The Reality of the Soul in an Age of Neuroscience

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Introduction

> Does it never give thee pause, . . . that men then had a *soul*—not by hearsay alone, and as a figure of speech; but as a truth that they *knew*, and practically went upon! Verily it was another world then. . . . But yet it is pity we had lost tidings of our souls—actually we shall have to go in quest of them again, or worse in all ways will befall![1]

Such were the thoughts of Thomas Carlyle in 1843 as he pondered the ruins of the ancient monastery of St. Edmundsbury. He marvels that the monks had not just known about the soul, but acted on that knowledge. Theirs was indeed "another world," he muses, one that, unlike his own, could still hear the "tidings of the soul." What of our world? Is it still possible to affirm the reality of the soul in this age of neuroscience? To explore that question, we will first have to discover something about the soul. We can then consider the problems and questions that neuroscience poses for the soul and look at some possible approaches and answers, especially in the thought of Aristotle and Thomas Aquinas.

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1 Thomas Carlyle, *Thomas Carlyle's Collected Works*, vol. 13, *Past and Present* (London: Chapman and Hall, 1870), 61–62.

Ancient Greek philosophers understood the soul as the source of movement in living things. Democritus believed it was composed of spherical fire atoms, while Anaximenes said it was air.[2] Plato emphasized the difference between soul and body, while Aristotle and his disciples, including Aquinas, began with the unity of the human person and saw the soul as the source of that unity. When Descartes rebooted philosophy in the seventeenth century, he tended to speak of "mind" rather than "soul." The mind was a thinking thing (*res cogitans*), while the body was an extended thing (*res extensa*). English-speaking philosophy has largely followed his example, using the word "mind" rather than "soul."[3] So current neuroscience ponders the mind–brain relation.

The methodology of neuroscience leaves no place for the soul, as cognitive scientist William Uttal notes: "Two fundamental assumptions are likely to remain constant as the enterprise [of neuroscience] goes forward. The first is the basic idea of materialism. . . . The second is that all mental processes . . . are functions of that material reality. . . . Without at least an implicit acceptance of these assumptions, it would be meaningless to pursue work in the field of cognitive neuroscience; we would have to accept the existence of a set of supernatural and uncontrolled variables that would make any experimental results meaningless."[4]

Established firmly on such methodological assumptions, neuroscience has flourished. Beyond its home base in biology, where it studies the brain and nervous system, it now partners with fields such as physics, chemistry, mathematics, medicine, computer science, and psychology. Its discoveries are described in mind-boggling numbers: "The brain consists of some 1010 neurons with their many branching dendrites and axons all interconnected by networks of unfathomable complexity, in which one neuron may be connected with tens or hundreds of thousands . . . of other

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2 "This is what led Democritus to say that the soul is a sort of fire or hot substance; his 'forms' or atoms are infinite in number; those which are spherical he calls fire and soul" (Aristotle, *De anima* 1.2.404a1–5, in *The Basic Works of Aristotle*, ed. Richard McKeon [New York: Random House, 1941]). "As our soul which is air . . . holds us together, so wind and air encompass the whole world" (Anaximenes, in *Selections from Early Greek Philosophy*, ed. Milton Nahm [New York: Appleton-Century-Crofts, 1964], 43).

3 On this vocabulary, see Nancey Murphy, "Human Nature: Historical, Scientific, and Religious Issues," in *Whatever Happened to the Soul? Scientific and Theological Portraits of Human Nature*, ed. Warren S. Brown, Nancey Murphy, and H. Newton Malony (Minneapolis, MN: Fortress, 1998), 7.

4 William R. Uttal, *Mind and Brain: A Critical Appraisal of Cognitive Neuroscience* (Cambridge, MA: MIT Press, 2011), 364.

neurons. In each cubic mm of cortex there are one billion synapses!"[5] The brain is both complex and plastic, developing new structures and connections in response to personal experience.[6] Conscious activities have been mapped to specific brain areas, allowing for the discovery of previously unknown brain regions.[7] The discoveries of neuroscience have been used to treat numerous neural pathologies, from the effects of stroke to obsessive compulsive disorder.[8]

The Dilemmas of Neuroscience

Despite these achievements, some basic questions still baffle neuroscientists. One is to explain how the observable activities of the brain result in consciousness. As Michael O'Shea observes: "We have no idea how consciousness arises from a physical machine and in trying to understand how the brain does that, we may well be up against the most awkward of scientific challenges."[9] Uttal sees this as "an intractable problem that neither new measuring devices nor computational engines can ever begin to unravel."[10] One source of the dilemma may be neuroscience's own materialistic, methodological assumptions. As David Chalmers explains: "Any account given in purely physical terms will suffer from the same problem. It will ultimately be given in terms of the structural and dynamical properties of physical processes, and no matter how sophisticated such an account is, it will yield only more structure and dynamics. . . . The existence of consciousness will always be a further fact, relative to structural and dynamic facts, and so will always be unexplained by a physical account."[11]

A second basic question is to explain how consciousness can affect the physical brain and, in turn, the material world. As Walter Freeman says:

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5 John R. Smythies, *The Walls of Plato's Cave: The Science and Philosophy of Brain, Consciousness and Perception* (Aldershot, UK: Avebury, 1994), 28.

6 Jeffrey M. Schwartz and Sharon Begley, *The Mind and the Brain: Neuroplasticity and the Power of Mental Force* (New York: Harper, 2003), 15, 111–23, 339; Holmes Rolston III, "Genes, Brains, Minds: the Human Complex," in *Soul, Psyche, Brain: New Directions in the Study of Religion and Brain–Mind Science*, ed. Kelly Bulkeley (New York: Palgrave Macmillan, 2005), 26–27.

7 Matthew F. Glasser et al., "A Multi-modal Parcellation of Human Cerebral Cortex," *Nature*, no. 536 (August 11, 2016): 171–78. On possible limits and flaws in such brain mapping, see Uttal, *Mind and Brain*, 10–11, 378–79.

8 Schwartz, *Mind*, 15–16, 54–65, 70–95.

9 Michael O'Shea, *The Brain: A Very Short Introduction* (Oxford: Oxford University Press, 2005), 2.

10 Uttal, *Mind and Brain*, 12.

11 David J. Chalmers, *The Conscious Mind*: *In Search of a Fundamental Theory* (New York: Oxford University Press, 1996), 121–22.

"The problem boils down to the questions of how and in what sense brains, with their cells, the neurons, can create actions and thoughts, which we experience as our minds and ourselves, and whether or how our experiences can change or influence our brains and their neurons. What does it mean to say that one causes the other?"[12]

Our account of human freedom is closely connected with this question, as Anthony Dardis explains: "That thinking should make things happen—cause things—seems both necessary and impossible. If thinking didn't make things happen, the foundations of how we think about ourselves would collapse. . . . But, on the other hand, it seems impossible for me—my consciousness, my feelings, my experience—to make anything happen. . . . The physical world operates according to the laws of nature. The laws of nature govern each change in us, as they govern each change at every point in space and time. . . . If the mind is something distinct from the body, then it is impossible to explain how you (your decisions) make anything happen. If the mind is the same thing as the body, then it's not you that is making things happen, it's your body."[13] Such questions also affect our fundamental understanding of ourselves, as John Searle shows: "We have a conception of ourselves as conscious, intentionalistic, rational, social, institutional, political, speech-act performing, ethical and free-will-possessing agents. Now, the question is, How can we square this self-conception of ourselves as mindful, meaning-creating, free, rational, etc., agents with a universe that consists entirely of mindless, meaningless, unfree, nonrational, brute physical particles?"[14]

It seems that, amid the wealth of discoveries of neuroscience, one important item has vanished: the human person (you and I). We, you and I, are no longer real—unless we are willing to redefine ourselves as just an assemblage of neurons or a mere collection of "brute physical particles." To some scientists that seems a happy prospect. So, the neuroscientist Joseph LeDoux says: "You are your synapses. They are who you are."[15] And the psychologist Michael Gazzaniga explains: "The modern perspective is that brains enable minds, and that you is your vastly parallel and distributed

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12 Walter J. Freeman, *How Brains Make Up their Minds* (New York: Columbia University Press, 2001), 3.

13 Anthony Dardis, *Mental Causation: The Mind–Body Problem* (New York: Columbia University Press, 2008), ix–x, 5.

14 John R. Searle, *Freedom and Neurobiology: Reflections on Free Will, Language, and Political Power* (New York: Columbia University Press, 2007), 5.

15 Joseph LeDoux, *Synaptic Self: How our Brains become Who We Are* (New York: Viking, 2002), 324.

brain without a central command center."[16] If we find this an *unhappy* prospect, we need to take a critical look at these issues.

Finding a Starting Point

Where should we begin? The Polish poet and essayist Czesław Miłosz offers some sound advice for addressing any fundamental question:

> I am here. Those three words contain all that can be said. . . . And so I must offer resistance, check every moment to be sure I am not departing from what I have actually experienced on my own, what I myself have touched. . . . I can distinguish, I hope, between what is mine and what is merely fashionable. I cannot expel from memory the books I have read, their contending theories and philosophies, but I am free to be suspicious and to ask naïve questions.[17]

We can also begin with our own experience and distinguish it from the currently fashionable *Zeitgeist* known as materialism. We are free to be suspicious and even to ask naïve questions. Fundamentally, we are free to affirm the experience of our own consciousness and actions as non-negotiables, even as we appreciate the discoveries of neuroscience.

If we start with, and hold onto, our own experience, we will find ourselves in good company. Many scientists do the same. Stanley Jaki, for instance, tells this story of the physicist and Nobel laureate Arthur Holly Compton: "As he discussed in a lecture at Yale the claim that the laws of physics left no room for the freedom of will he raised his little finger, bent it and said: if the laws of physics ever should come to contradict my conviction that I can move my little finger at will then all the laws of physics should be revised and reformulated."[18] And the cognitive scientist Jerry Fodor avers: "If it isn't literally true that my wanting is causally responsible for my reaching, and my itching is causally responsible for my scratching, and my believing is causally responsible for my saying, . . . if none of that is

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16 Michael S. Gazzaniga, *Who's in Charge? Free Will and the Science of the Brain* (New York: HarperCollins, 2011), 108.

17 Czesław Miłosz, *To Begin Where I Am* (New York: Farrar, Straus, and Giroux, 2001), 1–2.

18 Stanley Jaki, "Brain, Mind and Computers," *Journal of the American Scientific Affiliation* 24 (1972): 12–17, asa3.org/ASA/PSCF/1972/JASA3-72Jaki.html.

literally true, then practically everything I believe about anything is false and it's the end of the world."[19]

Well, happily we are not at the end of the world (yet). Still, we should ask how it is that mind, which seems so self-evident, could be reduced so readily to the function of something else—to the physical firings of neurons in the brain. There must be some strong presuppositions at work here that lead to this reduction. Perhaps if we can sort them out, we will be a step closer to finding not just a *place* but also a *need* for the soul in this age of neuroscience.

The Method and Assumptions of Neuroscience

The achievements of neuroscience, like all empirical science, stem from strict adherence to a method that limits itself to quantified, empirically verifiable data. Since a spiritual soul is not empirically verifiable, there is simply no place for it in the discipline of neuroscience. That need not mean, however, that there is no place for it in an *age* of neuroscience.

To exclude the soul from the *age* of neuroscience, we would have to extend the *method* of neuroscience beyond the boundaries of that discipline to include all that is—all that exists. But the method of neuroscience would then be no longer just a method, a way of proceeding within a certain discipline. It would become a metaphysics, an assertion about everything that is. This is what is happening in neuroscience today, and it is exactly what happened in the physical sciences at the time of the Scientific Revolution. Reality was limited to what is quantifiable, and causality was reduced to the force that moves the atoms. The result was not science, but scientism.[20] Jeffery Schwartz explains how scientism is evident in the assumptions of neuroscience: "Classical physics held that the reality of the physical world is constituted of infinitesimal particles in a sea of space.

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19 Jerry Fodor, "Making Mind Matter More," in *A Theory of Content and Other Essays* (Cambridge, MA: MIT Press, 1990), 156.

20 "Scientism is fundamentally the transformation of the methodology of empirical science into a metaphysics, a move from the quantitative investigation of nature to the assumption that being is always quantitative. While the former is a legitimate methodology, the latter is mere ideology" (Michael J. Dodds, *Unlocking Divine Action: Contemporary Science and Thomas Aquinas* [Washington, DC: Catholic University of America Press, 2012], 51n27; see also 48–53). "The absence of a true philosophy of nature transformed . . . this methodological reductionism into a metaphysical one, with the consequence that modern science was built on 'faith' in a certain (mechanical) conception of matter and the universe" (Gennaro Auletta, "Science, Philosophy and Religion Today: Some Reflections," *Theology and Science* 5 [2007]: 273).

Causation, in this scheme, reflects, at bottom, one particle's acting on its immediate neighbor, which in turn acts on its neighbor, until—well, until something happens. Wholly deterministic natural laws govern the behavior of matter. . . . This mechanistic view—stimulus in, behavior out—evolved into today's neurobiological model of how the mind works: neurotransmitter in, behavior, thought, or emotion out. . . . The cascade of discoveries in neuroscience and genetics has created an image of individuals as automata, slaves to their genes or their neurotransmitters, with no more free will than a child's windup toy."[21]

Approaches to the Dilemmas

Various ways have been proposed to address these issues. We will look at four of them: materialism, emergence, dualism, and hylomorphism.[22] The fourth will open us to the thought of Aristotle and Aquinas.

Materialism

In some ways, materialism offers the easiest solution. Since matter is the only reality, the mind, like the brain, must be simply matter.[23] Since matter can certainly act on matter, the mind can act on the brain. Paul Churchland extols "the rich resources and explanatory successes of current materialism."[24] David Papineau praises the simplicity of the materialist approach: "We don't need any fancy new concepts to understand consciousness. For there isn't anything really mysterious about it in the first place. . . . Why not

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21 Schwartz, *Mind*, 260–61, 300.

22 Some have also sought a solution by using features of quantum physics. Henry Stapp, John Eccles, Jeffrey Schwartz, Richard Swinburne, and John Searle have all entertained a role for quantum physics, with varying degrees of elaboration and thoroughness. See: Henry P. Stapp, *Mind, Matter, and Quantum Mechanics* (New York: Springer, 1993); Richard Swinburne, *The Evolution of the Soul* (Oxford: Clarendon, 1986), 231–61; Searle, *Freedom and Neurobiology*, 74–76; John C. Eccles, *How the Self Controls Its Brain* (New York: Springer, 1994), 145–66; Schwartz, *Mind*, 255–89. While significant, this approach seems tenuous, since it depends on the indeterminacy of nature as affirmed by the Copenhagen interpretation of quantum physics. Other interpretations, such as that of David Bohm, do not imply such indeterminacy; see Bohm, *Causality and Chance in Modern Physics* (Garden City, NY: Doubleday, 1954).

23 "Materialism, of course, is the belief that only the physical is ontologically valid and that, going even further, nothing that is not physical—of which mind and consciousness are the paramount examples—can even exist in the sense of being a measurable, real entity" (Schwartz, *Mind*, 28).

24 Paul M. Churchland, *Matter and Consciousness: A Contemporary Introduction to the Philosophy of Mind* (Cambridge, MA: MIT Press, 1988), 19.

just accept that having a subjective feeling is being in a material state?"[25]

Why not just accept materialism? Perhaps because it remains fundamentally unable to explain human consciousness and action. Socrates recognized this long ago.[26] Searle, while embracing materialism, admits that neuroscience has not yet solved the dilemma of consciousness.[27] Materialism also jeopardizes human integrity and freedom by reducing humans to collections of atoms. If all is matter, and matter is deterministic, then freedom is impossible.[28] Ultimately, materialism is self-defeating, as J. B. S. Haldane has pointed out: "If my mental processes are determined wholly by the motions of atoms in my brain, I have no reason to suppose that my beliefs are true. They may be sound chemically, but that does not make them sound logically. And hence I have no reason for supposing my brain to be composed of atoms. In order to escape from this necessity of sawing away the branch on which I am sitting, so to speak, I am compelled to believe that mind is not wholly conditioned by matter."[29]

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25 David Papineau, *Thinking About Consciousness* (Oxford: Clarendon, 2002), 1–2.

26 "But to call things like that causes is too absurd. If it were said that without such bones and sinews and all the rest of them I should not be able to do what I think is right, it would be true. But to say that it is because of them that I do what I am doing, and not through choice of what is best—although my actions are controlled by mind—would be a very lax and inaccurate form of expression. Fancy being unable to distinguish between the cause of a thing and the condition without which it could not be a cause! It is this latter, as it seem to me, that most people, groping in the dark, call a cause—attaching to it a name to which it has no right" (Plato, *Phaedo* 99a–b, in *The Collected Dialogues of Plato*, ed. Edith Hamilton and Huntington Cairns [Princeton, NJ: Princeton University Press, 1973]).

27 "All of our mental states are caused by neurobiological processes in the brain, and they are themselves realized in the brain as its higher-level or system features. . . . The solution to the philosophical mind-body problem seems to me not very difficult. However, the philosophical solution kicks the problem upstairs to neurobiology, where it leaves us with a very difficult neurobiological problem. How exactly does the brain do it, and how exactly are conscious states realized in the brain? What exactly are the neuronal processes that cause our conscious experiences, and how exactly are these conscious experiences realized in brain structures?" (Searle, *Freedom and Neurobiology*, 40).

28 "As long as we accept this conception of how nature works, then it doesn't seem that there is any scope for the freedom of the will because on this conception the mind can only affect nature in so far as it is a part of nature. But if so, then like the rest of nature, its features are determined at the basic micro-levels of physics" (John Searle, *Minds, Brains and Science* [Cambridge, MA: Harvard University Press, 1984], 93).

29 J. B. S. Haldane, "When I Am Dead," in *Possible Worlds and Other Essays* (New York: Harper and Brothers, 1928), 209.

Emergence

Recognizing the inadequacy of reductionistic materialism, some thinkers have invoked the notion of emergence to explain the mind–brain relation. As the property of wetness "emerges" from a collection of water molecules, so the mind "emerges" from brain activity, yet manifests properties that cannot be reduced simply to brain function. There are two basic versions of emergence, "weak" and "strong." In "weak emergence" or epiphenomenalism, the mind is considered a real product of brain activity, but one that does not exercise any causal influence on the brain. In effect, "the mind" is simply an alternative description of brain activity.[30] In "strong emergence," the mind is said to exercise a kind of "downward causality" on the brain.[31] The nature of that influence, however, and the type of causality it entails remain obscure.[32] While claiming that a whole, such as a human being, emerges from its parts, emergence provides no ontological principle to explain or ground the being of the whole, and so remains in constant danger of falling back into reductionism. The mind is said to emerge from cerebral processes, but ontologically appears to be nothing but a collection of such processes.[33]

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30 "The problem of mental causation . . . is to explain how mental events can cause physical events. . . . When you have a thought, brain activity is actually going on. Brain activity causes bodily movements by physiological processes. Now, because mental states are features of the brain, they have two levels of description, a higher level in mental terms, and a lower level in physiological terms. The very same causal powers of the system can be described at either level. . . . At the higher level of description, the intention to raise my arm causes the movement of the arm. But at the lower level of description, a series of neuron firings starts a chain of events that results in the contraction of the muscles" (John Searle, *Minds, Brains and Science*, 26).

31 Nancey Murphy argues, for instance, that "non-reductive physicalism" allows consciousness to have a "top-down causal influence on the body" (Nancey Murphy, "Non-reductive Physicalism: Philosophical Issues," in Brown, Murphy, and Malony, *Whatever Happened*? 129–31).

32 See: Mariusz Tabaczek, "Emergence and Downward Causation Reconsidered in Terms of the Aristotelian-Thomistic View of Causation and Divine Action," *Scientia et Fides* 4, no. 1 (2016): 115–49; Derek Jeffreys, "The Soul is Alive and Well: Non-reductive Physicalism and Emergent Mental Properties," *Theology and Science* 2 (2004): 205–25.

33 Jaegwon Kim points out the tendency of emergence to fall back into reductionism: "So all roads branching out of physicalism may in the end seem to converge at the same point, the irreality of the mental. This should come as no surprise: we should remember that physicalism, as an overarching metaphysical doctrine about all of reality, exacts a steep price. . . . At any rate, what is becoming increasingly clear from the continuing debate over the mind-body problem is that currently

Dualism

Dualism sees the human being as a combination of two radically different things—a material thing (the body) and a spiritual thing (the mind). Some neuroscientists have embraced dualism as the solution to the mind–brain problem. So John Eccles remarks: "This dualist conclusion is the culmination of my life-long dedication to the self-brain problem."[34] And Wilder Penfield avers: "For myself, after a professional lifetime spent in trying to discover how the brain accounts for the mind, it comes as a surprise now to discover, during this final examination of the evidence, that the dualist hypothesis seems the more reasonable of the two possible explanations."[35]

Dualism is able to affirm the reality of mind unequivocally, but has difficulty in showing how mind and body together constitute one being, one human person. The consequent temptation (to which Descartes fell victim) is to identify the human being simply with the mind: "I concluded that I was a thing or substance whose whole essence or nature was only to think, and which, to exist, has no need of space nor any material thing or body."[36] If mind and brain are distinct substances, it is difficult to explain their unity and to show how one influences the other. As Jaegwon Kim notes: "The problem of mental causation is coeval with the mind-body problem—Descartes invented them both, or at least was responsible for them. For Descartes, mental causation became a problem—ultimately an insuperable one—because of his ontology of two radically diverse sorts of substances—material bodies whose essence is having a bulk in space and minds with consciousness as their essence. . . . I believe that the problem goes deep, deep into our fundamental metaphysical views about ourselves and the world we live in, and that we need to make fairly drastic adjust-

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popular middle-of-the-road positions, like property dualism, anomalous monism, and nonreductive physicalism, are not easily tolerated by robust physicalism. To think that one can be a serious physicalist and at the same time enjoy the company of things and phenomena that are nonphysical, I believe, is an idle dream" (*Mind in a Physical World: An Essay on the Mind-Body Problem and Mental Causation* [Cambridge, MA: MIT Press, 1998], 119–20).

34 Eccles, *How the Self*, 182. See also Karl R. Popper and John C. Eccles, *The Self and Its Brain* (New York: Springer, 1977).

35 Wilder Penfield, *The Mystery of the Mind: A Critical Study of Consciousness and the Human Brain* (Princeton, NJ: Princeton University Press, 1975), 85.

36 René Descartes, *Discourse on Method*, pt. 4, in *Discourse on Method and Meditations*, trans. Laurence J. Lafleur (New York: Bobbs Merrill, 1977), 25. For a contemporary defense of Descartes, see John Foster, *The Immaterial Self: A Defense of the Cartesian Dualist Conception of the Mind* (New York: Routledge, 1991), and W. D. Hart, *The Engines of the Soul* (New York: Cambridge University Press, 1988).

ments if we are serious about coming to terms with the problem."[37] Perhaps the best place to look in making such metaphysical adjustments is the hylomorphic theory of Aristotle and Aquinas.

Hylomorphism

Hylomorphism allows us to maintain both the reality of the mind and the integrity of the human person as a single being. It sees the human being as composed of two principles, but not two substances. Following Aristotle, the principles are called matter (*hylē*) and form (*morphē*). "Matter" as used here is not a kind of "stuff"—an actual *something*. It is rather the mere possibility of being *something-or-other*. And form is not just a shape or structure. It is the principle by which a thing is what it is. In living things, this principle is called "soul." Together, these two principles comprise not two beings (as in dualism), and not just a quasi-whole, which is really a collection of other stuff (as in reductionism and emergence), but one being. Put the terms together (*hylē* + *morphē*) and you have the word "hylomorphism." Put the actual ontological principles together and you have a single substance, such as a single human being.

To get a quick fix on hylomorphism, I invite you to picture Bobby, a ten-year-old boy, who gets a puppy for his birthday and happily names it "Rover." Three days later, however, his puppy runs out into the street and gets smashed by a cement roller. So, it is over for Rover, who is now just a blob on the pavement. (Metaphysics isn't always pretty.) Poor Bobby is desolate, but his Dad tries to help. Unfortunately, Dad is a reductionist, so he tells little Bobby: "Don't worry, son. Rover's still here—right here on the pavement. There's nothing missing. He's just— had his parts rearranged." Well, little Bobby knows better: Rover is over. This is not just a reshaping of parts. Something more radical has happened, something substantial—what Aristotle would call "substantial change."

In any change, there is always something that stays the same and something new. If I crumple a piece of paper, for instance, the paper (a substance) stays the same, and gets a new shape. Aristotle would call this accidental change. The substance stays the same, while the accidents (the shape) change. But what happens when the substance itself changes? If substance itself is changing, it cannot be substance that stays the same. It has got to be something more basic, more fundamental. Rover was a substance—a dog, a being. So when that being, that substance, changed

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[37] Kim, *Mind in a Physical World*, 57, 59. See also Thomas Nagel, *Mind and Cosmos: Why the Materialist Neo-Darwinian Conception of Nature is Almost Certainly False* (New York: Oxford University Press, 2012), 35–36.

(when Rover died), substance could not have been what stayed the same—unless, of course, Rover never really was a substance, a single being, but only a collection of other substances, of other stuff. But in that case, Rover was never really Rover, and Dad is right: even after the accident, Rover is still right there on the pavement. He has just had his parts rearranged.

But if a substance is really a substance—if Rover is really Rover—and if the substance changes, it cannot be substance that remains the same. But, if it is not substance (or a collection of substances, a bunch of stuff) that stays the same, what is it? Aristotle's answer is that what stays the same is not substance, but the mere possibility of being a substance—what he calls "primary matter" (*prōtē hylē*).[38]

According to hylomorphism, every material substance is composed of two principles. One is the mere possibility of being (primary matter). It explains why the substance can cease to be what it is and become something else. Every material substance always has the "possibility of being" something else, as wood has the possibility of being ashes. The other principle is substantial form, the principle by which the substance is the kind of thing that it is—the principle by which Rover is a dog. Neither primary matter nor substantial form is itself a "thing"—a substance. Each is rather a principle of substance. Only together do they constitute a complete substance. In living things, substantial form is called "soul." So, in living things (whether dogs or cats or humans), soul and primary matter (or "bare matter," as Aquinas calls it) are not two things, but are together a single living thing, a substance.[39] Even in this age of neuroscience, if dogs

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38 Aristotle, *Physics* 2.1.193a29, in *Basic Works of Aristotle* (ed. McKeon). See William Wallace, *The Modeling of Nature: Philosophy of Science and Philosophy of Nature in Synthesis* (Washington, DC: Catholic University of America Press, 1996), 8.

39 "By 'soul' we understand that by which a living thing is alive; it is understood, therefore, as existing in a subject, taking 'subject' in a broad sense to include not only those actual beings which are subjects of their accidental modifications, but also bare matter or potential being" (Thomas Aquinas, *In* II *de anima*, lec. 1, no. 220, in *Aristotle's De Anima in the Version of William of Moerbeke and the Commentary of St. Thomas Aquinas*, trans. Kenelm Foster and Silvester Humphries [London: Routledge and Kegan Paul, 1951]). "Body and soul are not two actually existing substances; rather, the two of them together constitute one actually existing substance. For man's body is not actually the same while the soul is present and when it is absent; but the soul makes it to be actually" (Thomas Aquinas, *Summa contra gentiles* [*SCG*] II, ch. 69, no. 2, trans. James F. Anderson [New York: Doubleday, 1955]). Note that this distinction between "form and possibility-of-being" is not to be equated with the distinction between "mind and body" or "soul and body." The living human body is not mere possibility-of-being. It is possibility-of-being already actualized by the human substantial form.

are still dogs, cats are still cats, and humans are still humans (and not just collections of other stuff), then each must have a substantial form or soul.

Some things we come across in the world—like log cabins or skyscrapers—are just collections of other stuff (such as building materials that have been structured in a new way). Before, during, and after the skyscraper is built, its steel girders are still steel. But other things, like Rover—like dogs and cats and people—exhibit a kind of unity in their being and action that allows us to recognize each of them as a whole and not just a collection of parts, a bunch of other stuff. If that is our intuition, then we need an ontological principle to explain that unity, that oneness. We need a principle to explain why all of the parts of Rover are really Rover and why all the parts of me and you (carbon, nitrogen, and so forth) do not exist as other stuff, but as me and you. This principle is what Aristotle calls substantial form or, in living things, soul.[40]

The soul is not an add-on, a little homunculus that we can do without. It is not a ghost. It is an ontological principle, present in every living thing, that makes it to be the kind of thing it is—that actualizes or determines possibility-of-being to be a particular kind of thing. So, in hylomorphic philosophy, the whole does not "emerge" from a collection of parts. Rather the substantial form or soul, as the principle of the whole, itself accounts for the existence and structure of the whole with all its parts. In effect, the whole does not depend on the parts (as in emergence), but the parts depend on the whole. As Aquinas explains: "Now the substantial form perfects not only the whole, but each part of the whole. For since a whole consists of parts, a form of the whole which does not give existence to each of the parts of the body, is a form consisting in composition and order, such as the form of a house; and such a form is accidental. But the soul is a substantial form; and therefore it must be the form and the act, not only of the whole, but also of each part."[41] The soul accounts for the existence of the whole with all its parts. So Rover has bones and heart and nose and tail because of his soul. By causing a thing to be what it is, the soul also accounts for

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40 Aristotle, *De anima* 2.1.412b5.

41 Thomas Aquinas, *Summa theologiae* [*ST*] I, q. 76, a. 8, resp., trans. Dominican Fathers of the English Province (New York: Benziger Brothers, 1946). Aquinas is telescoping his metaphysics here, in saying that substantial form "gives existence." Elsewhere, he shows that, while substantial form (that by which a thing is what it is) explains *what* the thing is, the "act of existing" (*esse*, that by which a thing exists) gives existence and so explains *that* the thing is. See *SCG* II, ch. 54, and Thomas Aquinas, *De potentia*, q. 7, a. 2, ad 9 (Westminster, MD: Newman Press, 1952).

the characteristic activities of the thing.[42] So dogs bark, ducks quack, and humans think—all in virtue of their particular soul.

Once things exist and have characteristic ways of acting, then empirical science can study those activities, quantify them, and see their interrelationships. It can also codify its findings as scientific laws. But such laws are always descriptive, not prescriptive. They describe the behavior of things quantitatively. They never prescribe or cause such behavior. As an empirical science, neuroscience studies the activity of the human brain. But it can do so only because, at a more fundamental level, a human being is a human being, existing as one being that has certain characteristic activities, including brain activities, in virtue of the substantial form or soul, by which it is a human being.

Neuroscience does not study the soul, since the soul lies beyond its methodological limits. Like all empirical sciences, neuroscience limits itself to what is quantifiable. The soul, however, as a substantial form, is not quantifiable. A substantial form is not a "what" that can be weighed and measured. It is rather the ontological principle "by which" a thing is what it is. The soul cannot therefore be studied within the limits of neuroscience. Beyond those limits, however, the soul can be investigated in the philosophy of nature and philosophical anthropology. These disciplines do not contradict the work of neuroscience and the other empirical sciences, but rather complement it.[43]

Hylomorphism and Mind–Brain Interaction

Hylomorphism offers a coherent framework for understanding the mind–brain relation.[44] It begins with the whole human being, since it is the whole

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42 "For since everything acts insofar as it is actual . . . and since every being is actual through form, it is necessary for the operation of a thing to follow its form. Therefore, if there are different forms, they must have different operations" (*SCG* III, ch. 97, no. 4; trans. Vernon J. Bourke). See also William Wallace, "Nature as Animating: The Soul in the Human Sciences," *The Thomist* 49 (1985): 612–48.

43 See: Wallace, *Modeling*; Michael J. Dodds, *The Philosophy of Nature* (Oakland, CA: Western Dominican Province/lulu.com, 2010); Dodds, *Philosophical Anthropology* (Oakland, CA: Western Dominican Province/lulu.com, 2013).

44 See: James D. Madden, *Mind, Matter, and Nature: A Thomistic Proposal for the Philosophy of Mind* (Washington, DC: Catholic University of America Press, 2013); William Jaworski, *Structure and the Metaphysics of Mind: How Hylomorphism Solves the Mind-Body Problem* (New York: Oxford University Press, 2016); Edward Feser, *Philosophy of Mind: A Short Introduction* (Oxford: Oneworld, 2005), 173–80; Michael J. Dodds, "Hylomorphism and Human Wholeness: Perspectives on the Mind-Brain Problem," *Theology and Science* 7 (2009): 141–62; and Richard Cross, "Aquinas and the Mind-Body Problem," in *Mind, Metaphysics,*

that explains the part, not the part that explains the whole.[45] Action is accordingly attributed to the whole human person, and the action of the part (such as the brain) is always understood in the context of the whole.[46] This is a healthy corrective to the tendency of neuroscience to attribute action to the part rather than the whole.[47] Once the whole is established as the subject of action, we can discuss how one part may act on another—as I might use my hand to scratch my head. Hylomorphism brings a broad understanding of causality to this discussion. Formal and final causality as well as principal and instrumental causality (as aspects of efficient causality) can be employed here to give a more complete and integral account of action.[48] Efficient causality itself is not reduced to the force that moves the atoms, and we are not reduced to pondering how the mind can exert a physical force on the brain.[49]

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and Value in the Thomistic and Analytical Traditions, ed. John Haldane (Notre Dame, IN: University of Notre Dame Press, 2002), 36–53.

45 *ST* I, q. 76, a. 8, resp. See also Michael J. Dodds, "Response to John R. Searle's 'The Future of Philosophy,'" *Nova et Vetera* (English) 14, no. 2 (2016): 559–64.

46 "Yet to say that it is the soul which is angry is as inexact as it would be to say that it is the soul that weaves webs or builds houses. It is doubtless better to avoid saying that the soul pities or learns or thinks and rather to say that it is the man who does this with his soul" (Aristotle, *De anima* 1.4.408b 12–13). See also *ST* I, q. 75, a. 2, ad 2.

47 "Neuroscientists are prone to ascribe consciousness to the brain. . . . This conception is a particular instance of what we have called 'the mereological fallacy in neuroscience,' inasmuch as it involves ascribing to the brain—that is, to a part of an animal—an attribute which it makes sense to ascribe only to the animal as a whole" (M. R. Bennett and P. M. S. Hacker, *Philosophical Foundations of Neuroscience* [Oxford: Blackwell, 2003], 15, 239–40). "Such category mistakes as, for example, attributing psychological features that belong to the whole person to parts of his brain, are rampant among our contemporaries and are even defended as philosophically insightful avenues for understanding the neural correlates of consciousness" (Daniel D. De Haan and Geoffrey A. Meadows, "Aristotle and the Philosophical Foundations of Neuroscience," *Proceedings of the American Catholic Philosophical Association* 87 [2013]: 215). "To have a mind . . . requires more than a brain. Brains don't have minds; people (and other animals) do" (Alva Noe, *Out of Our Heads: Why You Are Not Your Brain, and Other Lessons from the Biology Of Consciousness* [New York: Hill and Wong, 2009], 10).

48 "The soul is the cause or source of the living body. The terms cause and source have many senses. But the soul is the cause of its body alike in all three senses which we explicitly recognize. It is (a) the source or origin of movement, it is (b) the end, it is (c) the essence of the whole living body" (Aristotle, *De anima* 2.4.415b 9–11]). See Dodds, *Unlocking Divine Action*, 160–204.

49 "The mind-body problem, and its interactionist solution, were common possessions of the school of Aristotle. The members of this school, who accepted the doctrine that the mind was incorporeal, also accepted, tacitly but none the less

The Soul and Human Immortality

The principles of hylomorphism allow us to account for human immortality without sacrificing the unity of the human person. We start with the philosophical principle that "action follows being." What a thing *does* tells us about what it *is*.[50] (So, if it walks like a duck and quacks like a duck, it's probably a duck.)

Some characteristic human actions suggest immateriality. Our acts of self-reflection and intellectual abstraction, for instance, transcend the capacity of matter.[51] But if we transcend the limits of matter in our *actions*, we must also transcend matter in our very *being*, since action follows being.[52] Since the soul is the principle of human action, if the action transcends matter in some way, the soul must also transcend matter.[53] If so, the human substantial form is unlike that of any other material thing, both in its instantiation and in its destiny.

In its instantiation, the human soul is not simply "educed from the

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clearly, that the mind-body relation was based on an interaction which was as a matter of course non-mechanical. The mind-body problem was solved in this way, as I have already suggested, by all thinkers of the time, except by the atomists who believed in a mechanical interaction" (Popper and Eccles, *The Self*, 176).

50 "The operation of anything follows the mode of its being" (*ST* I, q. 75, a. 3, resp.).

51 Aristotle, *De anima* 3.4–8; *SCG* II, ch. 49; *ST* I, q. 75, a. 2.

52 "Wherever there is individuation within kinds there is matter, wherever there is universality matter is absent. . . . Abstract thought is structured by universals and universals only exist as such apart from (empirical) matter. Now recall the principle that acting follows upon being (*agere sequitur esse*). This captures the fact that activities are exercises of powers and that powers belong to substances as parts of their natures. If thought is a non-physical activity, as I have argued (admittedly schematically) that it is, then the intellectual powers are not physical; nor, therefore can be the substance to whose nature those powers belong" (John Haldane, "A Return to Form in the Philosophy of Mind," in *Form and Matter: Themes in Contemporary Metaphysics*, ed. David S. Oderberg [Oxford: Blackwell, 1999], 58).

53 "The intellectual principle which we call the mind or the intellect has an operation *per se* apart from the body. Now only that which subsists can have an operation *per se*. For nothing can operate but what is actual; wherefore a thing operates according as it is; for which reason we do not say that heat imparts heat, but that what is hot gives heat. We must conclude therefore that the human soul which is called the intellect or the mind is something incorporeal and subsistent" (*ST* I, q. 75, a. 2, resp.). "The intellective soul acts through itself, inasmuch as its proper activity occurs without the body sharing in it. And since a thing acts insofar as it is in act, it follows that the intellective soul has existence through itself, independently. Its existence does not depend on the body" (Thomas Aquinas, *Quaestio disputata de anima* [*Q. disp. de anima*], q. 1, resp., in *Questions on the Soul*, trans. James H. Robb [Milwaukee, WI: Marquette University Press, 1984]). See also *SCG* II, ch. 68, nos. 4–5.

potency of matter," as are the forms of all other material substances, but is rather created.[54] As to its destiny, the human soul does not cease to be when the human being dies. Since the human soul transcends matter, it may continue to exist even without its material co-principle of primary matter. In this continued existence, however, the soul is not a complete human being. Since humans are rational *animals*, they essentially require matter as well as form for their completeness. Aquinas therefore teaches that, after death, the separated soul is not itself a human person, but only part of a person: "Not every particular substance is a hypostasis or a person, but that which has the complete nature of its species. Hence a hand, or a foot, is not called a hypostasis, or a person; nor, likewise, is the soul alone so called, since it is a part of the human species."[55]

Since action follows being, the action of the separated soul, as part of the human being, will be different from the action of the whole human being, composed of both soul and matter. In this life, any human act is radicated in the soul as "the source of motion and rest,"[56] but belongs to the whole human person. Even the immaterial act of the intellect, however much it is in itself independent of matter, does not occur without a particular phantasm of the imagination: "In the present state of life in which the soul is united to a passible body, it is impossible for our intellect to understand anything actually, except by turning to the phantasms."[57] (To illustrate this, I invite you to think of the word "butterfly." As you think of it, you will immediately have the idea of butterfly [that applies to all butterflies] in your intellect, but not without the image of some particular butterfly in your imagination.) The intellect is an entirely immaterial power, while the imagination, one of the "internal senses," is a physically based power that Aquinas understood to be located in the brain.[58] So, for Aquinas, the

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54 "The rational soul can be made only be creation" (*ST* I, q. 90, a. 2, resp.). "Since the rational soul does not depend in its existence on corporeal matter, and is subsistent, and exceeds the capacity of corporeal matter, as we have seen, it is not educed from the potentiality of matter" (*ST* I, q. 90, a. 2, ad 2). See also *De potentia*, q. 3, a. 8, ad 7.

55 *ST* I, q. 75, a. 4, ad 2. "A human being naturally desires his own salvation; but the soul, since it is part of the body of a human being, is not a whole human being, and my soul is not I; so even if a soul gains salvation in another life, that is not I or any human being" (Thomas Aquinas, *Super 1 Cor* 15, lec. 2, as quoted in Anthony Kenny, *The Self* [Milwaukee, WI: Marquette University Press, 1988], 27).

56 Aristotle, *Physics* 2.1.192b 21–23.

57 *ST* I, q. 84, a. 7, resp.

58 "Often Aquinas, with usual reference to the Arabian philosophers, indicates that the internal sense organs are in the brain, rendering the brain itself the physiological basis for the organs of the internal senses. Yet the brain itself, as a material

intellect in this present life does not act apart from the brain. This philosophical conclusion accords well with current brain research showing that every act of knowing or willing is accompanied by some brain activity.[59]

After death, the soul will exist without its material co-principle, and will be able to act without it, since a thing's mode of action follows its mode of being. It will not require the imagination or the brain in its act of knowing: "It must be borne in mind that the soul understands in a different manner when separated from the body and when united to it, even as it exists diversely in those cases; for a thing acts according as it is. . . . It follows that, so long as the soul is in the body, it cannot perform that act without a phantasm. . . . The separated soul, however, exists by itself, apart from the body. Consequently its operation, which is understanding, will not be fulfilled in relation to those objects existing in bodily organs which the phantasms are; on the contrary, it will understand through itself, in the manner of substances which in their being are totally separate from bodies."[60]

This has theological implications for the Christian notions of immortality and resurrection. If the separated human soul, by itself, before the resurrection of the body, were unable to know or to love, it could not enjoy the beatific vision of God. On the other hand, if the human soul itself were equated with the human person, there would be little philosophical reason for a resurrection involving (in some way) a reuniting of the soul and matter.[61]

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organ, is an instance of *esse naturale*. All knowing is in the psychological status of *esse intentionale*. It is the root of intentionality in Aquinas to have an 'immaterial' reception of forms serve as the groundwork for all cognitive states. The faculties, however, must be found in a physiological 'home,' as it were, which is the organ itself" (Anthony J. Lisska, *Aquinas's Theory of Perception: An Analytic Reconstruction* [Oxford: University of Oxford Press, 2016], 228).

59 "All the psychological categories and concepts we shall examine signify attributes of human beings (and, in many cases, of other animals too). The logical grounds for their ascription to a subject, as we have seen, are the behavior of the subject, of the human being, not of his brain. For nothing a brain can do could possibly constitute a ground for ascribing thought, perception, imagination or volition to the brain. Rather, we can correlate neural events and processes with the human being's thinking or perceiving, imagining or intending, and discover (if we can) what neural states, events and processes are causally necessary conditions for the human being to think or perceive, imagine or intend" (Bennett and Hacker, *Philosophical Foundations*, 117).

60 *SCG* II, chs. 80–81, no.12. See also *ST* I, q. 89, a. 1, resp.

61 Lest we think that the soul is better off without the body, Aquinas points out that the soul, as united to the body, is more God-like than the separated soul: "The

Conclusion

"To begin where I am." As humans, we begin with sensation and intellectual knowledge, along with the passions and affections that attend them, and through these faculties each of us experiences herself or himself as an integral human being.[62] We experience ourselves as whole persons, and we marvel at our wholeness—that our whole being acts for the good of each part and each part acts for the good of the whole. We are indeed "fearfully and wonderfully made" (Ps 138:14). Hylomorphism recognizes the substantial form or soul as the ontological ground of our wholeness.[63] If our experience in the world, our interaction with other people, our introspection, and our faith lead us to the conviction that we are spiritual as well as physical, then hylomorphism also allows us to account for these dimensions of ourselves without sacrificing our wholeness. Finally, if human wholeness is our starting point, if the soul is the ground of our wholeness, and if the full achievement of wholeness, both bodily and spiritually, is our ultimate end in God, then we can be sure that there is not just a place for the soul in this age of neuroscience, but a need:

> Does it never give thee pause, . . . that men then had a *soul*—not by hearsay alone, and as a figure of speech; but as a truth that they *knew*, and practically went upon! Verily it was another world then. . . . But yet it is pity we had lost tidings of our souls—actually we shall have to go in quest of them again, or worse in all ways will befall!
>
> Another world, truly: and this present poor distressed world might get some profit by looking wisely into it, instead of foolishly. . . . These old St. Edmundsbury walls, I say, were not peopled with phantasms; but with men of flesh and blood, made altogether as we

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soul united with the body is more like God than the soul separated from the body, because it possesses its nature more perfectly" (*De potentia* q. 5, a. 10, ad 5).

62 "Now this science of the soul . . . has certainty; for everyone knows by experience that he has a soul which is his life-principle" (Aquinas, *In* II *de anima*, lec. 1, no. 6). "Since the soul is the living thing's life principle, Aquinas says that we know 'by experience' that we have a soul, simply because we know that we are alive" (Adrian J. Reimers, *The Soul of the Person: A Contemporary Philosophical Psychology* [Washington, DC: Catholic University of America Press, 2006], 23). On the importance of the passions, see Nicholas E. Lombardo, *The Logic of Desire: Aquinas on Emotion* (Washington, DC: Catholic University of America Press, 2011).

63 It should be noted that, for Aquinas, wholeness is due not only to unity of form, but also to unity of act of existence (*esse*): "That same existence that belongs to the soul is communicated to the body, so that there might be one existence of the whole composite" (*Q. disp. de anima*, q. 1, a. 1, ad 1).

> are. Had thou and I then been, who knows but we ourselves had taken refuge from an evil Time, and fled to dwell here, and meditate on an Eternity, in such fashion as we could? . . . For twenty generations, here was the earthly arena where painful living men worked out their life-wrestle—looked at by Earth, by Heaven and Hell. Bells tolled to prayers; and men, of many humors, various thoughts, chanted vespers, matins—and round the little islet of their life rolled forever (as round ours still rolls, though we are blind and deaf) the illimitable Ocean, tinting all things with *its* eternal hues and reflexes; making strange prophetic music! . . . He that speaks what *is* really in him, will find men to listen, though under never such impediments.[64]

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64 Carlyle, *Past and Present*, 61–63.