³ As Aquinas explains, this is because the soul, as substantial form, “give[s] prime] matter its act of existing pure and simple [*esse simpliciter*].”⁵⁴ This *esse* is “that which most immediately and intimately belongs to [living] things,”⁵⁵ whereas “the powers of the soul are the qualities by which it operates,” that is, intermediaries by which the soul moves the body.⁵⁶ In other words, the soul *per se* (the soul’s essence as it were) is distinct from its powers (capacities) because,

⁵⁰ See Aristotle, *Metaphys.* 9.1049a. A paradigmatic example is the human zygote that possesses already in itself the active potential of human personhood (including sentience and rationality). In the absence of external hindrance, this potentiality will progress to its fullness.

⁵¹ Aristotle, *De anima* 2.412a27. In classical language, the term “body” signifies an ensouled (hence, living) body. A corpse is a body in the homonymous sense only.

⁵² See Massimo Reichlin, “The Argument from Potential: A Reappraisal,” *Bioethics* 11, no. 1 (1997): 14.

⁵³ *ScG* II, c. 71; *Q. D. De Anima* a. 9 (trans. John Patrick Rowan [St. Louis: B. Herder Book Company, 1949]); *STb* I, q. 76, aa. 6-7.

⁵⁴ *Q. D. De Anima*, a. 9.

⁵⁵ *Ibid.*

⁵⁶ *Ibid.*, ad 1.

just as the act of being (existence) itself is a kind of actuality of an essence, so operating/acting is the actuality of an operative capacity/power. Accordingly, each of these is an actuality: essence in terms of existence, and capacity in terms of operation. Hence, since in no creature is its own activity identified with its own existence, for this pertains to God alone, it follows that *in no creature is its capacity for operation identified with its essence*. To God alone is it proper that his essence is his power.⁵⁷

In corporeal beings, essence (nature) consists of matter and substantial form. As capacities are distinct from essence, they are necessarily distinct from the soul. Put simply, capacities, functions, and dispositions all belong to the category of accidents, which can only come into existence (in the *subiectum*) once matter has received its *esse simpliciter* from the soul. In this regard, Aquinas specifically states the following: (1) “all the powers of the soul . . . flow from the essence of the soul,”⁵⁸ and (2) “it must be recognized that the powers of the soul are its proper accidents and do not exist without the soul.”⁵⁹ It is self-evident that this statement of Aquinas regarding the powers of the soul also applies to what Lee and Grisez refer to as radical capacities. Of the three powers of the soul, the most fundamental is the vegetative power, since it is “the first and most commonly possessed potentiality [capacity] of the soul in virtue of which they [living things] all have life.”⁶⁰ Similarly, the presence of the sensitive and intellective powers can be inferred from the manifestations of their corresponding activities. But the loss of these, however permanent or irreversible it might appear to be, does not imply the absence or loss of their respective powers.⁶¹

⁵⁷ *De Spir. Creat.*, a. 11 (my translation).

⁵⁸ *STh* I, q. 77, a. 6.

⁵⁹ *Q. D. De Anima* a. 9, ad 5. See also *STh* I, q. 77, a. 1, ad 5. Here Aquinas writes: “as the power of the soul is not its essence, it must be an accident; and it belongs to the second species of accident, that of quality.” Here, human knowledge about the relationship between the soul and its power reaches its limits; it is not possible to speculate regarding the particularities of this causal relationship because the soul is immaterial. In other words, it is not possible for the human mind to determine the intricacies of the interface between the immaterial soul and the material body.

⁶⁰ Aristotle, *De anima* 2.415a24-25.

⁶¹ A very common logical fallacy which has often entered in bioethical debates is the inverse fallacy in which the argument has the form of “if P then Q; not P

From the above classical Aristotelian-Thomistic account flow the following conclusions: (1) the manifestation of activities of at least one of the powers of the human soul indicates that the same soul is still united to the body; and (2) the loss of one power of the human soul, unless it is the most foundational power (that which is common to all living things, i.e., the vegetative), does not indicate that the soul has left the body. This is precisely the case in BD patients. In other words, the absence of any detectable activities indicative of conscious sentience cannot be taken as an indicator that the human soul has left the BD patient. Moreover, the presence of ongoing vegetative activities, carried out in a human way, is a further confirmatory indicator that the patient's human soul is still present and, therefore, no substantial change has occurred.

II. CRITICAL ANALYSIS OF MOSCHELLA'S ARGUMENTS

In 2016, Melissa Moschella presented two different, albeit interrelated philosophical arguments in defense of BD.⁶²

A) *Analysis of Moschella's First Rationale*

In Moschella's own words, her first rationale "rel[ies] primarily on Hoffmann and Rosenkrantz's account of organismal unity" which she "consider[s] as one of the most rigorous and plausible accounts available."⁶³ Without scrutinizing this account in great detail, suffice it to note that, as Hoffmann and Rosenkrantz themselves state, it is a "reductionistic" account.⁶⁴ Such an account, of its nature, omits

therefore not Q." Moreover, it should be noted that irreversibility is not an empirical concept.

⁶² Melissa Moschella, "Integrated but Not Whole? Applying an Ontological Account of Human Organismal Unity to the Brain Death Debate," *Bioethics* 30, no. 8 (2016): 550-56; Moschella, "Deconstructing the Brain Disconnection-Brain Death Analogy." For the purposes of this article, Moschella's rationale in the article published in *Bioethics* is considered to be the first rationale.

⁶³ Moschella, "Integrated but Not Whole?," 551.

⁶⁴ Joshua Hoffman and Gary S. Rosenkrantz, *Substance: Its Nature and Existence* (Boston: Taylor & Francis, 1996), 98. On the same page, the authors further stress this point by stating, "We do not accept the anti-reductionist and anti-naturalistic theories about natural function listed above." The phrase "natural

both final and formal causes, and relies solely on efficient and material causes as explanatory principles. The central thesis made by Hoffmann and Rosenkrantz which is relevant to the BD issue is the following: (1) every living “organism, O,” must have a “master-part, i.e., a vital part which regulates O’s life processes, including the life-processes or functional activities of O’s parts.”⁶⁵ The causal relation between the master-part and the other parts of the organism is one of regulation and functional subordination.⁶⁶ In brief, the master part is responsible for the organismic unity of the living being, such that without its master-part the organism will die. According to Hoffmann and Rosenkrantz, in man, the “central nervous system is [the] master-part . . . one which is self-regulating [i.e.,] functionally subordinate to itself.”⁶⁷ Building on Hoffman and Rosenkrantz’s account, Moschella argues as follows:

(1) After BD, “the body entirely lacks a master-part and is therefore no longer an organism as a whole.”⁶⁸ It has become a dead body, that is, a corpse. Moschella thus concludes that the BD body has undergone a substantial change.⁶⁹ This part of her argument more or less reiterates Bernat’s thesis.⁷⁰

(2) The fact that organs, tissues, and cells of the BD body can continue to manifest their natural functions, and therefore produce some sort of functional unity, is simply because “they continue to receive oxygenated blood.”⁷¹ For

function listed above” refers to “the natural function of the parts of organic life forms.”

⁶⁵ Ibid., 135; see also 126.

⁶⁶ See *ibid.*, 126-49. The discussion in these pages is devoted to the notion of the “master-part” and the causal relationship of regulation and functional subordination between the master part and all the other parts of the organism.

⁶⁷ *Ibid.*, 128. Hoffman and Rosenkrantz provide no medical/scientific reference to support their claim about the centrality of the central nervous system. Nevertheless, this could be traced to the work of Bernat in the 1980s (see above, nn. 3-5) as well as that of Julius Korein who asserts that “in the human organisms, the brain is the critical component.” See Julius Korein, “The Problem of Brain Death: Development and History,” *Annals of the New York Academy of Sciences* 315, no. 1 (1978): 19.

⁶⁸ Moschella, “Integrated but Not Whole?,” 553.

⁶⁹ *Ibid.*, 550, 553, 554, 556.

⁷⁰ See above, nn. 3-5.

⁷¹ Moschella, “Integrated but Not Whole?,” 552.

Moschella, such a unity is not a “unity proper to a human organism (or to any natural type),”⁷² but rather either a new “unified organism [which is] a new entity [that] could perhaps best be described as a kind of organic artifact [analogous to] cells and tissues in culture.”⁷³ This signifies that a substantial change has occurred, transforming the BD patient into some sort of new organism of an unknown type. Here, Moschella’s rationale converges with that of Lee and Grisez.

There are two interrelated difficulties with the thesis of the master-part, however. The first difficulty is that such a thesis necessarily reduces a complex whole to its vital parts and even all the way to one single critical part. It is then postulated that the activity of the critical part is the causal mechanism that accounts (directly and/or indirectly) for all the activities manifested by the complex whole. This type of strategy, ubiquitously applied in modern sciences, is paradigmatic of Cartesian mechanistic thinking.⁷⁴ Since the last century, however, contemporary biophilosophy has gradually moved away from a reductionistic-mechanistic view of organisms to a more holistic approach, in which the focus is

⁷² Ibid., 556.

⁷³ Ibid., 554. The assertion that the BD body is analogous to a cell culture is often brought up by BD defenders; see for instance Condic, “Determination of Death,” 258-59, 265. Such a claim does not square with scientific reality, however. Cells in a culture only produce more cells to form an aggregate without any organized structure or functionality. To maintain a steady-state environment necessary for long term cell-culture also requires the use of technologically sophisticated bioreactors. See John W. Haycock, “3D Cell Culture: A Review of Current Approaches and Techniques,” in *3D Cell Culture: Methods and Protocols*, ed. John W. Haycock (New York: Humana Press, 2011), 4-10. In contrast, the BD body is capable of maintaining its own internal steady state. This in itself is an indicator that all the body parts, from the microscopic level to the macroscopic, are still working together in unison for the maintenance of the body, which in turn explains the phenomenon of long term “chronic BD” survivors (see above, n. 7). In brief, cell cultures demonstrate no *telos*, but BD bodies do.

⁷⁴ The second of the four rules in Descartes’s method is to reduce a complex whole to its components. See René Descartes, *Discours de la méthode* (1637), 14, http://classiques.uqac.ca/classiques/Descartes/discours_methode/Discours_method.p df. Each component is then analyzed individually. Based on the results obtained regarding the activities of the parts, it is postulated that the structure of the whole is such and such, or that such and such a mechanism accounts for an observed behavior (e.g., a life process) of the complex whole. See Ernan McMullin, “Structural Explanation,” *American Philosophical Quarterly* 15 (1978): 139.

not so much about “*how* organisms are put together (reductionism) . . . [but rather] to understand *why* they are put together in the way they are (systems; holism).”⁷⁵ Along with the rediscovery that nature has a final end is the recognition that living organisms are complex, dynamic, hierarchically organized,⁷⁶ closed network-systems, in which one of the key properties is “the *reticular* or *circular* character of their organization.”⁷⁷ In this reticular scheme of organization, the parts are connected in a complex network of functional co-dependencies such that, while some processes or parts are more important than others, no process or part can be considered as the causal control center to account for the organism’s life and its integration.⁷⁸ Thus, in the holistic approach from the systems view perspective,

the human organism [is seen] as a dynamic, complex, and seamlessly integrated network not [only] of organs or cells but [also] of molecules, including DNA, RNA, lipids, metabolites, and proteins, connected by reaction pathways which generate shape, mass, energy, and information

⁷⁵ Anthony Trewavas, “A Brief History of Systems Biology,” *The Plant Cell* 18, no. 10 (2006): 21 (emphasis added). See also James A. Marcum, *The Conceptual Foundations of Systems Biology: An Introduction* (New York: Nova Science Publishers, 2009), 1-12. For a detailed discussion on the holistic vision of life, death and organism, see Nguyen, *New Definitions of Death*, 359-425.

⁷⁶ In very simple terms, hierarchical organization refers to the organization of cells into tissues, of tissues into organs, of organs into organ systems, and of organ systems into the organism as a whole. The term “hierarchical” does not imply a control center determining the activities of the whole, however; see Leonardo Bich and Luisa Damiano, “Life, Autonomy and Cognition: An Organizational Approach to the Definition of the Universal Properties of Life,” *Origins of Life and Evolution of Biospheres* 42, no. 5 (2012): 393.

⁷⁷ *Ibid.*, 392. The interdependencies between the organs (or organ systems) are self-evident in the following simplified sketch: (1) every part in the body depends on blood circulation to receive its required nutrients and oxygen and eliminate its waste and carbon dioxide; (2) but the blood itself must be pumped, hence its dependence on the heart; (3) the blood must also be properly oxygenated and cleared of excess carbon dioxide, hence its dependence on the alveolar lining of the lungs; (iv) the inflation of the lungs, in turn, needs the activity of the diaphragm (and intercostal muscles); (v) the activity of the diaphragm requires the neural input from the midbrain respiratory center; and (vi) the latter, in turn, needs to be triggered by some increase of carbon dioxide in the blood. The functional co-dependencies between the parts thus follow a pattern of organizational circularity.

⁷⁸ See *ibid.*, 391-93; Luisa Damiano, “Co-Emergences in Life and Science: A Double Proposal for Biological Emergentism,” *Synthese* 185, no. 2 (2012): 279-83; Marcum, *Conceptual Foundations of Systems Biology*, 6.

transfer over the course of a human lifetime. In contrast to the . . . prevailing reductionistic and mechanistic views, the organism is seen here as a single, unified whole, a complex and dynamic network of interacting molecules that appear and then disappear in time. It is an embodied process that has both spatial and temporal manifestations.⁷⁹

The second difficulty raised by Moschella's rationale, as well as Hoffman and Rosenkrantz's thesis, is about "whole and parts." The question is: in an organic whole, can a part—be it the central nervous system, the brain, or any other organ—account for its own unity (i.e., to be "functionally subordinate to itself"), and moreover, account for the unity (integration) of the complex whole? According to both Aristotelian-Thomistic hylomorphic philosophy and contemporary holistic biophilosophy, the answer to this question is no. Both recognize that the organic whole is ontologically prior to its parts. In Scholastic terminology, the living whole, that is, an "organism as a whole," is a substance. A substance "derives its unity from its own internal essence that serves as a principle of unity from within."⁸⁰ "This principle is what accounts for the internal relations among organs and body parts, and that between the parts and the whole, such that all the organs and parts are ordered to the whole and function together for the good of the whole."⁸¹ Likewise, holistically oriented scientists recognize that "an organism is an organism from the start . . . whereas a house is not a house until it is finished,"⁸² and that "*the activity of the whole cannot be fully explained in terms of the activities of the parts isolated by analysis.*"⁸³ Furthermore, on the basis of efficient causality alone, a part cannot be the cause of unity of the organic whole because

the material part causing the integration would have to be directly controlling all other parts of the body to prevent them from being subject to forces of nature pulling them away from the body. A question would

⁷⁹ Austriaco, "Immediate Hominization from the Systems Perspective," 722-23.

⁸⁰ James Porter Moreland and Scott B. Rae, *Body & Soul: Human Nature & the Crisis in Ethics* (Downers Grove, Ill.: InterVarsity Press, 2000), 79.

⁸¹ Nguyen, *New Definitions of Death*, 283.

⁸² Joseph H. Woodger, *Biological Principles: A Critical Study* (London: K. Paul Trench Trubner, 1929), 294.

⁸³ Edward S. Russell, "From Mechanistic to Organismal Biology," *In Context Newsletter*, no. 30 (2013): 17, <http://natureinstitute.org/pub/ic/ic30/russell-on-holism.pdf>.

then arise: how does the integrator itself remain integrated? It cannot be its own cause of integration, since an external agent is necessary for efficient causality. Another part would have to integrate the integrator, in which case this other part takes precedence as “central integrator,” setting up an infinite regress.⁸⁴

B) *Analysis of Moschella’s Second Rationale*

Moschella’s second rationale begins with her criterion for differentiating an organism from a nonorganism. The criterion is as follows:

A putative organism is an organism if it possesses the *root capacity for self-integration*. Possession of the root capacity for self-integration (of which the soul is the principle) is evidenced by (1) possession of the material basis of the capacity for self-integration—i.e., the capacity for control of respiration and circulation—or (2) possession of the material basis of the capacity for sentience.⁸⁵

The emphasis on self-integration is appropriate since it reflects the common knowledge that the principle for organismic unity/integration is intrinsic to the organism.⁸⁶ Solid research in contemporary biophilosophy has amply shown that in organisms, ranging from unicellular to complex multicellular organisms, self-integration involves a whole host of interrelated vital vegetative functions, in which no function or part can be considered as the starting point or causal control center.⁸⁷ Moschella’s argument

⁸⁴ Accad, “Of Wholes and Parts,” 222.

⁸⁵ Moschella, “Deconstructing the Brain Disconnection–Brain Death Analogy,” 289. The term “root capacity” is synonymous with the terms “radical capacity” and “active potency.”

⁸⁶ See above, nn. 79–82.

⁸⁷ There is a wealth of literature in this regard in contemporary biophilosophy. See for instance, Joseph H. Woodger, “The ‘Concept of Organism’ and the Relation between Embryology and Genetics, Part II,” *The Quarterly Review of Biology* 5, no. 4 (1930): 459; Matteo Mossio, Maël Montévil, and Giuseppe Longo, “Theoretical Principles for Biology: Organization,” *Progress in Biophysics and Molecular Biology* 122, no. 1 (2016): 26; Nicanor Austriaco, “The Hylomorphic Structure of Thomistic Moral Theology from the Perspective of a Systems Biology” (STD diss., University of Fribourg [Switzerland], 2015), 283; Pier L. Luisi, “Autopoiesis: A Review and a Reappraisal,” *Naturwissenschaften* 90, no. 2 (2003): 49–59.; Edward S. Russell, “From Mechanistic to Organismal Biology,” 15–19; Marcum, *Conceptual Foundations of Systems Biology*, 6; Leonardo Bich and Luisa Damiano, “Life, Autonomy and Cognition,” 391–93; Luisa Damiano, “Co-Emergences in Life and Science,” 282–83.

stands in direct contradiction to this holistic understanding, however, as it proceeds through a series of reductive steps (summarized below) which ends with the brain as the causal control center:

- (1) All the vital vegetative capacities of the soul are reduced to the capacity for control of respiration and circulation; this in turn is reduced to the capacity for spontaneous breathing;⁸⁸
- (2) The capacity for self-integration is thus reduced to the capacity to breathe spontaneously and the capacity for sentience;
- (3) The brain, besides being “the material basis of the root capacity for sentience,”⁸⁹ is also (via the brainstem) “the material basis of the capacity for regulation of circulation and respiration.”⁹⁰ Therefore, “the brain is the material basis of the root capacity for autonomous organismal integration.”⁹¹ By this, Moschella implies that the brain is “the material basis for both vegetative and sentient functioning.”⁹²

These reductive steps thus lead to the following corollary to Moschella’s criterion for differentiating organism from nonorganisms:

In conclusion, total brain death is death because total brain death marks the loss of the material basis of the capacity for self-integration—understood most essentially as the capacity to breathe spontaneously—as well as the material basis of the capacity for sentience—and thus renders the body inadequate for rational ensoulment.⁹³

With its insistence on spontaneous breathing and sentience (which implies conscious sentience), Moschella’s conclusion strongly echoes the “fundamental work” rationale of the 2008 President’s Council on Bioethics.⁹⁴ At the same time, however, her insistence that “the brain, as *controller* of circulation and respiration, is . . . the *sine qua non* of self-

⁸⁸ See Moschella, “Deconstructing the Brain Disconnection–Brain Death Analogy,” 291.

⁸⁹ *Ibid.*, 290.

⁹⁰ *Ibid.*, 292.

⁹¹ *Ibid.*, 283.

⁹² *Ibid.*, 291; Mossio et al., “Theoretical Principles for Biology: Organization.”

⁹³ Mossio et al., “Theoretical Principles for Biology: Organization,” 293.

⁹⁴ See above, n. 11.

integration,”⁹⁵ reiterates Bernat’s thesis of the brain as central somatic integrator.⁹⁶

There are several difficulties with Moschella’s second rationale. While both circulation and respiration are important elements of vegetative life, the assertion that the brain (via the brainstem) is the material basis which “specifically . . . controls these vital functions,”⁹⁷ contradicts biological reality. The discussion which follows is derived from standard medical textbooks of anatomy and physiology, which teach that respiration, properly understood, is more than the act of breathing to move air in and out of the lungs, because the more fundamental aspect of respiration is the exchange of oxygen and carbon dioxide in the lungs and throughout the body.⁹⁸ Whereas the moving of air in and out of the lungs is a mechanical function (and as such can be grossly replaced by the ventilator), the exchange of oxygen and carbon dioxide is integral to the immanent and systemic metabolic activity present throughout the human organism (and as such it cannot be substituted by any conceivable man-made device). At the core of the systemic metabolic activity is the mitochondrial production of the high energy molecule adenosine triphosphate (ATP) necessary for life-constitutive integration.⁹⁹ While the brain (via the respiratory center in the brainstem) has a role to play in the mechanical part of respiration, a role which is further shared with other body parts, including “the phrenic nerves, diaphragm and intercostal muscles,” no part of the brain is involved in the most fundamental aspect of respiration, which is the exchange of oxygen and carbon dioxide.¹⁰⁰ Similarly, with regard to circulation, the brainstem is involved only in the regulation of blood pressure, but this regulation is not under the exclusive control of the

⁹⁵ Moschella, “Deconstructing the Brain Disconnection–Brain Death Analogy,” 292.

⁹⁶ See above, nn. 3-5.

⁹⁷ Moschella, “Deconstructing the Brain Disconnection–Brain Death Analogy,” 292.

⁹⁸ This is summarized in Shewmon, “The Brain and Somatic Integration,” 464. See also the discussion on organizational circularity in n. 77, above.

⁹⁹ See Nguyen, *New Definitions of Death*, 385-86, 415.

¹⁰⁰ Shewmon, “The Brain and Somatic Integration,” 464.

brainstem since it also involves the spinal cord.¹⁰¹ Moreover, circulation entails the activities of other parts, including (1) the heart, which has its own nervous system and can beat independently of the brain; and (2) the blood, which consists of various cellular and noncellular elements. The bone marrow production of the cellular elements of the blood, as well as the complex interactions of these elements among themselves and with other parts of the body—interactions that are necessary for the maintenance of the internal steady state—are not controlled by any part of the brain. In addition, as amply demonstrated by Shewmon in his report on “chronic BD” survivors, the brain is not involved in a whole host of vegetative functions necessary for somatic integration, in particular, such functions as the maintenance of body temperature, homeostasis of the immune system, and assimilation of nutrients and excretion of waste.¹⁰² In other words, the irrefutable medical evidence which constitutes the biological/physiological reality manifested by “chronic BD” survivors” does not confirm Moschella’s claim of the brain as the material basis of the root capacity for self-integration.

There are also difficulties with Moschella’s rationale from the perspective of Aristotelian-Thomistic philosophical anthropology. On the one hand, Moschella follows Aquinas’s doctrine:

¹⁰¹ Control of blood pressure by the spinal cord accounts for hemodynamic stability in “chronic BD” survivors as well as patients with high spinal cord injury, once they get over the acute period of spinal shock. See D. Alan Shewmon, “Spinal Shock and ‘Brain Death’: Somatic Pathophysiological Equivalence and Implications for the Integrative-Unity Rationale,” *Spinal Cord* 37, no. 5 (1999): 313-24; Nicanor Austriaco, “A Philosophical Assessment of TK’s Autopsy Report: Implications for the Debate over the Brain Death Criteria,” *Linacre Quarterly* 83, no. 2 (2016): 195-96.

¹⁰² Shewmon gives a nonexhaustive list of vital vegetative functions that are crucial for somatic integration and yet not mediated by the brain. See Shewmon, “The Brain and Somatic Integration,” 467-70. The one vegetative function which involves the brain is the neuroendocrine function of the hypothalamus and pituitary. BD proponents such as Bernat argue, however, that the presence of the neuroendocrine function of the brain does not invalidate a diagnosis of BD. See James L. Bernat, “Refinements in the Definition and Criterion of Death,” in *The Definition of Death: Contemporary Controversies*, ed. Stuart J. Youngner, Robert M. Arnold, and Renie Schapiro (Baltimore, Md.: Johns Hopkins University Press, 1999), 86.

The soul is in every part of [the living] being. . . . Each *human* being has one soul, a *rational* soul, that makes the body *be* a body . . . and be a *human* body. The rational soul is the formal principle of the unity and essential identity of the human person . . . and the source (as formal principle) of all of the human being's actions, operations, and capacities, ranging from vegetative functions like metabolism and homeostasis to rational activities.¹⁰³

On the other hand, she also insists on the primacy of the brain, namely, that it is "the primary organ through which the soul acts to *integrate the body* in humans beyond a certain stage of development."¹⁰⁴ Such an insistence echoes Condic's assertion that "at postnatal stages of human life, integration is uniquely accomplished by the brain."¹⁰⁵ The idea of the brain as primary organ in the postnatal stage is much stressed by Moschella and Condic; it constitutes the foundation of their accounts. There are two difficulties with this kind of assertion, however. First, the data of modern embryology have confirmed that in the human embryo many vital processes, including the heart and vascular system, appear and become fully functional well before the brain is formed. Indeed, the neural groove, the earliest evidence of the central nervous system, does not appear until the fourth week of gestation. Such vital functions are thus brain-independent. Hence, the thesis of the brain as primary organ in the postnatal stage must be accompanied by confirmatory biological evidence to show how and when exactly the brain becomes the primary organ to control all those vital processes which are functioning well before the brain itself even develops. Neither Moschella nor Condic provides this evidence.

More problematic, however, is Moschella's claim that it is through the brain that the soul acts to integrate the body. That the soul, as the substantial form of the body, gives *esse* to the body and makes that human body what it is¹⁰⁶ necessarily means that the soul is both the principle of life

¹⁰³ Moschella, "Deconstructing the Brain Disconnection–Brain Death Analogy," 284. Moschella reiterates this idea more than once in her essay, in addition to emphasizing three times the postnatal primacy of the brain.

¹⁰⁴ *Ibid.*, 288 (emphasis added).

¹⁰⁵ Condic, "Determination of Death," 273. Condic emphasizes this point repeatedly in her paper. The term "postnatal" appears nine times.

¹⁰⁶ See *Q. D. De Anima*, a. 10.

and the principle that integrates the body (a process which begins at the moment of conception), and keeps it integrated as it goes through continuous changes during the lifetime of the human person.¹⁰⁷ Like two sides of the same coin, life and integration are inseparable. That “the whole soul is in each part of the body by totality of perfection and of essence” and with respect to the power corresponding to that part¹⁰⁸ means that it is the soul that gives life to that part, keeping it integrated and functional as a part of the living whole. According to Moschella’s assertion, however, it seems that the soul, if it is to integrate the body or achieve anything in any body part, can only do so via the brain. But the brain is an organ of the body, which itself needs to be integrated, and this integration is done by nothing other than the soul. Thus, an astute reader will recognize the incoherence in Moschella’s argument that the soul integrates the body through the brain, even though the brain, by virtue of being an organ, is part of the integrated body.

Does the soul, being itself the immanent cause of integration of the body, need the brain as its primary organ for integration? If this were the case, and since life and integration are inseparable, it would mean that the soul also needs the brain as its primary organ to give existence to the body. But this is an impossibility since, in the embryo, the neural groove does not appear till the fourth week of gestation. It is true that, in the context of the limited medical knowledge of his time, Aquinas speaks of a primary organ, but only as an instrument of motion and not as an instrument of integration. Therefore, Aquinas explicitly states:

The union of soul and body ceases at the cessation of breath, not because this is the means of union, but because of the removal of that disposition by which the body is disposed for such a union. Nevertheless the breath is a means of moving, as the first instrument of motion.¹⁰⁹

¹⁰⁷ See above, n. 79.

¹⁰⁸ *STh* I, q. 76, a. 8.

¹⁰⁹ *STh* I, q. 76, a. 7, ad 2. Elsewhere, Aquinas speaks of the heart as the first instrument of motion. See *Q. D. De Anima* a. 9, ad 13; Aquinas, *De Motu Cordis* (trans. Gregory Froehlich, http://www4.desales.edu/~philtheo/loughlin/ATP/De_Motu_Cordis/De_Motu_Cordis.html). The obvious question then is: which one, the breath or the heart, is the first instrument of motion? A discussion on this issue can be found in Nguyen, “Pope John Paul II and the Neurological Standard for the Determination of Death,” 170-71. Moreover, the notion of the primary organ is

That some organ of the body is the first instrument of motion necessarily presupposes that the body, of which that organ is a part, is a *living* body. In this light, what Aquinas is saying in the above passage is simply this: the cessation of breath indicates that the “body” is no longer disposed to the soul-body union because it is now a dead “body” (a body in the homonymous sense, i.e., a corpse).¹¹⁰ Furthermore, there cannot be an instrument of integration precisely because the soul, the principle of both integration and life, is united to the body substantially. If there were an instrument of integration, then such an organ would be mediating the soul-body union, in which case the soul would be united to the body merely as its motor (a Platonic dualistic view of human nature) and not as its substantial form.

Difficulties with Moschella’s thesis become more apparent in her philosophical account of high spinal cord injury (HSCI), a condition “*functionally equivalent* to whole brain death.”¹¹¹ Because of this functional equivalence, any argument in defense of BD must also be capable of providing a logical and coherent account of the phenomena observed in HSCI. Moschella’s account of HSCI cases, which reflects her criterion for distinguishing organisms from nonorganisms, reads as follows:

In the case of an SCI patient, the “organism as a whole” could be constituted by the head alone, not the head and brain-disconnected body

not confirmed by contemporary embryology; the human organism begins at the zygote (one cell-stage), well before the appearance of any organ. For details on the question of the primary organ, see Nguyen, *New Definitions of Death*, 330-46, in particular nn. 1047, 1048, and 1084.

¹¹⁰ See Michel Accad, “Letter to the Editor: A Rejoinder to Jason Eberl on Brain Death,” *Linacre Quarterly* 83, no. 1 (2016): 1-2. Accad’s letter shows that Aquinas’s teaching can be easily misinterpreted when one confuses or conflates the notion of instrument of motion with that of instrument of integration.

¹¹¹ Jason T. Eberl, “Ontological Status of Whole-Brain-Dead Individuals,” in *The Ethics of Organ Transplantation*, ed. Steven J. Jensen (Washington, D.C.: The Catholic University of America Press, 2011), 62. There are numerous somatic similarities between patients who suffer BD and those who suffer HSCI (transection of the spinal cord at the level of the second cervical vertebra) because in both cases the spinal cord, and therefore, the body from the neck down, has lost its rostral input from the brain. HSCI patients are ventilator-dependent. Essentially the only difference between BD and HSCI is that BD patients are deeply comatose whereas HSCI patients are not. For details on the close somatic similarities between BD and HSCI, see Shewmon, “Spinal Shock and ‘Brain Death,’” 313-24.

together, because the brain is the material basis of the root capacity for autonomous organismal integration, and the brain continues to have control over the rest of the head, while the body below the transection, since it is disconnected from the brain, lacks the material basis of that root capacity. . . . It [the body] is therefore strictly speaking neither a separate independent organism nor a proper part of the patient's overall organism, but rather a collection of organs and tissues that are functionally coordinated with each other and with the brain/head through external agents (mechanical ventilation, pharmacological treatments, etc.). Conversely . . . a living brain, even if largely disconnected from what used to be the rest of the body, *does* retain the material basis of the root capacity for autonomous organismal integration, and is therefore itself an "organism as a whole," though a severely disabled one. . . . The fact that neither BDB [brain-dead body] nor SCI patients can breathe on their own due to the death of the brain (in the case of the BDB) or its disconnection from the body (in the case of the SCI patient) may simply mean that *neither* the BDB *nor* the "body" of the SCI patient below the point of transection are integrated organisms as a whole (in the case of the BDB) or proper parts of integrated organisms as a whole (in the case of the SCI patient).¹¹²

The above passage contains two notable reductions. First, all the vegetative capacities are reduced to the capacity for spontaneous breathing, such that without it the body (from the neck down, in HSCI patients) is no longer somatically integrated. Here, Moschella's claim echoes Condic's assertion, that the HSCI patient "remains alive . . . but without functioning as an organism" because of the lack of somatic integration below the neck.¹¹³ Second, the human organism as a whole is reduced to the head alone and, according to Moschella, even to the brain alone:

I would argue that the "brain in a vat" is a human organism as a whole both because it retains the material basis for organismal integration and because it retains the material basis for sentience, thus indicating that the soul as formal principle of those capacities is still present.¹¹⁴

¹¹² Melissa Moschella, "Brain Death and Human Organismal Integration: A Symposium on the Definition of Death," *Journal of Medicine and Philosophy* 41, no. 3 (2016): 283.

¹¹³ Condic, "Determination of Death," 269. Condic's statement is incoherent, however, because the notions of life, organismic integration, and "organism as a whole" (i.e., a living organism) go hand in hand.

¹¹⁴ Moschella, "Deconstructing the Brain Disconnection–Brain Death Analogy," 295 n. 11. Moschella's statement echoes a common idea held in secular philosophy, namely, that the identity of a person coincides with the identity of his or her brain because it is with the brain (or head) that he or she thinks and experiences: "where my brain goes, go I." See Eberl, "Ontological Status of Whole-

The above statement conveys the idea that somehow the soul is strictly tied to the brain such that where the living brain is, there the soul is. It is difficult to reconcile such an idea to the classical Aristotelian-Thomistic doctrine which specifically teaches that the soul is diffusely present in every part of the body. This in turn raises the question: does Moschella's account of HSCI cohere with the classical doctrine?

To claim that in HSCI patients the head or the brain alone is the human organism as a whole amounts to saying that only the head or the brain alone constitutes the substance of which the human soul is the substantial form, which then indicates that the soul is located in the head or the brain alone. Meanwhile, the HSCI body below the neck is nonintegrated, which means that it is a nonorganism, a homonymous body, a thing in which the human soul is not present. Hence, according to Moschella's account, the HSCI patient is a juxtaposition of an organism (the ensouled head or brain) and a nonorganism (the nonensouled body). Such a scenario evokes science fiction, however, especially since the purported nonintegrated HSCI body continues to function (vegetatively) much in the same way as the patient's body before the injury. Moreover, it is recognized that any non-integrated organic entity, such as a corpse or an excised body part, succumbs rapidly to disintegration and putrefaction.¹¹⁵ Why do HSCI bodies, in which the principle of integration is purportedly absent, not undergo disintegration for decades? Likewise, if indeed "brain death is death,"¹¹⁶

Brain-Dead Individuals," 66; Michael B. Green and Daniel Wikler, "Brain Death and Personal Identity," *Philosophy and Public Affairs* 9, no. 2 (1980): 124.

¹¹⁵ The disintegration process begins within minutes after death. For details on this process see Norman L. Cantor, *After We Die: The Life and Times of the Human Cadaver* (Washington, D.C.: Georgetown University Press, 2010), 76-77. The same is true when an organ is removed from the body. This is why in organ transplantation, cooling is a critical element in preserving *ex vivo* organs. Currently, under the best conditions of preservation, the tolerated *in vitro* duration for to-be-transplanted organs is counted in terms of hours (24 hours for the kidney, much shorter for other organs), not days or weeks. For further details, see Edgardo E. Guibert et al., "Organ Preservation: Current Concepts and New Strategies for the Next Decade," *Transfusion Medicine and Hemotherapy* 38, no. 2 (2011): 125-42.

¹¹⁶ Moschella, "Deconstructing the Brain Disconnection-Brain Death Analogy," 281, 293.

then why do BD bodies not show the same signs of disintegration as seen in normal corpses, and why do some even remain intact and functional for months and years? Moschella's explanation is that

an *external cause* [the ventilator] can . . . trigger the internal capacities of a multitude of living entities that used to be parts of a whole in such a way that those entities can continue to exhibit some degree of functional coordination, thus maintaining functional integration and successfully opposing entropy, [but this] does not imply that genuine *self-integration* is present.¹¹⁷

This passage reiterates the “masking death” argument made by BD defenders, namely, that “artificial means of support mask [the] loss of integration.”¹¹⁸ It contains two inter-related assertions: (1) the ventilator can “trigger” the unintegrated parts to perform their respective functions to produce an anti-entropic effect, and (2) this is possible because unintegrated parts, despite the fact that they are no longer parts of the whole, retain their internal capacities. Each of these claims deserves to be examined closely.

According to the principle of proportionate causality, whatever is present in an effect must also be in some way in its cause; hence, Moschella's first claim necessarily implies that the ventilator itself is capable of opposing the relentless increase in entropy which sets in immediately upon death. This is an impossibility, however, since the ventilator, by virtue of its design, “does only two things: (1) expand the lungs in lieu of the intercostal muscles and the diaphragm, and (2) pump oxygenated air into the lungs.”¹¹⁹ As Accad points out,

the ventilator has no power to control homeostasis, circulation, digestion, growth, or any other such function, even for a millisecond. Insufflation of air in and out of the chest—even if supplemented by intravenous infusions of metabolically active drugs—cannot extend in time the myriad motions which must occur to keep the body integrated and working as a unitary whole.¹²⁰

¹¹⁷ *Ibid.*, 288.

¹¹⁸ President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research, *Defining Death*, 33.

¹¹⁹ Nguyen, “Pope John Paul II and the Neurological Standard for the Determination of Death,” 161.

¹²⁰ Accad, “Of Wholes and Parts,” 224.

Moschella's first claim also contradicts the second law of thermodynamics. Scholars in contemporary biophilosophy have recognized that a central characteristic of life is anti-entropy, that is, the phenomenon of life goes counter to the second law of thermodynamics, which is the natural tendency of things to move from order to disorder until they reach "the state of thermodynamic equilibrium or maximum entropy."¹²¹ A paradigmatic example of this is a corpse or an excised body part. In contrast, a living body, while it continuously produces entropy, keeps itself in a dynamic steady state by absorbing nutrients from and excreting waste into its environment.¹²² This global activity of bilateral exchange with the environment and self-maintenance is designated by the umbrella term "metabolism," which refers to the totality of complex, orderly, and mutually interrelated vital processes at all levels (from microscopic to macroscopic) within the organism.¹²³ Metabolism (which in warm-blooded animals, is oxygen dependent) is an indispensable, constitutive, and immanent property of every living thing; this fact is recognized not only by scientists but also by contemporary philosophers (e.g., Hans Jonas).¹²⁴ A paradigmatic example of this fundamental characteristic of metabolism is the continuous mitochondrial production (throughout the body) of the high-energy molecule ATP which is necessary for every life activity. Upon death or the excision of an organ, the production of ATP ceases in the whole body or the excised part, respectively; this is then

¹²¹ Erwin Schrödinger, *What Is Life? And Other Scientific Essays* (Garden City, N.Y.: Doubleday, 1956), 68.

¹²² See Ludwig von Bertalanffy, *General System Theory: Foundations, Development, Applications* (New York: George Braziller, 1969), 43; Pietro Ramellini, *Life and Organisms* (Vatican City: Libreria Editrice Vaticana, 2006), 81. Nutrients include oxygen, and waste includes carbon dioxide. In warm-blooded beings, the maintenance of body temperature is a sign of the organism's dynamic steady state. Note that BD patients are warm and pink, whereas a true corpse is gray, with the same temperature as that of its surroundings.

¹²³ See Ludwig von Bertalanffy, *Modern Theories of Development: An Introduction to Theoretical Biology*, trans. Joseph Henry Woodger (London: Oxford University Press, 1933), 48-49.

¹²⁴ Hans Jonas thus expresses his understanding of the foundational role of metabolism as follows: "metabolism, the basic level of all organic existence . . . is itself the first form of freedom." See Hans Jonas, *The Phenomenon of Life: Toward a Philosophical Biology* (New York: Harper & Row, 1966), 3.

followed by a series of phenomena known as disintegration.¹²⁵ In summary, that metabolism is fundamental to life (anti-entropy), and that it is a constitutive and immanent property of living organisms, necessarily mean that no external cause in the created order, be it the ventilator or any other man-made device, can substitute for it. This insight about metabolism strongly echoes Aristotle's understanding that the nutritive soul (the vegetative power) is foundational to life.¹²⁶ This is why Shewmon, in his seminal work on the philosophy of organismic integration, emphatically insists that

[life] constitutive integration is intrinsically and absolutely not substitutable. Nor is it even partially substitutable. Unlike the therapeutic replacement of a health-maintaining integrative function, which can replace the natural function well or poorly, constitutive integration is all or none, just as "unity" is all or none. Some or many cells might cease to participate in an organism's anti-entropic constitutive integration, for example, but if the remaining ones suffice to maintain the organism's antientropy, the constitutive integration remains undiminished; indeed it is undiminishable, only present or absent. No futuristic intensive care technology can prevent the increase in entropy (i.e., biological decay) if it is not endogenously opposed from the very life processes themselves of the living organism.¹²⁷

Put bluntly, life-support measures, as the term itself indicates, only work as long as there still remains some life in the patient, however minimal it might be as the person approaches the moment of death.

In her second claim, Moschella speaks of the un-integrated parts in BD bodies (as well as HSCI bodies) as a "multitude of living entities" which still retain their internal

¹²⁵ There is a brief time-window of viability after the cessation of ATP production. The more an organ requires an uninterrupted supply of oxygen and nutrients, the shorter this window is. Efforts in organ preservation for transplant purposes seek to stretch this window of viability, which nevertheless can only last for hours and not days, weeks, or months.

¹²⁶ See Aristotle, *De anima* 3.434a22-26. Here, Aristotle reiterates, "everything then that lives and has a soul must have the nutritive soul, from birth until death; for anything that has been born must have growth, maturity, and decline, and these are impossible without nourishment. The potentiality for nutrition [i.e., the vegetative power] must therefore be present in all things which grow and decline."

¹²⁷ D. Alan Shewmon, "You Only Die Once: Why Brain Death Is Not the Death of a Human Being; A Reply to Nicholas Tonti-Filippini," *Communio* 39 (2012): 440.

capacities. At the same time, she holds that neither BD bodies nor HSCI bodies can be the material basis for ensoulment by the rational soul. How does one account, philosophically, for the persistence of these two groups of nonensouled bodies, since it is evident that they continue to exhibit a whole host of vegetative functions that were present in the patients prior to their diagnosis of BD or HSCI? One must posit that in these cases, the body is informed by at least one other substantial form, such as the substantial form of corporeity. Moreover, one needs to account for the presence of a “multitude of living entities” in bodies which are not ensouled by the rational soul. According to Eberl, whose argument in defense of BD precedes that of Moschella and is very similar to it, the organs and body parts of the HSCI body are “each informed by a vegetative soul.”¹²⁸ Thus, according to this thesis, the body of the HSCI patient is made up of different substances (namely, the unintegrated body parts) that are only accidentally working together as a whole. The question arises, is such a thesis in accord with Aquinas’s account of the unicity of the human soul?

A careful examination of the arguments of Eberl and Moschella reveals that it is not. Both insist that in the HSCI patient the organism as a whole is reduced to the head, and therefore the rational soul only informs the head.¹²⁹ It follows, therefore, as mentioned earlier, that the HSCI patient would be an entity in which an organism as a whole (either the head or the brain alone) is connected to a non-organism (a body composed of unintegrated parts). In philosophical terms this means that the HSCI patient would

¹²⁸ See Eberl, “Ontological Status of Whole-Brain-Dead Individuals,” 64. Eberl writes: “the body of a patient with high cervical cord transection is no longer informed by his rational soul below the point of the transection. . . . His soul now informs only his head and those parts of his body which his brain can still control, such as motor control over his facial muscles and other parts of his head. . . . [In the body below the transection], the cells and independent organ systems maintained with artificial assistance are each alive, each informed by a vegetative soul; they just no longer constitute the person’s life—that is, their vegetative capacities are no longer those of the patient’s rational soul” (*ibid.*, 63-64).

¹²⁹ See Moschella, “Deconstructing the Brain Disconnection–Brain Death Analogy,” 289. Here we read: “the head of the high cervical SCI patient can itself be understood to be an organism as a whole.” See also the block quotation at n. 114, and the quotation in n. 128.

be a juxtaposition of (1) the rational soul (associated with its material basis, the brain) which informs only the head, (2) a substantial form of corporeity to account for the persistence of the HSCI body over decades, and (3) a multitude of substantial forms, each informing its corresponding un-integrated body part. Similarly, the BD body would be the combination of a substantial form of corporeity together with a multitude of substantial forms of unintegrated parts remaining *in situ* in the alleged dead body.

A plurality of substantial forms directly contradicts Aquinas's teaching of the unicity of the substantial form, however. Such a thesis can be traced back to Plato, who "located the rational soul in the brain, the nutritive in the liver, and the appetitive in the heart."¹³⁰ The plurality of forms is also a hallmark of Duns Scotus's thought, which radically diverges from Aristotelian-Thomistic philosophy. Most notably, Scotus holds that: (1) prime matter has actuality and persists through substantial change,¹³¹ and (2) animate composites consist of a plurality of substantial forms. For Scotus, a form of corporeity must be posited in order to explain why the body after death is in continuity with the once-living body, and appears to be the "same" as when it was alive.¹³² Scotus also maintains that organs and body parts are substances—each informed by its corresponding substantial form—and these multiple disparate substances somehow mysteriously become united and informed by the rational soul during prenatal development.¹³³ In other words, according to Scotus, the organism as a whole is posterior to the parts, because the form of the organism as a whole is the last to come about, being preceded by prime matter and the substantial forms of the parts.¹³⁴

¹³⁰ ScG II, c. 58.

¹³¹ See John Duns Scotus, II *Sent.*, d. 12, q. 1, n. 10 (*John Duns Scotus: Opera Omnia*, Vol. 12, ed. Luke Wadding [Paris: Apud Ludovicum Vives, 1893]).

¹³² See John Duns Scotus, IV *Sent.*, d. 11, q. 1, n. 7 (*John Duns Scotus: Opera Omnia*, Vol. 17, ed. Luke Wadding [Paris: Apud Ludovicum Vives, 1894]); John Duns Scotus, IV *Reportata*, d. 10, q. 3, n. 26 (*John Duns Scotus: Opera Omnia*, Vol. 23, ed. Luke Wadding [Paris: Apud Ludovicum Vives, 1894]).

¹³³ See Scotus, IV *Sent.*, d. 11, q. 3, n. 41.

¹³⁴ See Scotus, IV *Sent.*, d. 11, q. 3, n. 46.

Scotus's theory raises a whole host of difficulties, however. In particular, it is incoherent that the parts in an organic whole could be prior to the whole itself. Moreover, this theory cannot give a satisfactory account for the unity of body and soul. With the plurality of forms, "the union of the soul to the body is at best an accidental state of affairs,"¹³⁵ which is akin to Plato's idea that "the soul is united as a mover and not as a form to the body, [i.e.,] the soul exists in the body as a sailor in a ship."¹³⁶ By contrast, Aquinas repeatedly stresses that there cannot be a plurality of substantial forms in any living being. For instance, he writes:

There cannot be more than one substantial form in any one thing; the first [substantial form] makes the thing an actual being; and if others are added, they confer only accidental modifications, since they presuppose the subject already in act of being. . . . [An individual man does not have] one form that made him a substance, another that gave him a body, another that gave him life, and so on.¹³⁷

The plurality of forms which underlies Moschella's argument to account for the persistence of life activities in HSCI bodies is not an exact replica of Scotus's plurality of forms, however. As noted above, Scotus posits that multiple substances (each informed by its own substantial form which perdures and is not subsumed into the higher level "soul") are somehow brought together (during prenatal development) to be informed by the rational soul. This gives a semblance of the unicity of the soul. According to Moschella's thesis, however, in HSCI patient the rational soul informs only the head. It would therefore have nothing to do with the above-mentioned "multiple living entities," that is, the multiple different substances (organs and parts) present in the HSCI body below the level of the cervical injury. The result would be a side-by-side coexistence of the rational soul and the substantial forms of the multiple living entities in the HSCI body. Even if one posits a substantial form of corporeity which unites in an accidental way the different substances, the result would be a side-by-side

¹³⁵ Richard Cross, *Duns Scotus* (New York: Oxford University Press, 1999), 79.

¹³⁶ *Q. D. De Anima*, a. 11.

¹³⁷ *II De Anima*, lect. 1.

coexistence of the rational soul and the substantial form of corporeity. In sum, neither scenario would produce a semblance of the unicity of the human soul.

Moschella's second claim raises an additional question: can body parts which are unintegrated, that is, no longer part of the whole, be alive? According to Aquinas,

bodily corruption . . . comes about from the fact that, when the principle which holds the individual contrary parts together is removed, they tend to whatever agrees with them individually according to their own natures, and so the dissolution of the body takes place.¹³⁸

Aquinas also teaches “that the soul, as it virtually contains the sensitive and nutritive souls, [also] virtually contain[s] all inferior forms,”¹³⁹ all the way down to elemental forms. The forms of the elements are in mixed bodies not in actuality but virtually by power (*virtute*).¹⁴⁰ It is thus safe to consider that the inferior forms include the forms of individual organs and body parts, and that these forms are present not actually but virtually by their power. It is also conceivable that under certain specific conditions such virtual forms can become actualized—but only as a transient phenomenon—which would be one of the steps during the initial phase of the disintegration process, which sets in at death or at the removal of an organ. Such a transient phenomenon would explain why for a limited time the inert lifeless corpse retains an appearance similar to that of a living body, and that an inert lifeless *ex vivo* organ retains some degree of viability while in transit to the recipient. In other words, life, or to be alive, is radically different from viability or “to remain viable.” This important distinction is already clearly encapsulated in the Aristotelian-Thomistic concept of homonymy, according to which unintegrated organs are organs in the homonymous sense only. For instance, a removed eye, while remaining viable, is an eye in name only; it cannot see, no more than the eyes of a statue.¹⁴¹ Likewise, a removed kidney from a living donor is a homonymous

¹³⁸ *De Verit.*, q. 25, a. 6 (trans. Robert W. Schmidt [Chicago: Henry Regnery Company, 1954]).

¹³⁹ *STh* I, q. 76, a. 4.

¹⁴⁰ *De Mixt. Elem.*, <http://www.corpusthomicum.org/opx.html>.

¹⁴¹ See Aristotle, *De anima* 2.412b17-24.

kidney, it cannot perform any activity proper to its nature in the absence of that principle (the soul) which integrates it to a living whole. Such unintegrated organs, whether they are excised *ex vivo* or remain *in situ* in a human “body” which is no longer informed by the rational soul, are merely homonymous organs. As Aquinas indicates in the above-quoted passage, without the soul (the principle of integration), such homonymous organs succumb quickly to corruption and dissolution. Thus, it is a self-contradiction to assert that organs and body parts in the BD body or HSCI body are unintegrated and, at the same time and under the same aspect, that they are living entities.

A philosophical question unrelated to BD and HSCI, but which is peripherally related to the notion of homonymy may be posed at this point: what is the status of the transplanted organ (e.g., the kidney) in the recipient?¹⁴² From the perspective of contemporary biophilosophy, it seems that the modern scientific equivalent of the Aristotelian-Thomistic concept of homonymy is the deprivation of the dynamic spatio-temporal organizing relations between the removed kidney and its *in vivo* conditions.¹⁴³ This is why the *ex vivo* kidney is inert and nonfunctional—a kidney in name only. Once transplanted into the recipient, the transplanted kidney becomes functional again, which implies the establishment of spatio-temporal organizing relations between the kidney and its new *in vivo* conditions. Strictly speaking, therefore, it is no longer a homonymous organ. The functioning of the transplanted kidney in its new “home” requires an uninterrupted suppression of the recipient’s immune system, however. Moreover, despite immune suppression, the recipient’s body will eventually reject the

¹⁴² This question was raised by one of the anonymous reviewers for *The Thomist*.

¹⁴³ “When a part is removed from a living body, that part becomes deprived from the various relations which it had *in vivo*, including: (1) relations with the upper level(s) of the organismic hierarchy, in particular the relations with the ‘local’ whole of which it was a part, (2) relations with other homologous and/or heterologous parts belonging to the same hierarchical level, and (3) relations with the non-cellular elements (including nutrients, and supportive matrix) which are part of its natural organic environment” (Nguyen, *New Definitions of Death*, 376). A discussion on dynamic spatio-temporal organizing relations can be found in *ibid.*, 367-78.

grafted kidney even though, thanks to medical advances, this may take many years. On the basis of this biological reality, the most plausible hypothesis is that the grafted kidney is not informed by the recipient's soul.¹⁴⁴ In other words, the substantial form (the "vegetative soul") of the donor's kidney, even though it is of the human species, is not subsumed into the rational soul of the recipient. Since the human soul is created and infused by God at conception, the rational soul of person A necessarily differs from that of person B. It is thus not too far-fetched to hypothesize that the rational soul of A confers certain specific particularities to the sensitive and vegetative "souls" (powers) and, likewise, to all the lower forms which are subsumed to it. Consequently, although human beings all have the same kind of organs and body parts proper to the human species, these organs and body parts bear particularities specific to each human person. One such particularity is the major histocompatibility complex (MHC) which manifests, in biological terms, the uniqueness of each human person. The difference in MHC between the donor and the recipient leads to the eventual rejection of the donor's organ. In other words, the phenomenon of MHC brings into relief the philosophical understanding of qualitative individuality within the human species. To sum up, it would not be far-fetched to say that the grafted organ in the recipient is in a rather unnatural hybrid condition: it is not homonymous but it is also not informed by the rational soul of the recipient. As such, it is an unstable condition which progresses, gradually but inexorably, toward the state of homonymy which occurs when the graft is fully rejected by the recipient's body.

CONCLUSION

Both the "substantial change" rationale of Lee (and Grisez) and the "loss of integration" rationale of Moschella (and Condit) contain serious difficulties, such that they are both incompatible with the Aristotelian-Thomistic doctrine on human nature. Each of the two rationales generates its own distinct set of difficulties. Nevertheless, they share the

¹⁴⁴ See Austriaco, "A Philosophical Assessment of TK's Autopsy Report," 200-201.

same common underlying deficiency. In both arguments, the overarching emphasis is on a functioning brain, hand-in-hand with a similar emphasis on the radical capacity for conscious sentience. Both rationales seem to overlook that the human rational soul is first and foremost the first *entelechia* of the body, that is, that which gives existence to the body (and therefore, to the whole being) in such a way that the organism is an individual of the human species.¹⁴⁵ As a result, both fail to recognize that the human rational soul still remains united to the body even when the patient is unable to manifest observable operations of the rational power (*viz.*, consciousness) and of the sensori-motor power (*viz.*, the lack of response to the apnea test, *i.e.*, lack of spontaneous breathing). As Robert Barry points out in his critique of BD, “the soul is the first or vivifying substantial act of the body and its operations are its second act. It is the first act of the body and is not an operative potency.”¹⁴⁶ Hence, when the soul *per se* is confused or conflated with its powers or operations, the inevitable result is the plurality of souls or substantial forms. As demonstrated in this essay, both Lee’s and Moschella’s rationales would make sense only if we accept some version of the plurality of souls. This would mean rejecting the classical Aristotelian-Thomistic teaching on the unicity of soul, however. If historically this occurred with Duns Scotus, today it has insidiously reappeared in the pro-BD arguments within Catholic circles.

A common problem in the BD controversy is the advancement of philosophical arguments leading to “conclusions that are counterintuitive from a biological perspective.”¹⁴⁷ A better approach would be one that closely follows the realism of an Aristotelian-Thomistic approach,¹⁴⁸

¹⁴⁵ See *Q. D. De Anima*, a. 1. Here we read in the *sed contra*: “a thing receives its species through its proper form [*i.e.*, its substantial form].”

¹⁴⁶ Robert Barry, “Ethics and Brain Death,” *The New Scholasticism* 61, no. 1 (1987): 88.

¹⁴⁷ Eberl, “Ontological Status of Whole-Brain-Dead Individuals,” 45. Eberl writes: “I argue that the philosophical concept of ‘living human animal’ may require accepting conclusions that are counterintuitive from a biological perspective—for example, that a decapitated head which is artificially sustained such that consciousness persists composes a living human animal—if being a living animal is essential to the existence of a human person, as . . . I contend.”

¹⁴⁸ In particular, Aristotle’s study of human nature in *De Anima* shows a close connection between biology and the philosophy of nature. Indeed, it was through

in which philosophical arguments are confirmed by biological reality.

deep reflections on the observable objective biological reality (and despite the limited scientific advances of his time) that Aristotle came “to postulate final causes in addition to the material, formal and efficient causes.” See Ernst Mayr, “Cause and Effect in Biology: Kinds of Causes, Predictability, and Teleology Are Viewed by a Practicing Biologist,” *Science* 134, no. 3489 (1961): 1503. Although the close connection between the philosophical and biological aspects of human nature has fallen by the wayside in modern studies, the philosophical community at large has slowly come to recognize “the persisting conceptual importance . . . of Aristotle’s biology and philosophy of life” (David Wiggins, *Sameness and Substance Renewed* [Cambridge: Cambridge University Press, 2001], xi).