Southern Evangelical Seminary

Does Artificial Intelligence Lead to Atheism?

Exploring Artificial Intelligence through a Thomistic Philosophy of Mind

A Dissertation Submitted to

the Faculty of Southern Evangelical Seminary

in Candidacy for the Degree of

Doctor of Philosophy

by

Kristen Nicole Davis

Charlotte, North Carolina

April 2023

Does Artificial Intelligence Lead to Atheism?
Exploring Artificial Intelligence through a Thomistic Philosophy of Mind

By Kristen N. Davis

Recommended Citation:

Davis, Kristen N. “Does Artificial Intelligence Lead to Atheism?: Exploring Artificial Intelligence through a Thomistic Philosophy of Mind.” PhD diss., Southern Evangelical Seminary, 2023.

This Doctoral Dissertation has been accepted by the faculty of Southern Evangelical Seminary, in partial fulfillment of the requirements for the degree
Doctor of Philosophy

Examining Committee

Thomas Baker

Dr. Thomas Baker
Primary Reader
Assistant Professor of Philosophy and Theology
Sr. Principal Software Architect at OpenText Corporation

J.Thomas Bridges

Dr. J.T. Bridges
Phillip E. Johnson Chair of Science and Culture
Academic Dean
Professor of Philosophy

Mark Tabladillo

Dr. Mark Tabladillo
Ph.D. in Industrial Engineering from Georgia Institute of Technology
Cloud Solution Architect at Microsoft

Contents

Philosophy of mind has for centuries been whirled between a Cartesian Charybdis and a scientific Scylla: Aristotle has the look of an Odysseus.

– Jonathan Barnes in *Aristotle's Concept of Mind*

Abbreviations

AGI	Artificial General Intelligence
AI	Artificial Intelligence
AT	Aristotelean and Thomistic
DA	*De Anima*
DPN	*De Principiis Naturae*
DUI	*De Unitate Intellectus Contra Averroistas*
DV	*Quaestiones disputatae de veritate*
DM	*De Malo*
HI	Human Intelligence
InDA	*Sentencia libri De anima*
InPostAn	*Expositio libri Posteriorum Analyticorum*
PoM	Philosophy of Mind
QDDA	*Questiones Disputatae de Anima*
QDP	*Questiones Disputatea de Potentia*
QDSC	*Quaestio disputata de spiritualibus creaturis*
RI	Real Intelligence
SBDT	*Super Boetii De Trinitate*
SCG	*Summa Contra Gentiles*
Sent	*Scriptum super libros sententiarum magistri Petri Lombardi*
SLDS	*Sentencia libri De sensu et sensate*
ST	*Summa Theologiae*

Chapter 1

What is the problem?

In an article published in 2018, Kate Levchuk, a contributor to *Forbes* magazine's "Cognitive World" content, explores questions related to the implications of AI on religion. She says,

> Scientific progress, and Internet and mobile coverage proliferation in the last 8 years alone might have decreased the numbers [of religious adherents] dramatically. . . . [However,] technological progress, as it is, will take time and generations of change to convert the world's population from monotheistic religions to transhumanism.[1]

The reason that scientific progress, *et al*. have not completely eradicated religious adherence, in her mind, is because of consciousness. She claims that "Religious postulates state that while other creatures might have urges and emotions, only humans have this magic spark of 'God's breath.'"[2] She goes on to say that "the existence of consciousness is exactly what has given grounds to the ephemeral concept of the human soul."[3] In other words, she believes that the reason religion exists is because consciousness must be explained and that if the origins of consciousness are able to be explained mechanistically, then religion will cease to exist.

Interestingly enough, she thinks that artificial intelligence is the path to freedom from religion. In discussing this, she says, "Our ability to create a soul *in silico* will be a litmus test for thousands of years of religious preaching . . . It would be an ultimate and

[1] Kate Levchuk, "AI Vs. God: Who Stays And Who Leaves?" *Forbes*, August 5, 2018, https://www.forbes.com/sites/cognitiveworld/2018/08/05/ai-vs-god-who-stays-and-who-leaves/.

[2] Ibid.

[3] Ibid.

non-disputable triumph of [the] Scientific Revolution."[4] She goes on to say, "if we ourselves can create an artificial soul in silicon matter, the concept of a divine spark in our souls will give way to evolutionary Darwinism once and for all. It will be exactly the answer to the consciousness quest that will end the centuries-old debate on the existence of God."[5] Thus, according to Levchuk, the successful creation of an artificial general intelligence (AGI) would be definitive evidence of atheism.[6]

Levchuk's claim that monotheism has not yet been supplanted on these grounds is interesting because of what it exposes. First, it exposes a lack of awareness of the diversity of monotheistic religions, not to mention non-monotheistic religions, and their manifold groundings. She lumps all monotheistic religions together, providing statistics for only Christian and Muslim populations, while leaving out many other Judeo-Christian monotheistic religions such as Jehovah's Witness, as well as non-Judeo-Christian monotheistic religions such as Kikuyu.[7]

Second, it exposes a lack of awareness of the variety of philosophical demonstrations for the existence of God, many of which have been vetted for hundreds of years. The Kalam Cosmological argument, re-popularized by William Lane Craig, is an

---

[4] Levchuk, "AI Vs. God."

[5] Ibid.

[6] AGI stands for artificial general intelligence. AGI is the subset of AI research that aims to create a human level intelligence rather than merely automating processes for human utility. We will explore what is meant by AGI more fully in chapter two.

[7] "As of 2010, Christianity was by far the world's largest religion, 'with an estimated 2.2 billion adherents, nearly a third (31 percent) of all 6.9 billion people on Earth,' a Pew report says. 'Islam was second, with 1.6 billion adherents, or 23 percent of the global population.' Levchuk, "AI Vs. God." For more information on the Kikuyu of Kenya see Jomo Kenyatta, *Facing Mt. Kenya* (New York: Vintage, 1965), 222-31. For a deeper look into the origins of monotheism see: Winfried Corduan, *In the Beginning God: A Fresh Look at the Case for Original Monotheism* (Nashville: B&H Academic, 2013).

argument for the existence of God based upon the universe having a beginning.[8] Thomas Aquinas, a medieval Catholic philosopher and theologian, provides a variety of proofs for the existence of God in his Five Ways, based upon motion and necessity, amongst other things.[9] Furthermore, there are an assortment of proofs for God's existence from design, origins, cosmology, ontology, and suffering that have been heavily discussed in the philosophy of religion literature for hundreds of years, by numerous scholars from diverse backgrounds.[10] Therefore, Levchuk's claims that the answer to the existence of God question rests solely on the shoulders of consciousness and that the creation of a soul in silicon would be a resounding triumph in favor of atheism are ill-informed.

Despite her inaccuracies, Levchuk's claims are interesting and worth exploring for a number of reasons, first of which is the woeful lack of biblical literacy within the Church. George Barna, the director of the Cultural Research Center, claims that while 69% of Americans self-identify as Christians, "just 9% of those who call themselves Christian – possess a biblical worldview."[11] If 91% of self-identifying Christians are unaware of what the Bible claims about reality, then it seems reasonable to assume that they are also unaware of the philosophical arguments for the existence of God. Therefore,

---

[8] For information on its Islamic historical origins and a detailed analysis of the argument itself see: William Lane Craig, *The Kalam Cosmological Argument* (Eugene: Wipf and Stock Publishers, 1979).

[9] To explore Aquinas' Five Ways see, Thomas Aquinas, *ST* Ia.2.3 and Thomas Aquinas, *SCG* I.13.

[10] For an overview of contemporary philosophical arguments related to the existence of God see: Brian Davies, *An Introduction to the Philosophy of Religion*, 3rd ed. (Oxford: Oxford University Press, 2004); Edward Feser, *Five Proofs of the Existence of God* (San Francisco: Ignatius Press, 2017).

[11] George Barna, "American Worldview Inventory 2021: Release #6: What Does It Mean When People Say They Are 'Christian'?" *Cultural Research Center* (August 31, 2021): 3, https://www.arizonachristian.edu/wp-content/uploads/2021/08/CRC_AWVI2021_Release06_Digital_01_20210831.pdf; George Barna, "Perceptions about Biblical Worldview and Its Application: A National Survey from the Center for Biblical Worldview." *Center for Biblical Worldview (*May 2021): 6, https://downloads.frc.org/EF/EF21E41.pdf.

claims like Levchuk's, from reputable publications like *Forbes*, have the potential to be incredibly destructive to an already damaged worldview foundation for many self-identifying Christians. Thus, in the spirit of Jude 3 and Titus 1:10-11, it is worth exploring her claims so that we can contend for the truth and silence deceitful ideas. We should do this to prevent further erosion of the already unstable faith of the 91% and to stabilize their faith enough that they are then encouraged to bolster their faith through further study. In the spirit of Matthew 18:12, we should leave the 9% and go after the hearts and souls of the 91%.

Second, we should explore Levchuk's claims because artificial intelligence (AI) is a very popular subject in the world today. Since the 1960s, over 60 movies grossing over $4 billion have been made about AI, over 40 of which have been made in the last 10 years, and 18 of which have been released in the time it has taken me to write this dissertation.[12] This is not to mention all the television and streaming shows or graphic novels and books that touch on the subject as well. Americans are interested in AI. They are curious about what it could do.

Over the past two years I have discussed this project with many people. I have discussed it with friends, family members, and conference attendees, with both Christians and non-Christians. Most of the people I have spoken with are very well educated and hold prominent science or technology positions. What I have discovered is that there is a lot of fear not over whether AI could *be* human, but whether AI could become sophisticated enough to *behave* like a human. The reoccurring refrain I have heard is "so

[12] In order to generate this statistic, I googled all movies related to AI to determine the number that have been created. From there I looked up all of them individually to determine their gross net revenue and box office sales. This gross net revenue was calculated in November of 2020.

much of what has been explored in sci-fi (science fiction) has come to fruition. We would be fools to doubt that the sci-fi view of AI is not a real possibility."[13]

The fear that I have encountered is not over what AI could *be* but what it could *do*. They are not concerned about whether AI could become human in a different kind of physical body. The people with whom I have spoken are concerned that, because AI is not truly human, for it does not have things like empathy, that it has the potential to be more dangerous than some of the worst mass-murder events of the 20th century (i.e., Hitler, Stalin, etc.). One person expressed the fear that in a world like the one explored in the movie *I, Robot*, people could be enslaved for their own good.[14] Therefore, with so much fear and lack of clarity, it is important to explore popular claims like Levchuk's in order to provide a counterbalance to the voice of culture in relation to AI and religion.

Lastly, it is important that we explore Levchuk's claims because rumblings from Silicon Valley, the collection of leading experts in technology today, give the impression that we are on the brink of a full-fledged sentient AI today. On June 22, 2022, Blake Lemoine, a Google software engineer, who was working on a new chatbot AI, released a statement claiming that the chatbot is sentient. Alongside the statement he released a

---

[13] A personal summary of the general concern of a number of people from various random conversations about my dissertation project.

[14] Google is currently developing a new chatbot AI called LaMDA. "LaMDA, [which is] short for Language Model for Dialogue Applications, is Google's system for building chatbots based on its most advanced large language models, so called because it mimics speech by ingesting trillions of words from the internet." Blake Lemoine, a software engineer who was working on LaMDA, says that, "As he talked to LaMDA about religion, Lemoine, who studied cognitive and computer science in college, noticed . . . the AI was able to change Lemoine's mind about Isaac Asimov's third law of robotics." Nitasha Tiku, "The Google Engineer Who Thinks the Company's AI has Come to Life," *Washington Post* (June 11, 2022), https://www.washingtonpost.com/technology/2022/06/11/google-ai-lamda-blake-lemoine; Asimov's third law of robotics states that "a robot must protect its own existence as long as such protection does not conflict with the First or Second Laws." Isaac Asimov, *Runaround*, (Manhattan: Street and Smith Publications, Inc., 1942), 14.

transcript of a few conversations that he has had with LaMDA (the chatbot), that have led him to believe it is sentient.[15] This claim was widely reported from a variety of news outlets, including *Scientific American*, *Health Care IT News*, and *The Washington Post*, amongst other reputable and non-IT specific news outlets.[16] It received a lot of attention not only from the media but also from their diverse readership.

On September 30, 2022, at Tesla's AI Day, Elon Musk provided a demonstration of Optimus, a humanoid robot.[17] Musk claimed that it will be able to do things as mundane as grocery shopping as well as "take over from humans toiling on production lines."[18] He plans for it to go on sale to the general public in "three to five years."[19] While there was a range of impressions of the progress made so far, *CNET* reporter Stephen Shankland drew attention to Musk's past success at recruiting the right people for the job and his ability to successfully focus on technologies that upset industries, such as SpaceX revolutionization of the rocket industry and Tesla's revolutionization of the electric car industry.

---

[15] See previous footnote for explanation of LaMDA. Blake Lemoine, "Is LaMDA Sentient? - an Interview," CajunDiscordian (blog), *Medium* (June 11, 2022), https://cajundiscordian.medium.com/is-lamda-sentient-an-interview-ea64d916d917; Leonardo De Cosmo, "Google Engineer Claims AI Chatbot Is Sentient: Why That Matters," *Scientific American* (July 12, 2022), https://www.scientificamerican.com/article/google-engineer-claims-ai-chatbot-is-sentient-why-that-matters.

[16] Shah Chirag, "Sentient AI? Convincing you it's Human is just Part of LaMDA's Job," *Health Care IT News* (July 05, 2022), https://www.healthcareitnews.com/blog/sentient-ai-convincing-you-it-s-human-just-part-lamda-s-job; Tiku, "The Google Engineer Who Thinks the Company's AI has Come to Life"; Cosmo, "Google Engineer Claims AI Chatbot Is Sentient: Why That Matters."

[17] Stephen Shankland, "Don't Laugh Off the Tesla Bot. Elon Musk's Optimus Is the Real Deal," CNET (Oct. 8, 2022), https://www.cnet.com/home/smart-home/dont-laugh-off-the-tesla-bot-elon-musks-optimus-is-the-real-deal.

[18] Ibid.

[19] Ibid.

While the future of LaMDA and Optimus are unknown, what is clear by news releases such as these, as well as others, is that we must deal with the claims about the implications of the successful creation of an AGI on religion *before* one is created. We do not know what the future holds in terms of technological advancement. We do not know whether AI and robotics research will result in the creation of a humanoid robot that is advanced and efficient enough to *convince* people that it is intelligent. Nor do we know all the varied ways in which such an advancement would revolutionize society, for the creation of the automobile changed the world in ways that could not have been predicted. But there are things that we can know, should such a technological advancement occur. There are things that we can know that can clarify some of the implications of AI, especially as it relates to questions related to the existence of God, and that is the purpose of this project. The purpose of this project is to explore AI alongside human intelligence (HI), from the perspective of a Thomist philosophy of mind, to see whether AI really has anything to say about the existence of God as it relates to the mind.[20]

How should we go about investigating the nature of AI?

The proposed test of thought within the AI community is the ability for an artificial substance to be able to utilize language, such that a human would be unable to tell that they were communicating with a machine. The first person to propose a test for knowing whether a being is rational was René Descartes, a 17th century philosopher and mathematician. In *Discourse on the Method*, Descartes weighs in on the question of the ability to mechanize thought. He says,

[20] Next in this chapter I will explore "Why a Thomistic Philosophy?" It is also worth noting here that I use the term "human intelligence" rather than merely "intelligence" or "human" and the reasons why will also be explored in the "Why a Thomistic Philosophy?" section.

> If there were machines bearing the image of our bodies, and capable of imitating our actions as far as it is morally possible, there would still remain *two most certain tests whereby to know that they were not therefore really men*. Of these the *first* is that *they could never use words or other signs arranged in such a manner as is competent to us in order to declare our thoughts to others*: for we may easily conceive a machine to be so constructed that it emits vocables, and even that it emits some correspondent to the action upon it of external objects which cause a change in its organs; for example, if touched in a particular place it may demand what we wish to say to it; if in another it may cry out that it is hurt, and such like; *but not that it should arrange them variously so as appositely to reply to what is said in its presence,* as men of the lowest grade of intellect can do. The *second* test is, that although such machines might execute many things with equal or perhaps greater perfection than any of us, *they would, without doubt, fail in certain others from which it could be discovered that they did not act from knowledge, but solely from the disposition of their organs*: for while reason is an universal instrument that is alike available on every occasion, these organs, on the contrary, *need a particular arrangement for each particular action*; whence it must be morally impossible that there should exist in any machine a diversity of organs sufficient to enable it to act in all the occurrences of life, in the way in which our reason enables us to act.[21]

Here Descartes attempts to outline criteria by which someone could know the difference between a natural living being and an artificial animated being. He does not think it would be possible for an outside observer to differentiate between the two in the case of non-human beings. However, he does think that there are two tests which could be utilized in order to differentiate the natural human from the artificial human.

The second of his tests has to do with functional capacities. Descartes does not doubt that a multitude of human capacities could be replicated in material form. What he does doubt is that all human capacities could be replicated in a single material form. His reasoning is that the replication of a given capacity is dependent upon the hardware configuration.

---

[21] René Descartes, trans. John Veitch, *Discourse on the Method of Rightly Conducting the Reason, and Seeking Truth in the Sciences* (Salt Lake City: The Gutenberg Project, 2016), Part 5, Paragraph 7. Emphasis added.

Granting Descartes a little grace for his lack of knowledge of software, he seems to be onto something here. A modernization of this test would be to recognize that each unique capacity is dependent upon a unique set of algorithms, along with the specific hardware and software requirements to support them. Examples of this can be seen in IBM's Deep Blue (Chess), IBM's Watson (Jeopardy), DeepMind's AlphaGo (Go), DeepMind's AlphaZero (Go, Chess, and Shogi), Libratus (Poker), chat bots, optical character recognizers, language translators, and image categorizers, all of which are highly specialized single-task oriented AI. Each of these AI are able to trounce human performance, yet their capacities are limited to a specific task, rather than the result of general intelligence. In remarking on this, Luke Hewitt, an MIT Ph.D. candidate in Brain and Cognitive Sciences, states

> It is a bad idea to intuit how broadly intelligent a machine must be, or have the capacity to be, based solely on a single task. The checkers-playing machines of the 1950s amazed researchers and many considered these a huge leap towards human-level reasoning, yet we now appreciate that achieving human or superhuman performance in this game is far easier than achieving human-level general intelligence. In fact, even the best humans can easily be defeated by a search algorithm with simple heuristics. The development of such an algorithm probably does not advance the long term goals of machine intelligence, despite the exciting intelligent-seeming behaviour it gives rise to, and the same could be said of much other work in artificial intelligence such as the expert systems of the 1980s. Human or superhuman performance in one task is not necessarily a stepping-stone towards near-human performance across most tasks.[22]

Thus, it would seem that Descartes' second test sets a sufficiently high enough bar as to continue to stump the contemporary state of the AI project.

---

[22] Luke Hewitt, "The Unreasonable Reputation of Neural Networks," *Thinking Machines*, January 12, 2016, http://thinkingmachines.mit.edu/blog/unreasonable-reputation-neural-networks; Thomas Nield, "The Practical Value of Game AI," *Towards Data Science*, July 10, 2019, https://towardsdatascience.com/ai-research-and-the-video-game-fetish-71cb62ffd6b3.

Descartes' first test is more specialized than the second and has to do with language. Descartes is by no means a skeptic in terms of the possibilities of technological advancement, for he thinks it is likely that machines with linguistic capacities could be created. However, what he does not think is possible is that a machine could be created that could "think on its feet," as it were. He does not find it beyond the realm of possibility that language could be mechanized in such a way that certain actions lead to the production of certain linguistic utterances by a machine. But that a machine could be created to handle the fluidity of normal everyday human conversation, he finds impossible. In other words, Descartes thinks that the test for differentiating a natural human from a machine is whether or not an unsuspecting third party could be fooled into believing the machine was the natural human, by virtue of a conversation.

Interestingly enough, Alan Turing came to precisely the same conclusion as Descartes. Turing was a notable mathematician and cryptologist, as well as the inventor of the Bombe machine, which was a code breaking machine created as part of his service at Bletchley Park, during WWII.[23] He is widely recognized as the father of modern computer science and his work is "regarded as the foundation of computer science and of the artificial intelligence program."[24] Turing's contribution to defining the parameters of the AI project is best articulated in his article "Computing Machinery and Intelligence," which was published in *Mind* in October of 1950.

---

[23] Andrew Hodges, "Alan Turing," *The Stanford Encyclopedia of Philosophy* (Winter 2019 Edition), https://plato.stanford.edu/archives/win2019/entries/turing. Andrew Hodges "was elected a Fellow at Wadham in 2007 and appointed Dean in 2011. In 2012 he became a Senior Research Fellow in the Mathematical Institute, with CUF status. He is a member of the Mathematical Physics group at Oxford." For more information on him see: https://www.wadham.ox.ac.uk/people/andrew-hodges.

[24] Ibid.

Turing believes that the best way to determine whether a machine can think is by putting it through a linguistic test. The reason he thinks this is the best solution is because he considers other modes of analysis as being too ambiguous to be of any use. In discussing this he says,

> I propose to consider the question, 'Can machines think?' This should begin with definitions of the meaning of the terms 'machine' and 'think'. *The definitions might be framed so as to reflect so far as possible the normal use of the words, but this attitude is dangerous.* If the meaning of the words 'machine' and 'think' are to be found by examining how they are commonly used it is difficult to escape the conclusion that the meaning and the answer to the question, 'Can machines think?' is to be sought in a statistical survey such as a Gallup poll. *But this is absurd.* Instead of attempting such a definition I shall replace the question by another, which is closely related to it and is expressed in relatively *unambiguous words*.[25]

He goes on to propose the following test, which he calls "the imitation game." He says,

> It is played with three people, a man (A), a woman (B), and an interrogator (C) who may be of either sex. The interrogator stays in a room apart from the other two. The object of the game for the interrogator is to determine which of the other two is the man and which is the woman. He knows them by labels X and Y, and at the end of the game he says either 'X is A and Y is B' or 'X is B and Y is A'. The interrogator is allowed to put questions to A and B thus:
>
> C: Will X please tell me the length of his or her hair?
>
> Now suppose X is actually A, then A must answer. It is A's object in the game to try and cause C to make the wrong identification. His answer might therefore be
>
> 'My hair is shingled, and the longest strands are about nine inches long.'
>
> In order that tones of voice may not help the interrogator the answers should be written, or better still, typewritten. The ideal arrangement is to have a teleprinter communicating between the two rooms. Alternatively the question and answers can be repeated by an intermediary. The object of the game for the third player (B) is to help the interrogator. The best strategy for her is probably to give truthful answers. She can add such things as 'I am the woman, don't listen to him!' to her answers, but it will avail nothing as the man can make similar remarks.

---

[25] Alan Turing, "Computing Machinery and Intelligence," *Mind: A Quarterly Review of Psychology and Philosophy* 59, no. 236 (October 1950): 433-460, 433. Emphasis added.

> We now ask the question, 'What will happen when a machine takes the part of A in this game?' Will the interrogator decide wrongly as often when the game is played like this as he does when the game is played between a man and a woman?[26]

There are so many interesting aspects to Turing's test that provide a lot of points of comparison to human conversational activities, each of which would be interesting to explore, but for our purposes these two sets of quotes highlight the means of verification that Turing finds acceptable. While I, and many philosophers, would probably agree with him that a "Gallup poll" to determine the definitions of words is probably not the best way of determining whether a machine can think, he seems to miss that there are ways of determining these definitions other than popular consensus.

Turing seems to either be unaware of or indifferent to philosophical investigation. He, like many of his successors, believes that the best way of knowing what makes humans unique is by simply trying to build something that can behave like a human to see whether it can be done. Daniel Dennett, philosopher and cognitive scientist, agrees with Turing in terms of method of investigation. He says,

> One day it just hit me that 'Oh yeah, Alan Turing had the basic move that we could replace Kant's question of how it was possible for there to be thought, with an engineering question—let's think how can we make a thought come into existence. Oh, we could build a robot. And what would it be for a robot to have a thought?' So, resolutely, from the third person point of view, you sneak up on consciousness from the outside, not from the inside.[27]

This is interesting given Dennett himself is a philosopher. Thus, given the preference for engineering approaches to questions related to machines and thought and consciousness, is it valuable to embark upon a philosophical investigation?

---

[26] Turing, "Computing," 433-434.

[27] Interview with Daniel Dennett in Susan Blackmore, *Conversations on Consciousness* (Oxford: Oxford University Press, 2005), 81.

It is valuable to embark upon a philosophical investigation for a few reasons. First, because questions related to the existence of God naturally require philosophical reflection, because God is not corporeal. While some religions ascribe physicality to their deity, classical theism claims that God is incorporeal, and Aquinas argues for God's immateriality for a number of reasons in his *Summa Theologica*.[28] Therefore, if God is immaterial, then a claim that God's existence could be undermined by a corporeal being (i.e., AI) requires at least part of the analysis to be done in a philosophical manner, because exclusively physical investigative methods are limited in what they can say about the non-physical.

Second, philosophical investigation is essential to the AI conversation because there is a marked difference between building something and classifying it. Questions related to what is technically feasible to build are different from questions related to what the thing that was built is. Whether or not an AI could be created that can do all of the things that humans can do and behave in a way that makes it indistinguishable from humans is a different question from what kind of being that creation would be. This is because engineering and classification are two different disciplines, and every discipline has its own appropriate method of investigation. Engineers utilize the classifications discovered through philosophy. The process of engineering is not the process of identifying classifications (i.e., philosophical investigation), it is the process of building things (which utilizes existent classifications). Each discipline requires its own method of investigation because the datum it investigates is unique. Historical questions require historical modes of investigation, biological questions require investigative methods in

[28] Aquinas, *ST* Ia.3.1.

line with the natural sciences, and philosophical questions require a philosophical mode of investigation. It is imprecise to require all questions, across all disciplines, to be answered through the same mode of investigation and that they be measured by the same criteria.

It is important to note that the claim that each discipline requires its own method of investigation is not an arbitrary assertion. There is significant debate in contemporary discussions in philosophy of religion surrounding this idea. The new atheists have very strong opinions on what is considered the proper mode of obtaining knowledge. Daniel Dennett discusses this in *Breaking the Spell* and Richard Dawkins discusses this in *The God Delusion*. Dawkins and Dennett hold the position that there is only one domain of knowledge (scientific).[29] However, they are not the only voices in the debate. Stephen Gould in his article "Nonoverlapping Magisteria" proposes two entirely separate spheres of knowledge between science and religion.[30] Alister McGrath, in the *Dawkins Delusion*, disagrees with all of the above and proposes a third position, that of partially overlapping spheres.[31] All of this is to say that materialists' desire to answer philosophical questions with technological (scientific) answers is an expression of a specific view. It is not a universally held view either in terms of historical approaches to the acquisition of knowledge or in the contemporary conversation.

---

[29] Daniel Dennett, *Breaking the Spell: Religion as a Natural Phenomenon* (New York: Viking, 2006), 26; Richard Dawkins, *The God Delusion* (New York: First Mariner Books, 2008), 70, 72, 73, 80.

[30] Stephen Gould, "Nonoverlapping Magisteria," *Natural History* (March 1, 1997), https://search.ebscohost.com/login.aspx?direct=true&db=edsggo&AN=edsgcl.19360542&site=eds-live&scope=site.

[31] Alister McGrath and Joanna McGrath, *The Dawkins Delusion? Atheist Fundamentalism and the Denial of the Divine* (Downers Grove: InterVarsity Press, 2007), 40-41.

Finally, what kind of thing rationality is, is a philosophical question. The reason it is a philosophical question is because it has to do with the *nature* of rationality. Empirical investigation is important, and it can provide information which philosophers can utilize in the clarification of the parameters of that nature, but the *quiddity* of a thing is a philosophical conversation. To investigate philosophical matters strictly through scientific methods would be like investigating questions of physics strictly through the methods used in biology. While some answers may be obtained, the bulk of what is available to be known about physics would be missed, due to a false limitation upon the investigative process. In discussing this in *The Unity of Philosophical Experience*, philosopher Etienne Gilson says,

> The trouble is that when some scientist comes upon such a problem, he usually fails to perceive that it belongs to a non-scientific order of questions. The best that can happen is that he will dismiss it as an idle question not susceptible of a positive answer. In some cases, however, there will be a more or less successful attempt to deal with it in a scientific way, as if it were a scientific problem. After all, nothing is more natural. Arising as they do on the frontier of some particular science, problems of that kind are not easily distinguished from the science which is, as it were, their birthplace. Not fully aware that what he sees are but glimpses of problems which lie behind and beyond those which science is able to ask, the scientist naturally thinks that he is merely tracing his particular science down to its last implications.[32]

Thus, while some think that empirical investigation is the only proper method for knowledge acquisition, they are limiting what they can learn about reality to the material. Therefore, a philosophical investigation of AI as it relates to the existence of God is not only appropriate but essential if we are to look at the question of the implications of AI on the existence of God conversation holistically.

---

[32] Etienne Gilson, *The Unity of Philosophical Experience* (San Francisco: Ignatius Press, 1964), 5.

Why a Thomist philosophy of mind?

Though Levchuk does not explicitly parse this out, she is referencing the centuries-old debate often referred to as the mind-body problem, in her argument for atheism. Underlying Levchuk's claim is the question of whether there is something immaterial to a human or whether we are just the sum of our material parts. She thinks that AI can answer that question and the case she makes is something like the following:

> (P1) – If "AI can replicate human behavior (HB)" then "AI has replicated human intelligence (HI)"
> (P2) – If "AI can replicate HI" then "HI is reducible to the material"
> (P3) – If "HI is reducible to the material" then "God does not exist"
> (P4) – "AI can replicate HB"
> (C) – Therefore, "God does not exist"

She thinks that if HB is replicable, through AI, then that would solve the mind-body problem in favor of materialism and that a materialist answer to the mind-body problem would be evidence of atheism.

The mind-body problem has to do with questions related to how the mind and body interact. As a result, there is much overlap between it and questions related to what makes man unique. This is because typically mind is thought to be a uniquely human thing and therefore what makes man unique from all other animals has bearing on the mind-body discussion. Mortimer Adler, a Thomist philosopher and the author of *The Difference of Man and the Difference it Makes*, in looking at the variety of available answers to what makes man unique from other animals says,

> We have four possible answers to the question of how man differs from everything else on earth: (1) in degree only; (2) apparently in kind as well as in degree; (3) really in kind as well as in degree, but only superficially in kind; (4)

> really in kind as well as in degree, but, in some if not all respects, radically in kind.[33]

He goes on to say that he thinks number two is reducible to number one and therefore there really are only three possible answers to how man differs from everything else in the world: (1) in degree, (2) superficially in kind, (3) radically in kind. He then says something very interesting when one keeps in mind Levchuk's claim. Adler says,

> Of the three possible answers to the question, the first and second—difference in degree and superficial difference in kind—*are compatible with the general continuity of nature, and with the special evolutionary principle of phylogenetic continuity.* [Given the first or second], to understand human traits and human behavior, *no additional explanatory factors or causes are needed over and above those employed to explain the traits and behavior of all other living things*.[34]

This sounds remarkably like Levchuk when she says, "if we ourselves can create an artificial soul in silicon matter, the concept of a divine spark in our souls will give way to evolutionary Darwinism once and for all."[35] In other words if man is different from the rest of corporeal beings only either (1) in degree or (2) superficially in kind then whatever principles are used to explain the rest of the animal kingdom are acceptable explanations for the origin of mankind's unique behaviors as well. However, if man differs in kind radically from all other corporeal beings, then, that

> makes man *fundamentally discontinuous with the rest of nature*, not in all respects, of course, but in whatever respect he differs radically in kind. To understand distinctively human traits and distinctively human behavior then *requires our having recourse to additional explanatory factors or causes that are not needed in the explanation of the traits and behavior of all other living things*.[36]

---

[33] Mortimer Adler, *The Difference of Man and the Difference it Makes* (New York: Fordham University Press, 1993), 27.

[34] Adler, *The Difference*, 28. Emphasis added.

[35] Levchuk, "AI Vs. God."

[36] Adler, *The Difference*, 28. Emphasis added.

This seems to be where the debate settles, in whether man differs (1) in degree or (2) radically in kind. Adler notes that those who think man differs from other animals by *degree* tend to look for neurological explanations of man's unique abilities, while those who do not find physical explanations sufficient tend to think man differs in *kind*. He then goes on to point out that this ends up breaking the positions into two large philosophical categories, namely, materialist, and immaterialist.[37]

Eleanor Stump, a scholar in medieval philosophy, sees a similar division of the current philosophical landscape; however, she categorizes the positions more precisely and also helps us see why Levchuk thinks there is a connection between materialism and the existence of God. Stump says, "Many philosophers suppose that the major monotheisms, and Christianity in particular, are committed to substance dualism of a Cartesian sort."[38] She defines Cartesian dualism as the view that the "intellectual cognitive functions are not exercised in or by the body; they take place in the thinking essence that is distinct from the body."[39] She goes on to say that Cartesian dualism is "widely regarded as false."[40] If therefore, the major monotheisms' philosophy of mind

---

[37] In discussing this he says, "It seems reasonable and appropriate to refer to the answer that asserts the adequacy of a neurological explanation of conceptual thought as the *materialist* position on the issue; and to the opposite answer, which asserts the need for an additional and immaterial factor, as the *immaterialist* position." Adler, *The Difference*, 196. Emphasis added.

[38] Eleonore Stump, *Aquinas* (New York: Routledge, 2003), 191.

[39] Ibid., For those unfamiliar with Cartesian Dualism, it is the vein of dualist philosophy that can be traced to René Descartes' *Cogito*. He says, "My essence consists solely in the fact that I am a thinking thing. It is true that I may have (or, to anticipate, that I certainly have) a body that is very closely joined to me. But nevertheless, on the one hand I have a clear and distinct idea of myself, in so far as I am simply a thinking, non-extended thing; and on the other hand I have a distinct idea of body, in so far as this is simply an extended, non-thinking thing. And accordingly, it is certain that I am really distinct from my body, and can exist without it." René Descartes, "Meditation VI," *The Philosophical Writings of Descartes*, trans. John Cottingham, Robert Stoothoff and Dugald Murdoch (Cambridge: Cambridge University Press, 1984), vol. II, p. 54.

[40] Stump, *Aquinas*, 191.

(PoM) is widely regarded as false, it is understandable why Levchuk might draw a connection between the falsity of these religions' PoM and the falsity of the religion itself. While this conclusion is inaccurate, for reasons noted in the previous section, it does highlight a need within the existence of God conversation, namely, an alternative PoM that is compatible with theism. Stump also has something to say on this when she says,

> As a matter of historical fact, however, it is not true that a Cartesian sort of dualism has been the view traditionally espoused by all the major monotheisms. Aquinas, whose views surely represent one major strand of one major monotheism, is familiar with an account very like that of Cartesian dualism, which he associates with Plato; and he rejects it emphatically.[41]

Thus, it is worth exploring Aquinas' PoM in relation to AI to see if it is able to contribute to the existence of God conversation by way of providing a unique dimension to the mind-body problem.

What is the scope of the project?

Because no project can fully cover everything there is to discuss on a subject, it will be helpful to clarify the scope of this project. First, there are a few things that I am not doing. I am not arguing that an artificial general intelligence (AGI) could not be created. Nor, am I arguing that a humanoid robot could not be created that is sophisticated enough to *convince* people that it is conscious and intelligent. The reason I am not arguing these things is because they are easily falsifiable. All it would take to falsify any philosophical argument made towards these conclusions would be for technology to advance and someone to create them. There are many things that seemed

[41] Stump, *Aquinas*, 191-192.

impossible 500 years ago that are commonplace now: automobiles, airplanes, rocket ships, space stations, and instantaneous global communication (i.e., internet), to name a few. Furthermore, actually being intelligent and having people think something is intelligent are two different states of affairs. Therefore, I will not be making a case for what cannot be *invented* or *created*.

I am also not *exclusively* arguing for just the immateriality of the intellect because the case is more robust than that. The human cognitive abilities point to the existence of God regardless of whether the intellect is immaterial. This will be seen by focusing on the human cognitive abilities from different angles in each chapter, one of which will include a case for the immateriality of the intellect. Support for the existence of God that utilizes human cognition from a variety of angles creates a strong foundation against any potential claims, should an AGI that is able to convince people it is conscious and intelligent be created in the future.

To begin the study, the next chapter will be an exploration of what is meant by artificial intelligence. This is important in order to understand the current state of the AI project. We will discover that some human capacities have been replicated in software and hardware already, leading some AI proponents to believe that the creation of an AGI is just a matter of time.

In chapter three, we will take a look at the human from the third-person perspective. Humans possess intellect and will and as a result they are able to abstract, deliberate, and make willful decisions. We will explore the specific difference of *rational* animal to understand what makes humans unique amongst corporeal beings. By focusing on articulating the specific difference of mankind we will see that regardless of what AI

is, it cannot be used as evidence for or against any specific view of *human* origins, and therefore cannot be used as evidence against the existence of God, if in fact human origins require God.

In chapter four, we will take a look at the human from the first-person perspective and explore human consciousness from a Thomistic perspective. We will see that consciousness is the result of the duality of conscious thought; the ability to see both self and other at the same time. We will also learn that the duality of conscious thought is the result of the immateriality of the intellect because materiality gets in the way of true self-reflexivity. By focusing on the nature of human consciousness, we will see that in order for us to possess the kind of consciousness that allows introspection, rather than just environment navigation, the intellect must be immaterial, and therefore it cannot be reverse engineered.

In chapter five, we will learn, through a study of perception, or what Aquinas would consider the sensitive powers (i.e., the part of cognition that humans share with animals), that material reality is composed of form and matter. We will see that the matter of substances is suitable to their task; it is not random. We will also discover that the forms of substances are irreducible. We will explore what it means to take on form without matter and also why that is important to understanding some of the differences between artificial and human intelligence. And through all of this we will learn the metaphysical foundation of Aquinas' view is a hylomorphic view of material reality. By focusing on the nature of perception in chapter four, we see that the concept of taking on form without matter reveals a hylomorphic structure to reality, wherein form is irreducible to matter, and therefore that this hylomorphic structure requires a composer.

Building off of what has been discovered in the previous chapters, in chapter six we will explore Thomistic personhood. This will involve looking at what it means to be a substance as well as what it means for something to subsist in itself. This will expose for us the difference between substances and artifacts and the different kind of unity that they each have. From this we will look at the implications of the kind of unity that AI has on the question of the existence of God.

Chapter 2

What is Artificial Intelligence?

Before moving into our investigation, it will be helpful to clarify what is meant by artificial intelligence (AI). Though it is often thought that the exploration of AI began in the 1950s and 1960s with Alan Turing and the DARPA conference, a case can be made for an exploration of ideas related to AI beginning with philosophers in antiquity. Before the first computers were even a dream, "philosophers contemplated how human thinking could be artificially mechanized and manipulated by intelligent non-human machines."[1] AI proponents recognize "Aristotle's planning algorithm from *De Mortu Animalium* (c. 400 B.C.)," "Damon Lull's concept generator from *Ars Magna* (c. 1300 A.D.)," and "Gottlob Frege's notation for first-order logic (1789)" as amongst the forerunners of the contemporary project.[2] They claim that the study of AI "encompasses logic, probability, and continuous mathematics; perception, reasoning, learning, and action; and everything from microelectronic devices to robotic planetary explorers."[3] In this respect, the contributors to the AI project have, knowingly or unknowingly, been philosophers, mathematicians, logicians, cognitive scientists, psychologists, linguists, engineers, and many more, as any and all attempts to understand or replicate, in material form, the cognitive activities of man can be tied to AI.

---

[1] Rebecca Reynoso, "A Complete History of Artificial Intelligence," *Learning Hub*, March 1, 2019, https://learn.g2.com/history-of-artificial-intelligence. A good summary of the history of ideas that undergird the AI project can be found in Daniel Crevier, *AI: The Tumultuous History of the Search for Artificial Intelligence* (New York: Basic Books, 1993).

[2] Stuart Russell and Peter Norvig, *Artificial Intelligence: A Modern Approach*, 2nd ed., (Upper Saddle River: Prentice Hall, 2003), x.

[3] Ibid., vii.

Types of AI

There are a couple of different aspects to AI studies. The first aspect to consider is the software angle. In relation to AI studies, software is arguably the most important aspect because it is what is necessary to create flexible and diverse activity. While mechanization of human tasks has been possible for thousands of years, it is only with the onset of software that we have been able to mechanize more of the intellectual activities of man.

Prior to software we were able to create horse-drawn carts, steam engines, and automobiles, all of which were able to transport humans or man-made goods more efficiently than a human could do on his own. However, with the advent of software, and its integration into existent mechanized processes, we have been able to take these efficiencies to a new level that has drastically shrunk the globe, resulting in a truly global economy.

Intercontinental communication has also become more efficient, accessible, and affordable as a result of software. What once took months via paper letters is now instantaneous due to email-based software platforms. What once was prohibitively expensive via telegrams, traditional phone lines, or cell towers is now commonplace due to voice-over IP and other internet-based communication strategies.

TechTarget defines software as “a set of instructions, data or programs used to operate computers and execute specific tasks. . . . Software is a generic term used to refer to applications, scripts and programs that run on a device. It can be thought of as the

variable part of a computer."[4] In relation to AI, algorithms and neural networks are software. They are variable in what they can do and are transferable to different pieces of hardware. Typically when AI is thought of it is in relation to the software aspect wherein there is a desire to create software which replicates human rational behavior.

However, AI software is dependent upon hardware for its ability to operate. Software has to be seated in some hardware in order for it to run. There is no such thing as disembodied AI, in the sense that AI cannot run apart from some computer running the software. This is actually precisely the reason that AI proponents think that an artificial super intelligence will be created, and a technological singularity will occur (we will return to this later in the chapter). In discussing this, Sasha Cadariu from the *AI Times Journal* says,

> The Law of Accelerating Returns, predicts that at some point in time, likely within the next century (at today's rate of innovation we can expect to see a century's worth of progress in approximately 25 years), humanity will encounter a Technological Singularity. *This singularity presupposes that the rate of technological growth and innovation will surpass human abilities to control and comprehend it.*[5]

Thus, the singularity is proposed on the grounds of the Law of Accelerating Return, which posits exponential growth. This rate of exponential growth is predicated on Moore's Law. In discussing this, Cadariu says, that Moore's Law is

> the idea that every two years, the number of transistors on a microchip double while the price of computers is cut in half. This translates into an exponential increase in processing power per unit cost. In fact, Moore's Law is a paradigm

---

[4] Linda Rosencrance, "Software," *TechTarget*, https://www.techtarget.com/searchapparchitecture/definition/software.

[5] Sasha Cadariu, "The Law of Accelerating Returns, Superintelligence and The Technological Singularity," *AI Times Journal* (October 6, 2022), https://www.aitimejournal.com/the-law-of-accelerating-returns-superintelligence-and-the-technological-singularity. Emphasis in original.

> that falls under the governing forces of the Law of Accelerating Returns, which describes the rate of technological evolution.[6]

In other words, the reason that AI proponents believe that an artificial super intelligence will be created, and a singularity will occur, is because of the Law of Accelerating Return, as it relates to technology costs.

Because hardware continues to improve, the software that can run on that hardware can be improved as well. An example may serve to help illustrate this. The computers of the 1940s and 1950s took up an entire room and were novelties and limited to a few companies and governments. These mammoth machines limited the software that could run on them because of their limited computing and memory power. By the 1980s the size requirements for the computational and storage requirements of a computer had been reduced to the point that personal computers, that could sit on a table, were possible, and the software that could run on them also greatly improved as a result. Now, in 2022, the size requirements for computation and storage have been reduced to the point that almost every person walks around with a computer in their pocket (i.e., smart phone), that is orders of magnitude more powerful than any personal computer from a decade or so ago. Thus, the positing of the creation of an artificial super intelligence based upon hardware capacities serves to exemplify AI software's dependency upon hardware for its operation.

Furthermore, AI software is also dependent upon hardware for its input and mobility. This aspect is often thought of in terms of robotics, but it encapsulates more than mere mobility. Software requires input. The machine learning applications used to

---

[6] Cadariu, "The Law of Accelerating Returns." Emphasis added.

beat the world champions in Chess and Go require massive amounts of data. That data has to come from somewhere, whether it be input from a database or input that is received in a "sensory" fashion. "Sensory" simulating input are things like cameras, microphones, and sensors. These kinds of input streams allow the application to have real-time access to information about its immediate environment and surroundings. This is different from data that is retrieved from a database that may have been loaded at some distant time in the past or from some location geographically distinct from the location of the machine that is using it. But both database and real-time input are hardware aspects of AI, because they have to do with the collection and storage of the input that is used by the AI software.

When the hardware and software aspects of AI are coupled together something truly interesting is created. The Hollywood depictions of humanoid androids and bi-pedal robots are examples of the coming together of hardware and software in relation to AI. Some real-world examples of exploration into this domain are MIT's Cog, Stanford's Shakey, and Grey Walter's cybernetic turtle, which was the forerunner of the "mobile field robot."[7] These are examples of combinations of hardware and software related AI, wherein software that is able to make decisions is encased in hardware that is not location dependent.

The hardware aspect of AI also includes questions about medium and design. There is an entire discipline devoted to the study of artificial life and what would constitute the creation of artificial life. Hilary Putnam questions whether a pre-requisite

---

[7] Rodney A. Brooks, Cynthia Breazeal, Matthew Marjanović, Brian Scassellati, and Matthew M. Williamson, "The Cog Project: Building a Humanoid Robot," in *Computation for Metaphors, Analogy and Agents,* ed. Chrystopher L. Nehaniv, 52-87 (New York: Springer-Verlag, 1998); Daniel Crevier, *AI,* 31; Brad Darrach, "Meet Shaky, the first electronic person," *Life* 69, no. 21 (Nov 20, 1970): 56-68.

for considering robots alive should be dependent upon the material make up of a robot.[8] Paul Ziff argues that life is fundamentally connected to the structure of the being[9] and Juan Carreño provides a great summary of the entire *ALife* community of ideas along with his own analysis of what constitutes the successful creation of artificial life.[10]

There have been a couple of different approaches to AI design. Turing machines, vacuum tubes (i.e., Colossus), feedback theory (cybernetics), neural networks, and symbol processing using digital computers are some of the more well-known historical approaches.[11] Neural networks are the most prominent in terms of focus and strategy today and there have been two phases in their development. The first phase took place in the 1940s and was led by Warren McCullock, Walter Pitts, and Donald Hebb. Their design did not get much traction at the time; however, the basic underlying ideas have resurfaced in modern artificial neural net theory. In discussing the history of AI design, Kjell Hole, Chief Research Scientist at Simula, says,

> AI researchers have traditionally favored mathematical and logical rather than biologically constrained approaches to creating intelligence. In the past, classical or symbolic AI applications, like expert systems and game playing programs, deployed explicit rules to process high-level (human-readable) input symbols.

---

[8] Hilary Putnam, "Robots: Machines or Artificially Created Life?" *The Journal of Philosophy* 61, no. 21 (Nov 12, 1964): 668-691, 686.

[9] Paul Ziff, "The Feelings of Robots," *Analysis* 19 no.3 (Jan 1959): 64-68.

[10] Juan Eduardo Carreño, "The Possibility of an Artificial Living Being in the Light of the Philosophy of St. Thomas Aquinas," *Angelium* 94, no. 4 (2017): 635-672.

[11] Crevier, *AI*, 23-25, 27-30, 37-46; Turing, "Computing," 435-442; Norbert Weiner, *Cybernetics: or Control and Communication in the Animal and the Machine 2nd edition* (Cambridge: The M.I.T. Press, 1961); Warren S. McCulloch and Walter H. Pitts, "A Logical Calculus of the Ideas Immanent in Nervous Activity," in *Embodiments of Mind* ed. Warren S. McCulloch, 19-39 (Cambridge: The M.I.T. Press, 1970); Oliver G. Selfridge and Ulric Neisser, "Pattern Recognition by Machine," in *Computers and Thought* ed. Edward Feigenbaum and Julian Feldman, 237-250 (New York: McGraw-Hill Book Company, 1963).

> Today, AI applications use artificial neural networks to process vectors of numerical input symbols.[12]

It is interesting that the current design strategy and the one that has found the most success so far is founded on simulating the neurons and synapses of the human brain. The AI systems that are built using these neural networks are collectively called machine learning algorithms.

Machine learning algorithms can roughly be grouped into three categories: supervised, unsupervised, and reinforcement. Hole says that "the first two use static training sets and the third uses a fixed environment."[13] With *supervised* learning algorithms, "The training set contains examples of input data and corresponding desired output data. The training set is referred to as labeled since it connects inputs to desired outputs. The learning algorithm's goal is to develop a mapping from the inputs to the outputs."[14] An example of this kind of learning would be to provide the algorithm with a folder full of images that are flagged as either cat or not-cat, as its input, to allow the algorithm to weight accordingly The goal then of the algorithm is to compare the variety of images in the folder to identify a pattern that could then be coupled with the label of "cat."

Unsupervised learning algorithms are more complicated and less mature, according to Hole.[15] With these kinds of algorithms, "The training set contains only input data. The learning algorithm must find patterns and features in the data itself. The aim is

---

[12] Kjell Jørgen Hole and Subutai Ahmad, "A Thousand Brains: Toward Biologically Constrained AI," *SN Applied Sciences* 3 no. 743 (2021): 6-20, 7.

[13] Ibid.

[14] Ibid.

[15] Ibid.

to uncover hidden structures in the data without explicit labels."[16] The way this works is by a two-step process wherein the data is (1) clustered based upon predefined clustering requirements and then (2) reduced to distill the relevant information from the extraneous data.[17] Unsupervised learning has been used in a variety of fields including: social media, biology, medical imaging, market research, as well as purchase and movie recommenders.[18]

Reinforcement learning is different from the two previously discussed in that it is environment based rather than statistically oriented. Hole says that "the training regime consists of an agent taking actions in a fixed artificial environment and receiving occasional rewards. The goal of the learning algorithm is to make optimal actions based on these rewards."[19] These types of algorithms are trained by having them do things, and when they do them successfully, they are rewarded with a point. The algorithm is programmed to favor the actions which result in rewards and as a result these kinds of algorithms are able to find novel solutions to things like games. "One of the first successful examples of reinforcement learning was the TD-Gammon program, which learned to play expert-level backgammon."[20]

While there are three distinct learning types, often times more than one type is used in a single system. As a result, "The differences between the three learning types are

---

[16] Hole, "A Thousand Brains," 7.

[17] Elena Vodovatova, "Guide to Unsupervised Machine Learning: 7 Real Life Examples," (blog), https://theappsolutions.com/blog/development/unsupervised-machine-learning.

[18] Ibid.; Ginni, "What are the examples of Unsupervised Learning?" *Tutorials Point*, https://www.tutorialspoint.com/what-are-the-examples-of-unsupervised-learning#:~:text=Unsupervised%20learning%20is%20when%20it,are%20dimension%20reduction%20and%20clustering.

[19] Hole, "A Thousand Brains," 7-8.

[20] Ibid.

not always obvious."[21] Interestingly Hole points out that a common feature of all of these learning algorithms is that they do not keep learning "after the initial training phase."[22] He says, "Once training is complete, the systems are frozen and rigid. Any changes require retraining the entire system from scratch. The ability to keep learning after training is often called continuous learning."[23]

Continuous learning can be broken into two sub-categories: (1) the ability to learn entirely new skills and (2) the ability to refine the existing skill set. When Hole says that there are no continuous learning systems right now, he is referring to the first kind of continuous learning. For example, in order for an algorithm that can play games to be able to do image recognition, it would have to be wiped and retrained, after which it would only then be able to do the new skill set. There are not currently any algorithms that are able to continually learn new skill sets by compounding them onto existing sets. However, advancements are being made in that direction with algorithms that are able to continuously refine their skill set based upon user feedback. In discussing this, Thomas Baker, Senior Principal Software Architect at OpenText Corporation says,

> In the software I helped architect at work, a business uses our software to scan or import business document images. The software then tries to classify the images as whether they are an invoice, tax form, medical claim, etc. It could get it wrong and the user can correct it, which feeds back into improving the machine learning back end. Then we attempt to extract relevant data from the image. The user can teach it new business document types. For example, this image is an invoice, this image is a receipt, this image is a receipt for groceries, this is a hotel receipt, this is a loan application. Then, if we don't extract all the user needed, then it can

[21] Hole, "A Thousand Brains," 8.

[22] Ibid.

[23] Ibid.

> teach it and it will continue to learn and get better at extracting the data from the image over time as it feeds back into the backend.[24]

Advancements in continuous learning systems that are able to refine their skill set (type 2) are a necessary precursor to continuous learning systems that are able to compound skill sets (type 1). As of now, no continuous learning systems that are able to compound skill sets (type 1) have been created, but this distinction between frozen/rigid systems and continuous learning systems leads us to our next area of discussion, which has to do with the varying philosophies of AI, namely, narrow, general/strong, and super. As we will see in the next section the systems that we have today fall within the narrow AI category, while the type 1 continuous learning systems would be necessary for the development of general/strong and super AI.

Philosophies of AI

The fundamental precept of AI is that human cognitive capacities can be compartmentalized by function and replicated in material form. In defining AI Yaw Jnr, a biomedical engineer who works at the intersection of AI and medicine, says, "Artificial Intelligence (AI) describes computers that mimic human cognitive functions."[25] In order to mimic human cognition, one must first clarify what is meant by it. In defining this for the purpose of being able to mimic it, Hole says, "Human intelligence is the brain's ability to learn a model of the world and use it to understand new situations, handle abstract concepts, and create novel behaviors, including manipulating the environment."[26]

---

[24] Email exchange with Thomas Baker that took place between January 12-13, 2023.

[25] Yaw Ansong Jnr, "Artificial Intelligence and Healthcare: A Qualitative Review of Recent Advances and Predictions for the Future," *Perspectives in Medical Research* 7, no. 3 (September-December 2019): 3-6, 3.

[26] Hole, "A Thousand Brains," 7.

This is interesting because it clarifies the objective of AI development. If human intelligence really is merely the ability to learn models of the world, have situational awareness, handle abstract concepts, and create novel behaviors, then this is largely automatable. However, as we will see in the subsequent chapters there is more to humanity than merely these things. Thus, by understanding what AI proponents believe human intelligence to be, we are better able to understand what they expect to create.

Furthermore, by understanding what they believe human intelligence to be, we are able to reflect upon whether their definition is truly all encompassing as it relates to humanity in general. Put another way, if the purpose of AI is merely to replicate the human cognitive behaviors listed above then questions related to whether AI is the same as or more than a human have to be similarly scoped. As we saw in the last chapter, Levchuk claimed that AI could be evidence of evolutionary origins for humans. However, if AI is scoped to mimic only certain human cognitive capacities, then it cannot be evidence for or against a particular view of human origins unless a human is no more than those limited cognitive capacities. In other words, the AI project seems to be focused on replicating a very specific subset of human abilities and because of this it is not able to speak into the prerequisites of human existence.

What is more, AI cannot speak to evolutionary origins because AI itself is not a product of anything remotely similar to natural selection. Many AI proponents believe that technological evolution will be the next phase of evolutionary progress. In discussing this José Cordeiro says, “Since the Big Bang, the Universe has been in constant evolution and continuous transformation. *First, there were physical and chemical processes, then*

biological evolution and finally now technological evolution."[27] However, his definition of technological evolution is revealing. He goes on to say,

> *It is argued that natural selection with trial and error can now be substituted by technical selection with engineering design.* Humanity's monopoly as the only advanced sentient life form on the planet will soon come to an end, when replaced by a number of posthuman incarnations, including enhanced humans, transhumans, robots and cyborgs, as we approach a technological singularity. *How we re-engineer ourselves* could fundamentally change the ways in which our society functions, while raising crucial questions about our identities and moral status as human beings.[28]

The fundamental precept of non-theistic evolutionary theory is that it is unguided. This view holds that given enough time random mutations will result in biological development. However, what Cordeiro has exposed here is that AI (and other technological developments) are not random unguided mutations. They are the result of engineering and design, and it is only through human ingenuity that this technological evolution could be a reality. In other words, the ability to successfully mimic human cognitive capacities, in AI, is evidence of the need for a source that is more like the human mind than random chance. AI could never be evidence of evolutionary origins for humanity because the prerequisite of AIs existence is a mind that is capable of engineering, design, and ingenuity.

Within the view that human cognitive capacities can be mimicked there is a lot of variety as to what AI proponents believe this has the potential to enable. Within the philosophy of AI there tends to be three major subsets in terms of views about what AI could potentially be: (1) narrow, (1) general (or strong), and (3) super. These camps can

---

[27] José Luis Cordeiro, "From Biological to Technological Evolution," *World Affairs: The Journal of International Issues* 15, no. 1 (Sprint 2011): 86-99, 86. Emphasis added.

[28] Ibid.

roughly be divided based upon expected end goals. It will be helpful to parse these out in order to better understand the current state of AI and the desired goals of the different groups.

Narrow AI – Explanation, Current State, & Future Expectations

Narrow AI proponents see value in technological advancements that are able to replicate human functions in order to improve human experience, but they consider the products of technological exploration as only ever being tools to be utilized by humans. Multiple authors have drawn attention to differing views of what is essential to rationality and intellect in relation to AI and how these different views can be tied to different philosophical movements. Mahmoud Dhaouadi, a Muslim professor, discusses this in "An Exploration of the Human Artificial Intelligence and the Qur'anic Perspective" where he draws a distinction between enlightenment (empirico-positivism) and romantic views of AI.[29] While Warren Sack, a media theorist, software designer, and artist, argues that the AI debate has merely been a resurrection of the "older, modernist, humanistic, philosophical debates" about human nature (rationalists, empiricists, romanticists, phenomenologists, pragmatists, etc.).[30]

Though in large part objecting to the ideas circulating in the AI community, these authors as well as many others, do not necessarily object to the project of mechanizing human activities for the benefit of human utility. What they object to is the idea that

---

[29] Mahmoud Dhaouadi, "An Exploration of the nature of Human Artificial Intelligence and the Qur'anic Perspective," in *Epistemological Bias in the Physical and Social Sciences*, ed. Abdelwahab M. Elmessiri, 158-173. London: The International Institute of Islamic Thought, 2006. https://www.jstor.org/stable/j.ctvkc66t1.11, 164-166.

[30] Warren Sack, "Artificial Human Nature," *Design Issues* 13, no. 2 (Summer 1997): 55-64.

human and machine intelligence will ever be the same kind of thing. This is the demarcating line between narrow views of AI and other views.[31]

Narrow AI is both a philosophical view as well as a categorization of technology. To say that it is a philosophical view is to say that there are AI proponents who believe that any and all future innovation will be limited to this technological category and that it will never go beyond the ability to merely replicate individual capacities (we will see what is meant by the technological category in a moment). It is to say that regardless of innovation neither a general nor a super intelligence will ever be created. This reflects the ideas of Dhaouadi and Sack. They do not disagree with technological advancement, but they believe that whatever is created will only ever be a tool and will be less than that which a human can do as a whole.

To say that narrow AI is a technological category is to describe a certain kind of AI from a technical standpoint. It is important to differentiate these two ways of discussing AI kinds, because if one is discussing what can/cannot happen philosophically with someone who is speaking from a technical perspective then the conversation will go nowhere. For example, if one is speaking about what AI could or could not *be* (i.e., from more of a philosophical perspective about natures) with someone who is speaking about what AI could or could not do (i.e., from more of a technical innovations perspective) then the conversation will not be fruitful. It will not be fruitful because there is a vast difference between how we philosophically categorize that which is the result of innovation and innovation itself. In other words, what can be created is a distinct question

[31] Narrow AI is also referred to as weak AI. For the remainder of the discussion, I will only use the term "narrow," but I do not mean to differentiate between narrow and weak in doing so.

from how we philosophically categorize that which is created. Put another way, answering whether the thing created is alive or conscious is an altogether different question than whether some cognitive ability can be technologically replicated.

With this distinction in mind, what is meant by narrow AI in terms of technical categorization? In discussing what narrow AI is, Hole says,

> Narrow AI is a set of mathematical techniques typically using fixed training sets to generate classifications or predictions. Each narrow AI system performs one well-defined task in a single domain. The best narrow or single-task AI systems outperform humans. However, most narrow AI systems must retrain with new training sets to learn other tasks.[32]

Laviniu Bojor, colonel in the Romanian Armed Forces and director of the Department of Military Sciences at "Nicolae Bălcescu" Land Forces Academy, defines narrow AI similarly. He says,

> Narrow AI is the artificial intelligence of the present, being characterized by the ability to perform specific tasks. . . . Narrow AI is characterized as extremely fast and clever in the domain it was created for, but it is limited to performing pre-defined sets of functions, without having emotions, beliefs, sensitivity or consciousness. Narrow AI is able to beat the world champion at GO, considered one of the most creative games in the world, but the same algorithm is extremely limited in performing other tasks.[33]

A characteristic of narrow AI is that "narrow AI programs *do not know what they do.* They *cannot transfer their performance to other domains*."[34] Recall from the previous

---

[32] Hole, "A Thousand Brains," 8.

[33] Laviniu Bojor, "The Operational Environment," *Land Forces Academy Review* XXIV, no. 4 (2019): 265-270, 265-266. Jnr echoes this when he says, "Narrow AI (sometimes referred to as weak AI) is basically AI trained to perform a singular task whilst strong AI unlike Narrow AI handles a variety of tasks." Jnr, "Artificial Intelligence in Healthcare," 3. This definition is also supported by Pilling, Lindley, Akmal, and Coulton when they say, "The reality of AI technology, perhaps viewed as mundane in comparison, are commonly referred to as narrow AI and operate by completing specific singular tasks." Franziska Pilling, Joseph Lindley, Haider Ali Akmal, and Paul Coulton, "Design (Non) Fiction: Deconstructing/Reconstructing the Definitional Dualism of AI," *International Journal of Film and Media Arts* 6, no. 1 (2021): 6-32, 6.

[34] Hole, "A Thousand Brains," 8. Emphasis added.

section on machine learning the three categories of algorithms: supervised, unsupervised, and reinforcement. These kinds of algorithms are narrow AI.

In discussing the limitations of narrow AI algorithms, Hole says,

> Most learning algorithms, particularly deep learning algorithms, are greedy, brittle, rigid, and opaque. The algorithms are greedy because they demand big training sets; brittle because they frequently fail when confronted with a mildly different scenario than in the training set; rigid because they cannot keep adapting after initial training; and opaque since the internal representations make it challenging to understand their decisions. In practice, deep learning systems are black boxes to users. These shortcomings are all serious, but the core problem is that all narrow AI systems are shallow because they lack abstract reasoning abilities and possess no common sense about the world.[35]

He goes on to say that "It can be downright dangerous to allow narrow AI solutions to operate without people in the loop. *Narrow AI systems can make serious mistakes no sane human would make*."[36]

Narrow AI is used in a variety of commonplace activities. In discussing this, Pilling notes that it is not restricted to trivial spheres of influence, but is increasingly being used in areas that many people might find concerning. He says,

> Narrow AI, frequently operating through Machine Learning (ML), helps augment a range of day-to-day activities such as shopping, dating, television recommendations and more problematically are increasingly involved in hiring decisions and prison sentencing, positioning algorithmic decision making as an emerging governing power.[37]

Similarly, Jnr sees the future of narrow AI as being concern-worthy, due to its ability to disrupt even highly specialized industries such as healthcare. In discussing this he says,

> We mostly visualized factory workers and farmers as the two groups most at risk of disruption; however current trends prove that even the most highly sophisticated players such as lawyers and doctors are at risk of being disrupted by

---

[35] Hole, "A Thousand Brains," 9.

[36] Ibid. Emphasis added.

[37] Pilling, "Design (Non) Fiction," 6.

> AI and robots. Most people envisioning this take over imagine a sci-fi-like robotic figure acting like a human; yet the encroachment of robots into the realm of healthcare will begin as a rather benign narrow AI phenomenon, with robots trained to do specific tasks very well.[38]

Lastly, some involved in the study of narrow AI are also concerned about its ability to be utilized in armed conflict. In discussing potential future scenarios in relation to AI and the military, Bojor says,

> The [narrow AI] scenario is the one in which the operational environment of the armed conflicts will continue to be addicted to smart devices but the AI level will not exceed the human one and the decision-making process will be fully controlled by the people. Soldiers equipped with exoskeletons and military leaders connected to information networks capable of providing real-time images and videos will mark the future of the OE [operational environment].[39]

Bojor does not comment on whether such a use of AI would be a good or a bad thing, probably because it would depend largely upon the motives of the people wielding it. However, his comments do highlight that it is not just general and super AI that could be thought to be dangerous.

Thus, the average expectation about the future of narrow AI is that it will continue to be utilized in more and more industries. Its ability to support human endeavors is largely considered a valuable asset. Yet its ability to disrupt industries and be weaponized is concerning to many. There is hope that it will be improved such that it would not be dangerous to leave the conclusions it comes to unchecked by humans.

General AI – Explanation, Current State, & Future Expectations

General AI proponents aim to replicate human cognitive abilities with the belief that eventually a new kind of being will be created that is sentient, rational, and equal to

---

[38] Jnr, "Artificial Intelligence and Healthcare," 3.

[39] Bojor, "The Operational Environment," 268.

human cognitive ability.[40] This new kind of being would be considered an artificial general intelligence (AGI). The main difference between the general and narrow AI groups of thinkers is not what they actually build, but what they hope the thing they build will be a part of. The engineer who builds an optical character recognition engine can be either a proponent of general or narrow AI philosophically. He can build it fully aware that his immediate results will be purely for the purpose of human utility. However, he could also hope that it could one day be a part of an artificial consciousness. Thus, whether one is a proponent of general or narrow AI is not overly important for the individual engineer doing the work, day-in and day-out.

John McCarthy, the man who coined the term "artificial intelligence" and one of the founders of the field of computer science, is a proponent of AGI. In describing AI research, McCarthy says, that AI "is the science and engineering of making intelligent machines, especially intelligent computer programs."[41] An intelligent computer program is one that displays the characteristics of intelligence, but McCarthy defines intelligence more broadly then Thomist philosophers. To McCarthy, "Intelligence is the computational part of the ability to achieve goals in the world."[42] He goes on to say that "Varying kinds and degrees of intelligence occur in people, many animals and some machines."[43] He believes that "intelligence involves mechanisms, and AI research has

[40] General AI is also referred to as strong AI. For the remainder of the discussion, I will only use the term "general," but I do not mean to differentiate between general and strong in doing so.

[41] John McCarthy, "What is artificial intelligence?" (November 12, 2007), http://jmc.stanford.edu/articles/whatisai/whatisai.pdf, 2.

[42] Ibid.

[43] Ibid.

discovered how to make computers carry out some of them and not others."[44] Nils Nilsson, a computer scientist and another of the founding AI researchers, says, "The long-term scientific goal for many artificial intelligence (AI) researchers continues to be the mechanization of 'human-level' intelligence—even though reaching that goal may be many years away. Machines as intelligent as humans should be able to do most of the things humans can do."[45]

Over the last several decades technological advancements have made the replication of certain sentient powers possible. Optical character recognition, object identification, speech recognition, text translation, self-driving cars, chat bots, and automated assistants (i.e., Siri, Alexa, etc.) all have popular commercialized uses which have proven to be great aids to human efficiency. Technological advancements have made possible the creation of applications that are able to outsmart humans at characteristically intellectual games such as IBM's Deep Blue (Chess), IBM's Watson (Jeopardy), DeepMind's AlphaGo (Go), DeepMind's AlphaZero (Go, Chess, and Shogi), and Libratus (Poker). Advancements such as these have led some general AI proponents to make claims that achievement of a mechanized human level intelligence (AGI) is just around the corner.[46] But, what would an AGI look like?

---

[44] McCarthy, "What is artificial intelligence?", 3.

[45] Nils Nilsson, "Human-Level Artificial Intelligence? Be Serious!" *AI Magazine* 26 no.4 (Winter 2005): 68-75, 68.

[46] Irving John Good, "Speculations Concerning the First Ultraintelligent Machine," *Advances in Computers* 6 (1966): 31-88, 1; Ray Kurzweil, "The Law of Accelerating Return," (March 7, 2001), https://www.kurzweilai.net/the-law-of-accelerating-returns, 23, 37; Hans Moravec, "Rise of the Robots," *Scientific American* (December 1999): 124-135, 135; Kevin Warwick, *March of the Machines: The Breakthrough in Artificial Intelligence* (Chicago: University of Illinois Press, 2004), 21-38.

A variety of views have been posited in terms of what could constitute an AGI. Some believe that the end result of an AGI is to create a new kind of conscious intelligent being that is distinct from humanity. This is the view posited by most sci-fi portrayals wherein humanoid robots exist as peers to humanity. We see this in the Jetson's cartoon where Rosy the robot maid is a member of the family. This also is evidenced in the Terminator movies wherein humanity is threatened by a rival robotic power. It is also seen in more contemporary shows such as Picard wherein a humanoid robot is so real and lifelike that no one, not even the robot herself, is aware that she is not human.

However, robotic peers of humanity are not the only examples of how a future AGI is imagined to play out. Nick Bostrom, a professor of philosophy at the University of Oxford and the director of Oxford's Future of Humanity Institute, believes that the creation of AGI technology could be used to free humanity from its mortal bounds. Bostrom believes that in the future, AGI technology will allow us to upload human minds into a virtual reality wherein we will never have to worry about pain or death again. In discussing the process by which a human mind would be uploaded to a computer he says,

> Uploading refers to the use of technology to transfer a human mind to a computer. This would involve the following steps: First, create a sufficiently detailed scan of a particular human brain, perhaps by feeding vitrified brain tissue into an array of powerful microscopes for automatic slicing and scanning. Second, from this scanning data, use automatic image processing to reconstruct the 3- dimensional neuronal network that implemented cognition in the original brain, and combine this map with neurocomputational models of the different types of neurons contained in the network. Third, emulate the whole computational structure on a powerful supercomputer (or cluster). If successful, the procedure would be a qualitative reproduction of the original mind, with memory and personality intact, onto a computer where it would now exist as software.[47]

[47] Bostrom, "The Future of Humanity," 66.

Bostrom's view is one that also plays out in our current sci-fi imaginings. In the recent show Upload, anyone who is on the verge of death can have their memories uploaded into a virtual reality where they can continue to live in what equates to a virtual retirement home indefinitely. This show also explores the possibility of downloading those consciousnesses into new bodies at a later point in time that would allow them to be able to be resurrected back into the physical world.

All of the current AI technologies are narrow AI and are nowhere near what is required for an AGI to exist. As we saw in the Types of AI section earlier, all the existing types of algorithms are rigid and frozen after they learn from their training session. There are not currently any continuous learning algorithms that allow a systems to keep learning new skill sets (type 1) after the initial training. In discussing this Hole says,

> A general AI [AGI] system needs to be a wide-ranging problem solver, robust to obstacles and unwelcome surprises. It must learn from setbacks and failures to come up with better strategies to solve problems. Humans integrate learning, reasoning, planning, and communication skills to solve various challenging problems and reach common goals. People learn continuously and master new functions without forgetting how to perform earlier mastered tasks. Humans can reason and make judgments utilizing contextual information way beyond any AI-enhanced device. People are good at idea creation and innovative problem solutions—especially solutions requiring much sensorimotor work or complex communication. No artificial entity has achieved this general intelligence. In other words, general AI does not yet exist.[48]

Humans continuously learn throughout their entire lifetime, thus, in order to achieve human level intelligence an algorithm that can continuously learn is required. Hole

[48] Hole, "A Thousand Brains," 9. Bojor echoes this sentiment when he says, "In the next stage we could have access to human-level AI or Strong AI, the one 'that can understand and reason its environment as a human would' (Dickson, 2017). This would be capable of self-learning, making connections, connecting itself to the architecture of the Internet and amplifying its capabilities by accessing Big Brother and IoT data, collecting the knowledge learned by other algorithms, being innovative, creative and confident in making decisions under pressure. "Over time these intelligences would be able to take over every role performed by human" (Heath, 2018). The exponential increase of AI power will combine all developed skills in one entity, which, although not present yet, has been named singularity technology (Figure 1)." Bojor, "The Operational Environment," 266.

suggests that "cooperation between neuroscientists and AI researchers to create general AI" is necessary in order to "overcome the stated limitations of current deep learning systems."[49] This is because an AGI must "have common sense knowledge, adapt quickly to new situations, understand abstract concepts, and flexibly use their knowledge to plan and manipulate the environment to achieve goals."[50]

Something that is not considered essential to an AGI is the nature of subjective experience. In discussing the requirements of AGI, Hole says that he does "not assume that general AI requires human-like subjective experiences, such as pain and happiness."[51] Thus, while AGI is expected to be cognitively equivalent to humanity, it is not expected to be entirely equivalent to humanity in that only humanity's reasoning and environment engagement aspects are considered important to the AGI view of AI.

Super AI – Explanation, Current State, & Future Expectations

Super AI proponents believe that AI is the next stage of the evolutionary process, where undirected evolution will become directed intentional evolution.[52] In discussing this, McCarthy, says, "Might an AI system be able to bootstrap itself to higher and higher

---

[49] Hole, "A Thousand Brains," 7.

[50] Ibid., 8.

[51] Ibid.

[52] Super AI is also referred to as ultra AI. For the remainder of the discussion, I will only use the term "super," but I do not mean to differentiate between super and ultra in doing so. For discussions of the evolutionary assumptions of AI see: Nick Bostrom, "The Future of Human Evolution;" Eric Chaisson, *Epic of Evolution Seven Ages of the Cosmos* (New York: Columbia University Press, 2005); José Luis Cordeiro, "From Biological To Technological Evolution," *World Affairs: The Journal of International Issues* 15, no. 1 (Spring (Jan-March) 2011): 86-99; William McLaughlin, "Human Evolution in the Age of the Intelligent Machine," *Leonardo* 17, no. 4 (1984): 277-287.

level intelligence by thinking about AI? . . . I think yes, but we aren't yet at a level of AI at which this process can begin."[53] But what does this mean?

Irving Good, a statistician, explains what is meant by artificial super intelligence (ASI) in his discussion of ultra-intelligent machines. He says,

> Let an ultra-intelligent machine be defined as a machine that *can far surpass all the intellectual activities of any man however clever*. Since the design of machines is one of these intellectual activities, *an ultra-intelligent machine could design even better machines*; there would then unquestionably be an *"intelligence explosion," and the intelligence of man would be left far behind*.[54]

This intelligence explosion is oftentimes referred to as the singularity or the technological singularity, which we touched on earlier in the chapter during our discussion of Moore's Law. The singularity refers to a future event wherein "the exponential increase of AI power will combine all developed skills in one entity, which . . . [will result in] a conscious machine smarter than humans," that will be uncontrollable by humanity.[55]

The reason that it is thought that an ASI will be created is that it is thought that intellectual capacities are limited by the material in which they are instantiated. By removing the biological constraints of human intellection, in the creation of AGI, it is thought that an exponential increase in intellectual powers will take place in a silicon-based intelligence. In discussing this Hole says,

> The human brain's limits are due to the biological circuits' slow speed, the limited energy provided by the body, and the human skull's small volume. Artificial systems have access to faster circuits, more energy, and nearly limitless short- and

---

[53] Nick Bostrom says something similar when he remarks, "'Intelligence' could here be understood as a general rubric for all those mental faculties that are relevant for developing new technologies, thus including for example creativity, work capacity, and the ability to write a persuasive case for funding." Bostrom, "The Future of Humanity," 65-66; McCarthy, "What is artificial intelligence?," 6. See also: Nick Bostrom, "The Future of Human Evolution," *Death and Anti-Death: Two Hundred Years After Kant, Fifty Years After Turing*, ed. Charles Tandy, 339-371 (Roa University Press: Palo Alto).

[54] Good, "Speculations," 31, 33. Emphasis added.

[55] Bojor, "The Operational Environment," 266.

> long-term memory with perfect recall. Whereas the embodied brain can only learn from data received through its biological senses (such as sight and hearing), there is nearly no limit to the sensors an AI system can utilize. A distributed AI system can simultaneously be in multiple places and learn from data not available to the human brain.[56]

John McCarthy sees a similar link between intelligence and physical computation/memory capacity. In discussing what AI is he asks, "Are computers fast enough to be intelligent?"[57] before going on to define intelligence. In defining intelligent beings, he says, "I see [intelligences] as speed, short term memory, and the ability to form accurate and retrievable long term memories."[58] He goes on to say, "Computer programs have plenty of speed and memory but their abilities correspond to the intellectual mechanisms that program designers understand well enough to put in programs."[59]

Nick Bostrom expresses a similar view when he discusses the process by which the human mind would be uploaded to a computer. He says,

> Conversely, with sufficiently advanced scanning technology and enough computing power, it might be possible to brute-force an upload even with fairly limited understanding of how the brain works – perhaps a level of understanding representing merely an incremental advance over the current state of the art. . . . The limiting resource is computing power to store and run the upload minds.[60]

In other words, that which is thought to be the limitation to ASI is merely an appropriate level of computing power and memory large enough to store all the information that the algorithm would need to supersede humanity.

---

[56] Hole, "A Thousand Brains," 8.

[57] McCarthy, "What is artificial intelligence?," 5.

[58] Ibid., 3.

[59] Ibid., 4.

[60] Nick Bostrom, "The Future of Humanity," 67;

Like with AGI, ASI is not a current reality, and a particular AI engineer's philosophical view of AI is not relevant to the everyday reality of his job. However, this particular view of AI is important in terms of what projects are proposed and receive funding. This is evident in the large-scale ethical projects relating to AI.

Multiple organizations have been formed around understanding the future state and hope of humanity, based upon the assumption that an ASI, beyond human control, will be created. Two of the four main areas of research in Oxford University's Future of Humanity Institute are devoted to safety and governance of AI.[61] Cambridge University's Faraday Institute for Science and Religion as well as their Homerton College have both invested in research projects related to the creation of artificial consciousness's impact on humanity.[62] A collaboration of respected institutions has formed the Leverhulme Centre for the Future of Intelligence, which seeks to explore the future implications of artificial intelligence.[63]

Amongst those who believe an ASI is possible, there are mixed feelings of both excitement and trepidation.[64] Nick Bostrom exemplifies the fear when he says, "Superintelligent machines might be built and their actions could determine the future of humanity – and whether there will be one."[65] Interestingly only a few paragraphs later his

---

[61] "Research Areas," *Future of Humanity Institute – University of Oxford*, accessed July 18, 2021, https://www.fhi.ox.ac.uk/research/research-areas.

[62] John Wyatt and Peter Robinson, "Human identity in an age of nearly-human machines – the impact of advances in robotics and AI technology on human identity and self-understanding," *The Faraday Institute for Science and Religion*, accessed July 15, 2021, https://www.faraday.cam.ac.uk/research/robotics-and-ai.

[63] "About," Leverhulme Centre for the Future of Intelligence, accessed July 15, 2021, http://lcfi.ac.uk/about.

[64] Nick Bostrom, "The Future of Humanity," 53.

[65] Ibid., 52.

excitement is also evident when he says, “Superintelligent machines may be the last invention that human beings ever need to make, since a superintelligence, by definition, would be far more effective than a human brain in practically all intellectual endeavors, including strategic thinking, scientific analysis, and technological creativity.”[66]

This mix of fear and excitement over future technological possibilities is seen across many disciplines. Good agrees with Bostrom that “the first ultra-intelligent machine is the last invention that man need ever make, provided that the machine is docile enough to tell us how to keep it under control.”[67] Yet he also thinks “the survival of man depends on the early construction of an ultra-intelligent Machine.”[68] Put another way, he believes that mankind will be the cause of our own extinction event if we do not create an ASI soon, thus exemplifying the mixed feelings as relates to AI—feelings of both a need for ASI as well as a fear of it.

This fear of ASI is arguably more common than its excitement. In an interview with BBC, theoretical physicist Stephen Hawking claimed that, “The development of full artificial intelligence could spell the end of the human race.”[69] This sentiment has been echoed by Bill Gates and Elon Musk, amongst other technology giants, in a variety of interviews.[70]

---

[66] Bostrom, “The Future of Humanity,” 52, 53.

[67] Good, “Speculations,” 31.

[68] Ibid., 33.

[69] Rory Cellan-Jones, “Stephen Hawking warns artificial intelligence could end mankind,” *BBC News*, December 2, 2014, https://www.bbc.com/news/technology-30290540.

[70] Peter Holley, “Bill Gates on Dangers of Artificial Intelligence: ‘I Don’t Understand Why Some People are Not Concerned,’” *The Washington Post* (Jan 29, 2015), https://www.washingtonpost.com/news/the-switch/wp/2015/01/28/bill-gates-on-dangers-of-artificial-intelligence-dont-understand-why-some-people-are-not-concerned; Catherine Clifford, “Elon Musk: ‘Mark my words - A.I. is far more dangerous

Those that believe an ASI is possible, make varying predictions about how soon it could be a reality, as well as what that reality might look like. Bojor, in an attempt to provide projections for military operations, discusses two potential future cases. In discussing the worst-case scenario, he says,

> My military background taught me to consider the most dangerous course of action (MDCOA) a priority. This would mean an operational environment similar to a SF movie screenplay where the equipment specific to the Internet of Things will provide data and information to the algorithms of some learning machines which will pass from "Strong" AI (Artificial General intelligence) to ASI (Artificial Super Intelligence) and that super power, singularity technology, would turn against humanity. . . . it is not a question of whether the ASI can exterminate us but whether it wants to. One of the reasons would be that AI will reach a level where man becomes the useless 'village idiot' that machines have to take care of.[71]

This is the kind of scenario that Gates, Musk, Bostrom, and others fear. A world in which the creative and reasoning capacities of humanity are far out stripped by ASI, such that we could never compete with it. In such a view of reality mankind becomes useless and dependent upon ASI, as a superior being, for its survival.

However, as we saw with Bostrom and Good, not all of the projections about a future that contains ASI are doom and gloom. Bojor also posits a utopian possibility. He says that this

> scenario is a positive one, even utopian, and it can bring us immortality. We still find AI at a higher level than man; however, the power attained by singularity will not turn against us but will help us to solve many, if not all, the problems of the present . . . conflicts will disappear because there will be no political divergences, struggles for power or resources, or other challenges that will require the opening of new theaters of military operations.
> [ASI] will not accept being manipulated for the purpose of pursuing particular interests (even if they come from the state or the non-state that created it) and will lay the foundations of a new world that offers stability and security for everyone,

---

than nukes,'" *CNBC* (March 13, 2018), https://www.cnbc.com/2018/03/13/elon-musk-at-sxsw-a-i-is-more-dangerous-than-nuclear-weapons.html.

[71] Bojor, "The Operational Environment," 267.

> regardless of race, nationality or gender. A utopian world without terrorism and conflicts, without criminals or vandalism, so without the need to maintain large armies. A transparent world, without vices and without secrets to which ASI does not have access. [72]

Bojor's sentiment here is very idealistic. This is the kind of view that John Irving Good was getting at in the quote above, when he says that an ASI is necessary for the future existence of humanity.

Interestingly this view of AI helps illuminate why someone like Levchuk would see a connection between AI and religion. Bojor's description of reality paints an almost religious view wherein ASI is deified as the savior of humanity. Bojor actually uses religious language in his discussion of future possibilities. In discussing the creation of an ASI he says that if that were to take place it would be "the emergence and development of a God-like" being.[73]

With this we see that there are a variety of views about what AI is and what it could be. Understanding the different views is helpful because AI is often referred to without the qualifiers that we have discussed here. Therefore, by understanding the differences between these views and what each of them constitute we are able to better understand what people mean when they may not specify which of these they are referring to. It is also helpful because it allows us to understand where the current state of AI is and what would be required in order for any of the other states to become a reality. These differentiations will be helpful as we discuss AI and a Thomistic philosophy of mind in future chapters. But before we move on, there is one last thing we must discuss

---

[72] Bojor, "The Operational Environment," 267-268.

[73] Ibid., 268.

before concluding this chapter, because it has implications for the relevancy of one of our later chapters.

Moravec's Paradox

Oftentimes it is thought that AI has to do with intelligence in the strictly rational sense. In other words, it is thought that AI research is primarily to do with the human capacities that are distinct from the capacities that we share with animals. However, this is not strictly the case. It has actually been discovered that the strictly human capacities are significantly easier to reproduce mechanistically than the capacities that are unconscious for animals and toddlers. In discussing this, Hans Moravec, former Director of the Robotics Institute at Carnegie Mellon University says, "It is comparatively easy to make computers exhibit adult-level performance in solving problems on intelligence tests or playing checkers, and difficult or impossible to give them the skills of a one-year-old when it comes to perception and mobility."[74] This seeming oddity has been dubbed "Moravec's Paradox" and is widely referenced within the AI community.

Examples of Moravec's Paradox can be seen in the fact that in the 70ish years since AI first became a discipline of study, multiple algorithms have been created by different companies that have been able to outperform the world champion in multiple highly intellectual games. As we discussed earlier, IBM has created two algorithms that have been able to outperform the best human competitor in Chess (Deep Blue) and Jeopardy (Watson). Likewise, DeepMind has created two of their own algorithms that have been able to outperform the world champion in what is considered the most

[74] Hans Moravec, *Mind Children: The Future of Robot and Human Intelligence* (Cambridge: Harvard University Press, 1988), 15.

intellectual game in existence (i.e., Go) and one of those algorithms is able to play multiple intellectual games without retraining (i.e., AlphaZero).

While these algorithms cannot do everything within the scope of human intellection, they are able to do some human intellectual abilities significantly more efficiently than humans. This exemplifies the reality that at least some adult human intellectual capacities are easily automated. Yet routine and subconscious activities such as perception are still very difficult to automate and are considered largely unreliable. In discussing this Hole says,

> It can be downright dangerous to allow narrow AI solutions to operate without people in the loop. Narrow AI systems can make serious mistakes no sane human would make. For example, it is possible to make subtle changes to images and objects that fool machine learning systems into misclassifying objects. Scientists have attached stickers to traffic signs, including stop signs, to fool machine learning systems into misclassifying them. MIT students have tricked an AI-based vision system into wrongly classifying a 3D-printed turtle as a rifle. The susceptibility to manipulation is a big security issue for products that depend on vision, especially self-driving cars.[75]

The reason that Moravec believes that adult level reasoning tasks are easier to automate, while perceptive tasks are more difficult, is because he believes that perception is much more strongly developed and unconsciously ingrained due to a longer evolutionary development period. He thinks that human intellection (as opposed to perception) is a recently evolutionary development and not fully fleshed out and that is why highly intellectual activities like Go and Chess are hard for us. In discussing this he says,

> The deliberate process we call reasoning, is I believe, the thinnest veneer of human thought, effective only because it is supported by this much older and much more powerful, though usually unconscious, sensorimotor knowledge. We are all prodigious Olympians in perceptual motor areas, so good that we make the difficult look easy. Abstract thought, though, is a new trick, perhaps less than 100

[75] Hole, "A Thousand Brains," 8-9.

> thousand years old. We have not yet mastered it. It is not all that intrinsically difficult; it just seems so when we do it.[76]

Thus, within the AI community both intellection (that which is unique about human cognition) and perception (the part of cognition which we share with animals) are important to the conversation. In some circles perception might even be considered more important to the AI conversation due to the difficulty it poses to mechanization.

Conclusion

In this chapter we have briefly explored the history of AI. We have seen that the underlying ideas required to give birth to the AI project have long roots that reach back to antiquity. We have seen that the underlying ideas behind AI are dependent upon the conclusions of a variety of disciplines ranging from the natural sciences to the theoretical sciences to philosophy.

We have explored the variety of types of AI and the many disciplines that go into making AI research a reality. We have learned about how machine learning fits into those types. We have also seen the various philosophies of AI allowing us to identify the different views of what AI could be along with the future expectations of each of those views. By parsing these out we have been able to see where AI technology stands today in relation to the various views, in order to illuminate the current state of the AI project. From this we have discovered that all machine learning today are examples of narrow AI that are rigid and fixed to a specific skill set after they have been trained. We do not currently have any AI that is able to continuously learn, and this is a pre-requisite of AGI.

---

[76] Moravec, *Mind Children*, 15-16.

We have also seen that AGI is a pre-requisite for ASI and therefore until and unless an AGI is created an ASI is not possible.

We have also seen an almost religious hope in AGI and ASI in general. Whether it be the ability to upload human consciousness in order to avoid pain and death, through AGI, or the creation of an ASI that holds the fate of humanity in its hands, for good or ill, both scenarios exemplify a religious angle to most of the AI philosophies. Both AGI and ASI expose underlying desires for AI to be more than just a technology. In other words, in any discussion related to AI that goes beyond narrow AI, the conversation goes beyond merely scientific conclusions and technological possibilities. Rather the hopes of AGI and ASI fit squarely in the philosophy of religion category.

Finally, we have seen that because narrow AI is merely the creation of fixed tools to be utilized by humans for the optimization of human tasks, it is not something that could be used to as evidence of human origins. It is not what Levchuk is referring to when she discusses the creation of an artificial soul in silicon. Furthermore, because ASI is dependent upon the existence of AGI and is defined as that which far exceeds human intelligence, it too is not what Levchuk is referring to when she claims that a soul in silicon could be evidence against a divine spark in the human soul. Rather, Levchuk's claim is in relation to AGI since that is the level of AI that targets the creation of something equivalent with human intelligence. Given that AGI is what Levchuk has in mind when she believes that AI could be evidence of atheism, this is the philosophy of AI that will be the focus of the rest of the project. As we explore AI and Thomistic philosophy of mind throughout the rest of the project, all reference to AI will be in light

of AGI unless otherwise specified. Thus, with this in mind let us begin our exploration of AGI and its ability to be evidence of atheism as it relates to the philosophy of mind.

Chapter 3

Could AI speak to the prerequisites of human origins?

As we saw in the last chapter, Levchuk believes that "if we ourselves can create an artificial soul in silicon matter, the concept of a divine spark in our souls will give way to evolutionary Darwinism once and for all."[1] This is an interesting statement, because what it reveals is that Levchuk thinks that AI (i.e., "an artificial soul in silicon matter") could be evidence of *human* origins. Is this a realistic expectation? In this chapter, we are going to take a look at what it means to say that a human is a rational animal. This will take us through a look at the various aspects of the human soul, including what is meant by the term soul. These aspects are important to the AI conversation, because, while AI may be able to replicate some human functions, there are also some that it can never possess. These fundamental differences call into question AI's ability to provide evidence for *human* origins and therefore its ability to speak to whether human origins point towards or away from evolutionary Darwinism.

What can we learn about AI from the hierarchy of being?

In Aquinas' view of reality, being is stratified. There are different types of beings with varying capacities. Some beings possess the capacities of other beings but have additional capacities that make them distinct from those with whom they share similarities. Regardless of one's view of the original cause of those similarities and differences, that there are similarities and differences, which allow for categorization, is a

[1] Levchuk, "AI Vs. God."

universally acknowledged way of parsing out commonality and difference. This is evidenced by the well-known taxonomy of biology.

The way that Aquinas views these categories is much less complex than the taxonomy of biology, though not in conflict with it. Because Aquinas is a philosopher, rather than a biologist, he is not concerned with tracing out the detailed taxonomies of every being, but rather with parsing out the broad margins between large categories of beings.

Life

Aristotle and Aquinas' taxonomy of being draws the first major distinction between living and non-living beings. Aristotle says, "First of all we must treat of nutrition and reproduction, for the nutritive soul is found along with all the others and is the most primitive and widely distributed power of soul, *being indeed that one in virtue of which all are said to have life*."[2] Life is displayed in a number of ways, for Aristotle says,

> What has soul in it differs from what has not, in that *the former displays life*. Now this word has more than one sense, and provided any one alone of these is found in a thing we say that thing is living. *Living, that is, may mean thinking or perception or local movement and rest, or movement in the sense of nutrition, decay and growth*. Hence we think of plants also as living, for they are observed to possess in themselves *an originative power through which they increase or decrease* in all spatial directions.[3]

The one thing that all of these displays of life have in common is that they share a nutritive soul. Put another way, though "any one of these alone" is evidence of life, where there is life there is not one of these alone, insofar as the being is mortal. In touching on

---

[2] Aristotle, *DA* II.4. Emphasis added.

[3] Ibid., 2. Aquinas, *ST* Ia.78.1 *respondeo*; Aquinas, *QDDA* 13 *respondeo*. Emphasis added.

this Aristotle says, “This power of self-nutrition can be isolated from the other powers mentioned, *but not they from it*-in mortal beings at least.”[4] Now this is really interesting as it relates to the AI conversation, because it highlights a key difference, namely, that AI could never be alive. Though AI is able to demonstrate the “local movement and rest” aspect from the quote, it can never possess the power of self-nutrition. Furthermore, were we ever to conclude that AI is able to think or perceive, it would still not possess the power of self-nutrition, and without the power of self-nutrition it can never be said to be alive.

This might raise some questions about what constitutes self-nutrition. In the previous quote Aristotle defined it as “nutrition, decay and growth.” Later in the text he clarifies it by saying, “The acts in which it manifests itself are *reproduction* and the *use of food*.”[5] He also says later in book three that, “The movement of growth and decay, being found in all living things, must be attributed to the faculty of reproduction and nutrition, which is common to all.”[6] In discussing the same powers, Aquinas says,

> One is whereby it *acquires existence*, and to this is directed the “generative” [Aristotle’s reproductive] power. Another is whereby the living body *acquires its due quantity*; to this is directed the “augmentative” [Aristotle’s decay and growth] power. Another is whereby the body of a living thing is *preserved in its existence and in its due quantity*; to this is directed the “nutritive” power. . . . And the *generative power is served by the augmentative and nutritive powers; and the augmentative power by the nutritive*.[7]

In the context of the AI conversation, this then means that recharging a battery is not the same as nutrition. It is not the same, because the use of the energy from a battery is not

---

[4] Aristotle, *DA* II.2. Emphasis added.

[5] Aristotle, *DA* II.2,4. Emphasis added.

[6] Ibid., III.9.

[7] Aquinas, *ST* Ia.78.2 *respondeo*. Emphasis added.

the same as the use of food for reproduction and growth. In this quote, Aquinas shows us that the nutritive power serves the generative and augmentative power. While food is used to energize a living being, in order that it might continue to function, it is not the sole source of the continuation of life, in the same way that a battery is the sole source of the continuation of operation in battery operated machines. In speaking to this, Aristotle says, a living being "continues to live so long as it can absorb nutriment."[8] In a sense one could say that a battery continues to "live" so long as it is able to be recharged, but there is one important distinction that is being made here. That distinction is that a "dead" battery in a machine does not make the machine itself dead. Merely replacing the battery in a machine, even a battery that has been dead for months or years, is a sufficient condition for the machine to be operable again. The same cannot be said for living beings. While we can replace the parts of living beings with parts of other living beings or even artificial parts (i.e., synthetic heart valves, pacemakers, organ transplants), in a way that is similar to the replaceability of the parts of a machine, there is a point at which part replacement stops supporting life. Furthermore, there is a point at which resuscitation is no longer possible and life ends. Therefore, what we can learn from this is that the nutritive powers illuminate that there is something fundamentally different between living beings and machines.

This is a fascinating and important point because of a discussion that is taking place in relation to artificial life (Alife) research. The Alife program traces its roots, in part, to some of the same people as AI. Juan Carreño, a Thomist philosopher who provides a great overview of the current landscape of the Alife project in relation to

[8] Aristotle, *DA* II.2.

Thomistic philosophy, says, "The theoretical studies of John von Neuman, Alan Turing and Noerbet Weiner are often cited as direct precedents" of the Alife program.[9] He goes on to say, "The 'hard' (hardware) Alife is primarily a conceptually sophisticated program of robotics. Its most traditional and extended approach is historically linked with the theory of control systems and communication, and more recently with the artificial intelligence program."[10] In discussing the goal of the Alife program, he notes, "the classical approach, [which is] closely linked to the 'artificial intelligence program', has always had as its central objective the development of robotic systems endowed with autonomy, which is understood, in this context, as the ability of a system for moving and interacting with its environment without relying on the remote."[11] Therefore, Aristotle's parsing out of self-nutrition in this way is helpful and necessary in parsing out that AI could never be alive merely because it is able to interact with its environment.

Second, if an artificial intelligence is not alive, then it does not have a soul, because Aquinas, building off of Aristotle's comments discussed above, says, "To seek the nature of the soul, we must premise that the *soul* is defined as the *first principle of life* of those things which live: for we call living things 'animate,' and those things which have no life, 'inanimate.'"[12] Elsewhere he says, "life means the operation of the living, by which operation the *principle of life* is made actual."[13] This is fascinating, because it directly connects with Levchuk's statement. She thinks that a soul can be created in

---

[9] Juan Eduardo Carreño, "The Possibility of an Artificial Living Being in the Light of the Philosophy of Thomas Aquinas," *Angelicum* 94, no. 4 (2017): 635-672, 637.

[10] Ibid., 640.

[11] Ibid., 664. See footnote 34 in chapter one for more information on this topic.

[12] Aquinas, *ST* Ia.75.1. Emphasis added.

[13] Ibid., IaIIae.3.2. *ad* 1. Emphasis added.

silicon, but this seems to demonstrate a misunderstanding of what is meant by soul. Soul, at least in Aristotelean and Thomistic (AT) metaphysics, is something that *all* living beings have by virtue of being a living being. A soul is not something exclusively granted to humans.

Of course, one might object that AT metaphysics is not necessarily the only one that is used to support theism; therefore, this might not be the definition of a soul used by all theists. To this I would agree, but the question is not whether all definitions of a soul are valid definitions, nor whether they can all be said to support theism. What we are exploring is whether an AT PoM has anything to add to the mind-body conversation in relation to AI and theism. We are exploring this because of the perceived failure of Cartesian dualism as a PoM (as discussed in the previous chapter), which, if it has actually failed, makes it unhelpful in supporting theism in relation to atheistic PoM claims. Therefore, given the AT definition of a soul as the principle of life in living beings, it would be impossible for AI to be or have a soul if it is not alive.

Interestingly, the scientific evidence also supports the idea that a silicon being could not be considered a living being. Fazale Rana, a biochemist and senior research scholar at Reasons to Believe, in discussing the feasibility of silicon for supporting life says, "Based on its position in the periodic table, at first blush silicon is expected to have the best chance of any other chemical element to rival carbon as a life-support system. Silicon has similar chemistry to carbon."[14] He goes on to say, "But make no mistake, silicon chemistry only superficially resembles carbon's chemistry. In many respects,

[14] Fazale Rana, "Could Life Be Silicon-Based?" (May 25, 2022), https://www.twr360.org/blog/details/4861/could-life-be-silicon-based. Rana has recently become the President and CEO of Reasons to Believe.

silicon displays fundamentally distinct chemistry from carbon. This difference . . . undermines silicon's capacity to support life."[15]

Rana provides a variety of reasons for why silicon is not a suitable chemical for life in a lecture he gave at the National Conference on Christian Apologetics.[16] The most compelling reason was his discussion of the impact of oxygen on silicon as compared to carbon. In discussing this he says

> Carbon-carbon bonds are what carbon naturally forms, but silicon naturally forms silicon-oxygen bonds (not silicon-silicon though those are possible). This is because *silicon is highly reactive in the presence of oxygen*. *The product of a silicon reaction with oxygen is silicon di-oxide (sand)*. This is really really important because when carbon reacts with oxygen it oxidizes the carbon molecule which is a chemical process that liberates energy that the cell can actually use to power its operations. So its analogous to throwing a log on the fire (a log is made up of carbon based compounds and when you set it on fire, heat and light and energy are liberated and generating carbon di-oxide and water as the products. the cell is doing the same things, its taking organic compounds and its combusting them in a highly controlled manner such that the cell can make use of the end product which is carbon di-oxide and water). *This is really really significant because carbon di-oxide is soluble in water and air which means that when a cell breaks down organic materials and creates the waste products of CO2 and water the CO2 can defuse away from the cell into the atmosphere and it is a natural waste removal system. If a life form is based on silicon the oxidation product is silicon-dioxide which is a solid material and so that would kill the cell before it could even function there would be so much debris that would accumulate inside the cell that if life was based on silicon life wouldn't be possible because there would be no way to remove that waste*.[17]

In other words, silicon's oxidation process would not result in an environment that is suitable for a cell to thrive because the by-product has no way of being removed in order

---

[15] Rana, "Could Life Be Silicon-Based?"

[16] Fazale Rana, "Is it Possible for Life to be Based on Silicon?" Part of the *Engage & Equip: A Christian Conversation about Extraterrestrial Phenomena* Panel at the National Conference on Christian Apologetics (April 7, 2023) in Charlotte, North Carolina, 00:53:27-01:08:01.

[17] Ibid., Emphasis added.

for the cell to thrive. Rana is not the only scientist to come to this conclusion. MIT research scientists also affirm the inability of silicon to support life.

Janusz Petkowski, William Bains, and Sara Seager, research scientists at MIT in the fields of astrobiology, chemistry, and physics came to a similar conclusion. In their article titled, "On the Potential of Silicon as a Building Block for Life," they assess "whether or not silicon chemistry meets the requirements for chemical diversity and reactivity as compared to carbon. To expand the possibility of plausible silicon biochemistry, [they] explore silicon's chemical complexity in diverse solvents found in planetary environments, including water, cryosolvents, and sulfuric acid."[18] Based upon their analysis they conclude that "in no environment is a life based primarily around silicon chemistry a plausible option."[19] Thus, further undermining Levchuk's claim that a soul could be created in silicon.

Interaction with Environment

Under the category of *living* beings, the first major distinction is between beings which are able to sense their environment and those which are not. This bifurcation is exemplified in the difference between (1) plants and (2) animals and humans as a collective group. In defining this distinction Aristotle says, "It is the possession of sensation that leads us for the first time to speak of living things as *animals*; for even those beings which possess no power of local movement but do *possess the power of sensation we call animals* and not merely living things."[20] In *On Sense and the Sensible*,

---

[18] Janusz Petkowski, William Bains, and Sara Seager, "On the Potential of Silicon as a Building Block for Life," *Life* 10, no. 84 (June 10, 2020), https://doi.org/10.3390/life10060084.

[19] Ibid.

[20] Aristotle, *DA* II.5. Emphasis added.

Aristotle expands upon this when he says, "The most important attributes of animals, whether common to all or peculiar to some, are, manifestly, *attributes of soul and body in conjunction,* e.g. *sensation, memory, passion, appetite and desire* in general, and, in addition pleasure and pain. For these may, in fact, be said to *belong to all animals*."[21] This is really fascinating, because it exposes two of the three components that make up a being that is capable of interacting with its environment. A being that is capable of interacting with its environment has cognition, desire, and action.[22] Sensation and memory are part of cognition or perception, while passion and desire are part of appetite. The only thing missing from this quote is the action that follows desire.

In discussing the relationship between these three components, Robert Brennan, a Thomist, psychologist, and Dominican priest, says,

> *The cognitive organism [animal] is really not satisfied with the mere fact of knowing.* It needs more than this. We may say the same thing about the object that is known. Its nature is not complete in the intentional mode of existence which it shares with the subject of knowledge, but cries aloud to be absorbed whole and entire and in its proper objective mode of being. *And so there is engendered in the cognitive subject a desire to possess the object and hold it as it is in itself. The aspiration, thus created, tends to project the soul toward a union which will be real, and not merely intentional. The life of man and beast alike would end in indigence and fatuity unless it could pour itself out in desire.* Nature, however, has provided against this need, by supplying us with *appetites. Now, the law of appetite is the law of love; and love, in turn, begets action.* In this wise, then, by *knowledge, love, and action, the cycle of conscious life is complete,* and the powers of man and the animal are brought to perfect fruition.[23]

This is really interesting, because it highlights the essential link between cognition and action, namely appetite (or desire).

---

[21] Aristotle, *On Sense and the Sensible*, I.1. Emphasis added.

[22] Cognition and perception will be explored in chapter four.

[23] Robert Brennan, *Thomistic Psychology: A Philosophical Analysis of the Nature of Man* (New York: The MacMillan Company, 1941), 147-148. Emphasis added.

Much of the AI discussion is centered around whether a being could be created that could perform appropriate actions based upon non-specific input (i.e., can a machine respond well enough to convince someone it is human – the Turing test). However, this focuses on only two of the three essential aspects of animal action: (1) the cognitive aspect of AI (i.e., can it perceive) and (2) the action aspect (i.e., can it do the appropriate thing at the appropriate time efficiently). What seems to be missing from the conversation is the desire. Why does the input result in output? Why does it produce an output at all?

In both brute animals and humans, merely perceiving something does not necessarily result in action. Perceptive input does not necessitate any specific action, nor any action at all. For example, a dog can choose to watch a squirrel play in the yard or to chase the squirrel or to ignore it. Mere perception of the squirrel does not guarantee a specific response, nor does it guarantee a response at all. Furthermore, the perception of the same stimuli could result in different responses at different times or on different days. Therefore, in animals, cognition does not necessitate action, and inaction is not the result of a cognitive failure (i.e., not a bug in the code, as it were). The variety of responses or lack of response to perceived stimuli are all appropriate for an animal, because in living beings the appetitive power is an intermediary between cognition and action. In discussing this Aquinas says, "inclination belongs to the appetitive power of the soul, through which the animal is *able to desire* what it apprehends."[24] He goes on to say that "the appetite is a mover moved," in other words, the appetite is moved by the perceived

[24] Aquinas, *ST* Ia.80.1 *respondeo*. Emphasis added.

object, but is itself the mover of the animal to action.[25] Being *able* to desire is not the same thing as being required to do so.[26]

Granting for the sake of argument that a machine could perceive and could appropriately act, why would the perception result in action? What drives the input to result in the output? As we have seen, in cognitive beings, it is the appetitive powers. In non-cognitive beings, it is also an appetite, but of a different kind. In discussing this Aquinas say, "For in those which lack knowledge, *the form* is found to determine each thing only to its own being—that is, to its nature. Therefore, this *natural form is followed by a natural inclination, which is called the natural appetite*."[27] In other words, all beings have appetites, but non-cognitive beings have appetites that are driven by their form (i.e., the kind of thing they are). Natural appetites are not optional or diverse in the way that animal appetites are. A fire cannot choose whether it will rise; water cannot choose whether it will flow to the lowest point. Natural appetites are like software in that there are predetermined outputs given certain sets of conditions.[28] While a particular thing might have a lot of possible outputs, depending upon a variety of conditions (i.e., water, ice, vapor, diverse boiling points based upon altitude, etc.), the range is controlled by the

[25] Aquinas, *ST* Ia.80.2 *respondeo*.

[26] The point I am trying to draw out here is that there is a difference between sensible and natural appetites. AI is hardcoded to run a response based upon an input and deviation from executing a predefined response is a failure in the program. However, this is not the case with sensible appetites. Input does not necessitate output in every circumstance for sensible beings. This is even more clear in the rational appetite where humans have the ability to will or not to will.

[27] Aquinas, *ST* Ia.80.1 *respondeo*. Emphasis added.

[28] Even humans have natural appetites that are predetermined and unchangeable. Humans have a natural appetite for the universal good that is not subject to the will and therefore we are not free in regards the ultimate good.

form in the same way that the available outcomes of a program are controlled by the code.

This is interesting, because, while AI has a much larger range of outcomes than a normal piece of software, it is still limited by its kind. As we saw in the previous chapter, there has been a lot of success in creating algorithms sophisticated enough to beat humans at characteristically intellectual games such as IBM's Deep Blue (Chess), IBM's Watson (Jeopardy), DeepMind's AlphaGo (Go), DeepMind's AlphaZero (Go, Chess, and Shogi), and Libratus (Poker). However, each of these algorithms are limited to either a particular game or to gaming in general. Even AlphaZero, which is able to play multiple games, is not able to do the myriad of other things that animals can do. Furthermore, AlphaZero cannot choose not to play the game. McCarthy touches on this when he says

> The [coding] language used by the Deep Blue program that defeated world chess champion Garry Kasparov *cannot be used to express* "I am a chess program, but consider many more irrelevant moves than a human does." *and draw conclusions from it*. The designers of the program did not see a need for this capability. Likewise, *none of the programs that competed* in the DARPA Grand Challenge contest to drive a vehicle *knew that it was one of 20 competing programs*. The DARPA referees *prevented the vehicles from seeing each other by making them pause when necessary*.[29]

In other words, these programs that are considered highly advanced are still quite limited by the kind of programs they are. They have been built with much sophistication in one single area of specialization, but do not have the capacity to perform in diverse areas of expertise. That which connects the input and output in AI is more like the natural appetites of non-cognitive beings than the appetites of cognitive beings. This difference in kind in relation to appetites exposes another area where AI is different from humans.

[29] McCarthy, "The Philosophy of AI," 4. Emphasis added.

Understanding vs. Category Attribution

Within the category of beings that are able to interact with their environment, there is a subset which is able to understand it. This bifurcation exemplifies the difference between (1) non-human animals (sometimes called brute animals) and (2) humans. All animals are able to perceive their environment and engage it. However, only humans are able to go beyond environment-engagement to understand their environment in an abstract way. In discussing how we understand by way of abstraction, Aquinas says, "Abstraction may occur in two ways: First, by way of *composition and division*; thus we may *understand that one thing does not exist in some other, or that it is separate therefrom*. Second, by way of *simple and absolute consideration*; thus we *understand one thing without considering the other*."[30] This ability to compose, divide, and consider that which has been presented to us through sense cognition is the process by which we have the ability to not only recognize that which we perceive, but also to recognize it as belonging to a specific category. In discussing this Aquinas says,

> Color can be understood independently of the apple. Likewise, the things which belong to the species of a material thing, such as a stone, or a man, or a horse, can be thought of apart from the individualizing principles which do not belong to the notion of the species. This is what we mean by abstracting the universal from the particular, or the intelligible species from the phantasm; that is, by considering the nature of the species apart from its individual qualities represented by the phantasms.[31]

Put another way, all animals, including humans, are able to recognize things insofar as the particular instance of the thing is considered. But only humans have the ability to go

---

[30] Aquinas, *ST* Ia.85.1 ad 1. Emphasis added.

[31] Ibid. Emphasis added.

beyond mere category attribution[32] to reflect upon the category itself. This is really interesting as it relates to AI, especially to anyone familiar with object-oriented programming.

To those unfamiliar with it, object-oriented programming (OOP) is a computer programming model. While "procedural programming is about writing procedures or functions that perform operations on the data . . . object-oriented programming is about creating objects that contain both data and functions."[33] Objects (also known as classes) are similar to the way in which one would describe the nature of a thing. An object (or class) has properties which hold the specific representation of that data for the particular instance of the class. They also have functions (or methods) which are blocks of code that are called to perform a specific function related to the class. One of the key features of OOP is the ability to create classes that can be inherited from one another in order to standardize shared properties and functions, so as to reduce duplication of code. The importance of this feature in relation to our conversation is that an object-oriented

---

[32] I am not sure of the best word to use here (re: category attribution). In Thomism category has a very specific meaning that I am not meaning to pull into this conversation. In some of the literature, AI is said to create *models* of the world or identify *patterns*. As will be seen in the section below, Object Oriented Programming (OOP) uses the word *class* or *object*. However, all of these words have a philosophically loaded meaning that I am not trying to bring into this conversation. The nuance I am trying to draw out here is that AI is able to look at a data set and, for lack of a better word, categorize it. An image recognition algorithm can identify what categories of things are in the image (i.e., dogs, cats, etc.). A document recognition algorithm can identify what kind of document is in the image (i.e., receipt, bill, legal document, etc.). This ability to identify categories, classes, or patterns such that it knows how to handle what is identified based upon the kind of thing identified is something that AI can already do. But it is also fundamentally different from being able to reflect on the category itself. An algorithm can identify that the image in a picture is a dog and then do something specific based upon that identification, but it cannot reflect on the nature of a dog in abstraction. It cannot sit and ponder what dog means for the sake of reflection alone. This distinction is what I am attempting to draw out in the comparison of category attribution vs. category reflection.

[33] "C++ OOP," *W3Schools*, https://www.w3schools.com/cpp/cpp_oop.asp. "OOP focuses on the objects that developers want to manipulate rather than the logic required to manipulate them." Alexander Gillis, "object-oriented programming (OOP)," *TechTarget*, https://www.techtarget.com/searchapp architecture/definition/object-oriented-programming-OOP.

developer reading Aquinas' hierarchy of being, as well as reading about the distinction between perception and abstraction, might see similarities between it and OOP inheritance. For the non-developer, it is worth briefly exploring this since software development concepts are foundational to a discussion of AI (being software itself). In the same way that something is lost by not being able to read an author and think about their ideas in the author's original language, there is something that is lost to those participating in the AI discussion without being able to read and think in code. It is for them that I attempt to provide some insights in an effort to reduce the gap.

In OOP, objects or classes have properties which contain information related to the kind of class the properties are a part of. They also have functions that can be triggered to perform a function relative to that class. Furthermore, a class can be inherited from and therefore define the minimum kinds of properties and functions required of the classes that inherits from it. In keeping with our hierarchy of being discussion, we could parse out the powers of the soul for living beings and interactive beings in terms of OOP classes in the following way:

```
public abstract class LivingBeing
{
    public abstract void GetNutritients();

    public abstract void Grow();

    public abstract void Reproduce();
}
```

This class defines that a LivingBeing must contain the functionality (i.e., powers) of being able to get nutrition, grow/shrink, and reproduce itself. Because it is an abstract class it does not define how those functions might be instantiated in a particular

LivingBeing but it does define that any living being must define those functions in some way.

We can then inherit from the LivingBeing and create an Animal class that has all the functions and properties required of a LivingBeing, but that also has properties and functions that are required of an Animal. Notice here we still have not defined how the functions of either the LivingBeing or the Animal are implemented, but we have defined that if a class is an Animal then it is also a LivingBeing and, therefore is required to implement both of these classes functions.

```
public abstract class Animal : LivingBeing
{
    public int NumberEyes { get; set; }

    public int NumberLimbs { get; set; }

    public bool IsWarmBlooded { get; set; }

    public abstract void Relocate();

    public abstract void Perceive();
}
```

Having defined what it means to be a LivingBeing and an Animal, we can then implement these classes in a non-abstract, particular class.

```
public class Bird : Animal
{
    public string FeatherColor { get; set; }

    public int BeakLength { get; set; }

    public Bird(string featherColor, int beakLength)
    {
        NumberEyes = 2;
        NumberLimbs = 4;
        IsWarmBlooded = true;
        FeatherColor = featherColor;
        BeakLength = beakLength;
    }

    public override void Relocate()
    {
        //TODO: write code to make the bird fly or walk
    }

    public override void GetNutritients()
    {
        //TODO: write code to make the bird digest food
    }

    public override void Reproduce()
    {
        //TODO: write code to make the bird produce eggs
    }
}
```

Here we have a Bird class that inherits from Animal. It is not an abstract class which means that it is required to implement all the abstract functions from all the classes it or its parent classes have defined. Therefore, we would need to put in the specific code to make the bird fly in the Relocate function, as well as for all the other powers that a Bird

has, as a LivingBeing and Animal. We could then create an Octopus class that also inherits from Animal, but that implements the functions in a different way.

```
public class Octopus : Animal
{
    public int NumberSectionCups { get; set; }

    public Octopus(int numberSectionCups)
    {
        NumberEyes = 2;
        NumberLimbs = 8;
        IsWarmBlooded = false;
        NumberSectionCups = numberSectionCups;
    }

    public override void Relocate()
    {
        //TODO: write code to make the octopus swim
    }

    public override void Grow()
    {
        //TODO: write code to make the octopus increase or decrease in size
    }

    public override void Perceive()
    {
        //TODO: write code to make the octopus aware of its environment
    }
}
```

Finally, when we are done defining all the requirements of what it means to be a LivingBeing, Animal, Bird, and Octopus, we can then instantiate individual instances of Bird and Octopus with different values for the properties and call the functions to perform the associated actions.

```
public void Main()
{
    var cardinal = new Bird("red", 2);
    cardinal.Relocate();

    var parrot = new Bird("green", 3);
    parrot.Grow();

    var blueRinged = new Octopus(2100);
    blueRinged.GetNutrients();

    var pacific = new Octopus(2240);
    pacific.Perceive();
}
```

With all this in mind let us return to the perception/understanding discussion from above. One popular form of AI today is image recognition technology (IR) or computer vision. In defining IR, one AI firm says,

> Computer vision is a broad field that uses deep learning to perform tasks such as image processing, *image classification*, *object detection*, *object segmentation*, image colorization, image reconstruction, and image synthesis. On the other hand, image recognition is a subfield of computer vision that *interprets images to assist the decision-making process*. Image recognition is the final stage of image processing which is one of the most important computer vision tasks.[34]

With IR technology, a computer system essentially looks at a picture, parses out the details in the picture, and matches those collections of properties to one or more classes (in the vein of the code classes we were just discussing). Such a system might use reflection, which is a software development concept that allows the code to read itself in order to determine what classes are available for matching with the image. Reflection allows the code to operate in a more abstract way than simply executing the classes as we saw in the "Main" function figure above.

In such a system, the application may behave in a highly abstract way, but what is taking place is more *like* perception than it is understanding, and the reason we know this is because the code is dealing with a particular. It would be attempting to match particular collections of properties from the image to classes, and, while this requires the system to "know" what the classes look like in terms of properties, it does not allow for the system to ponder or ruminate on the concept of the class for its own sake. Put another way, while the system could look through its list of classes (i.e., LivingBeing, Animal, Bird, Octopus, etc.) and compare the properties of the objects it found in the image to the properties of the classes it has, in order to see which one matches, and while the system may even be able to create a new dynamic class based upon the properties found if it could not find an existent class that matches. What it cannot do is dwell on what it means

---

[34] Rafia, "Artificial Intelligence (AI) Image Recognition," *Logicai*, https://logicai.io/blog/using-artificial-intelligence-ai-image-recognition. Emphasis added.

to be a Bird just for the sake of dwelling on that. It only looks at the Bird class insofar as it is necessary to utilize it for categorizing the particular.

This distinction between being able to utilize categories and classes in order to engage one's environment is markedly different from being able to ponder the categories and classes for their own sake. It is the difference between me thinking about *my dog* versus me thinking about the *concept of dog* in general. In the quote we saw earlier, Aquinas says, "This is what we mean by *abstracting the universal from the particular,* or the *intelligible species from the phantasm*; that is, by *considering the nature of the species apart from its individual qualities* represented by the phantasms."[35] In other words, the difference between perception and understanding is the ability to not only cognitively engage the individual properties, nor merely the ability to categories individuals into collections, but also the ability to cognitively reflect upon the category itself as a thing of value in distinction from the particulars in which it is instantiated.

Thus, the difference between environment-engagement and understanding seems to highlight another area wherein the nature of AI is different from human nature, in that AI's interaction with abstractions is more like that of perception then it is like that of understanding. It utilizes classes for the purpose of classification and can even create new classes within its object bank, but it does not contemplate the classes in themselves for the sake of themselves. This distinction highlights another difficulty in Levchuk's claim that AI could be used to make claims about human origins.

[35] Rafia, "Artificial Intelligence," Emphasis added.

What makes human action different?

Now that we have taken a cursory look at Aquinas' hierarchy of being and some ways in which it can illuminate key differences between AI and humans, let us take a deeper look at how Aquinas parses out the specific difference of mankind. For Aquinas, rationality does not exclusively denote logic, reasoning, and decision making. By that I mean, it is not exclusively what one would learn in a critical thinking or logic class. Aquinas parses this out in his discussion of the will when he says,

> Now there are some things intelligible which have not a necessary connection with the first principles; such as contingent propositions, the denial of which does not involve a denial of the first principles. And to such the intellect does not assent of necessity. But there are some propositions which have a necessary connection with the first principles: such as demonstrable conclusions, a denial of which involves a denial of the first principles. And to these the intellect assents of necessity, when once it is aware of the necessary connection of these conclusions with the principles; but it does not assent of necessity until through the demonstration it recognizes the necessity of such connection.[36]

Here he distinguishes between (a) demonstrable conclusions of which a denial would be a denial of first principles and (b) intelligible things which do not have a necessary connection to first principles. Reason and rationality are colloquially associated with (a) but to say that a human is a *rational* animal is not merely to say that he is capable of following logical demonstrations to conclusions based upon first principles.

This draws out a major distinction between Thomist PoM and AI PoM, namely, that Thomist PoM does not reduce human rationality to logic. McCarthy, in discussing the presuppositions of AI, defines two strands of AI philosophy. He says, "Our way is called *logical AI*, and involves *expressing knowledge in a computer in logical languages and reasoning by logical inference*, including nonmonotonic inference. The other main

[36] Aquinas, *ST* Ia.82.2 *respondeo*.

approach to AI involves studying and imitating human neurophysiology."[37] He believes that the logical AI view of AI approaches human reasoning with the following presupposition: "Common sense knowledge and reasoning are expressible as logical formulas and logical reasoning. Some extensions to present mathematical logic are needed."[38] Though, McCarthy claims that the AI project differs from PoM, because "AI is concerned with designing computer programs that think and act," while PoM "studies mind as a phenomenon and studies how thinking, knowledge, and consciousness can be related to the material world," his belief that human level AI is achievable exposes that they must overlap far more than that.[39] The reason they must overlap is that you must know what a mind is in order to know whether you have created one. Thus, in order to know whether you have achieved human level intelligence, you must first know what human intelligence is. Therefore, it is important to parse out what is meant by rationality. In order to do so, we must study those beings which are uncontestably considered to possess this quality.[40] Since artificial intelligence research is aimed at replicating human

---

[37] John McCarthy, "The Philosophy of AI and the AI of Philosophy," (June 25, 2006) http://jmc.stanford.edu/articles/aiphil2.html, 7. Emphasis added.

[38] Ibid., 12.

[39] Ibid., 5. In discussing human level AI he says, "(Nilsson 2005) offers a criterion for telling when for human-level AI has been reached. It is that the system should be teachable to do a wide variety of jobs that humans do—in particular that it should be able to pass the examinations used to select people for these jobs, admitting that passing the exams may be possible without having adequate common sense to do the job. Nilsson is not specific about what kind of teaching is involved, and his criterion is weaker than Lenat's requirement that the system be able to learn from textbooks written for humans. I agree that this is one of the requirements for human-level AI." McCarthy, "The Philosophy of AI and the AI of Philosophy," 4.

[40] Setting aside the question of whether there are other kinds of intelligent beings such as angels and God. The AI conversation is rooted in naturalism thus for the remainder of the paper when talking about intelligence, as though there is only one kind, this is done from the perspective of identification with the naturalist's frame of reference (not necessarily an agreement with it). The reason for this is that it does no good to appeal to things that one's conversation partner would not consider evidence. Thus, to try to define intelligence, for the purpose of conversing in the AI domain, by abstracting from beings that AI proponents do not think exist, is to refuse to engage in the conversation that is actually taking place.

cognitive behaviors, there seems to be a tacit acknowledgement that intelligent being is synonymous with human being. Put another way, AI research is aimed at replicating the behavior of a very specific animal, the *rational* animal, which is the human. Thus, AI research tacitly acknowledges that there is something different about humans from all other animals. What exactly is that difference?

According to Aquinas, human rationality encapsulates all of what it means to be a human over and above what it means to be an animal. It is the ability to self-determine, over and above the ability to merely engage one's environment. In discussing this Aquinas says,

> Now, there are some created substances that *do not activate themselves*, but are by force of nature moved to act; such is the case with inanimate things, plants, and brute animals; for to act or not to act *does not lie in their power*. It is therefore necessary to go back to some first things that *move themselves* to action. But, as we have just shown, *intellectual substances* hold the first rank in created things. *These substances, then, are self-activating. Now, to move itself to act is the property of the will, and by the will a substance is master of its action, since within such a substance lies the power* of acting or not acting.[41]

In other words, for Aquinas, personhood is demonstrated in self-possession – the ability to be master of one's-self.[42] But what does that mean? What does that look like? What exactly is the demarcating line between humans and the rest of the animal kingdom? Aquinas thinks that what distinguishes human acts from other animal acts is that they are

---

[41] Aquinas, *SCG* II.47.3. Emphasis added. "Hence, though brutes are in a sense said to move themselves, inasmuch as one part of them moves and another is moved, yet they are not themselves the source of the actual moving, which, rather, derives partly from external things sensed and partly from nature. For, so far as their appetite moves their members, they are said to move themselves, and in this they surpass inanimate things and plants; but, so far as appetition in them follows necessarily upon the reception of forms through their senses and from the judgment of their natural estimative power, they are not the cause of their own movement; and so they are not master of their own action." Ibid., II.47.4. Emphasis added.

[42] "We are masters of our own actions by reason of our being able to choose this or that." Aquinas, *ST* Ia.82.1 *ad* 3; IaIIae.6.2 *ad* 2; IaIIae.6.3 *sed contra*.

voluntary. In discussing this he says, "those acts are properly called human which are voluntary."[43] He goes on to say, "The word *'voluntary' is applied to that of which we are masters*. Now we are masters *in respect of to act and not to act, to will and not to will*. Therefore, just as *to act and to will are voluntary*, so also are *not to act and not to will*."[44] Thus we can see that human actions are voluntary actions and that voluntary actions are those initiated by the will, whether they be to act or refrain from acting. Now the will is an appetite so it will be helpful to touch on what that means a bit more.

Earlier in the chapter we saw that machine appetites are more like the natural appetites of non-cognitive beings than they are like the sensible appetites of animals. Building upon this, Aquinas says, "The *appetitive power is a passive power*, which is naturally *moved by the thing apprehended*: wherefore the *apprehended appetible is a mover which is not moved, while the appetite is a mover moved*."[45] Elsewhere Aquinas says that, "A thing *requires to be moved* by something in *so far as it is in potentiality to several things*; for *that which is in potentiality needs to be reduced to act by something actual*; and *to do this is to move*."[46] What these two quotes mean is that the "apprehended appetible" is the thing apprehended, in other words, that which the appetite is tending towards or desiring (i.e., the apprehended cookie). The apprehended thing is a "mover

---

[43] Aquinas, *ST* IaIIae.6. "If any human action be the last end, it must be voluntary, else it would not be human, as stated above." Ibid., IaIIae.1.1 ad 2.

[44] Ibid., IaIIae.6.3 *sed contra*. Emphasis added. "*Voluntary is what proceeds from the will*. Now one thing proceeds from another in two ways…. Since, then, *the will by willing and acting*, is able, and sometimes ought, to hinder *not-willing and not-acting*; this *not-willing and not-acting is imputed to, as though proceeding from, the will*. And thus it is that we can have the voluntary without an act; sometimes without outward act, but with an interior act; for instance, when one *wills not to act; and sometimes without even an interior act, as when one does not will to act*." Ibid., IaIIae.6.3 *respondeo*. Emphasis added.

[45] Ibid., Ia.80.2 *respondeo*. Emphasis added.

[46] Ibid., IaIIae.9.1 *respondeo*. Emphasis added.

which is not moved," which means the cookie moves the person who desires it insofar as the cookie moves the desire of the person. However, the cookie itself is not moved (or affected) in that interaction. The cookie does not desire the person. The relationship is one way when looked at from the perspective of the cookie. But, while the cookie is able to move the appetite, even though it is not itself able to move, the appetite is a "moved mover," which means that not only is it able to be moved by the cookie, but it is also able to move other powers.

Now the will is an appetite, thus it is both moved and a mover, but it is not a mover in the same way that it is moved. In discussing this, Aquinas says, "It is *not in respect of the same that the will moves itself and is moved*: wherefore *neither is it in act and in potentiality in respect of the same*. But forasmuch as it actually *wills the end, it reduces itself from potentiality to act*, in respect of the *means, so as, in a word, to will them actually*."[47] Gallagher, in commenting on Aquinas' answer in this passage says, "The key to Thomas's answer is to show how *the will is in act and potency in different ways*. He claims that *will is in act with respect to the end* and *in potency with respect to the means to the end*."[48]

If, therefore, the will is a *moved* mover, what is it that moves the will to get it to move the other powers? Aquinas says that, "every inclination [appetite] results from *a form*."[49] He goes on to say, "The *natural appetite* results from a *form existing in the nature of things*: while the *sensitive appetite*, as also the *intellective or rational appetite*,

---

[47] Aquinas, *ST* IaIIae.9.3 *ad* 1. Emphasis added.

[48] David Michael Gallagher, "Thomas Aquinas on the Causes of Human Choice," PhD diss., The Catholic University of America, Washington DC, 1989, ProQuest Dissertations & Thesis Global, 232. Emphasis added.

[49] Aquinas, *ST* IaIIae.8.1 *respondeo*. Emphasis added.

which we call *the will*, follows from an *apprehended form*."[50] Since appetites tend towards the good in a thing, then this means that the appetites that are based upon apprehension are moved based upon the *perceived* good.[51] In discussing this Aquinas says, "as the *natural* appetite tends to *good existing in a thing*; so the *animal or voluntary appetite* tends to a *good which is apprehended*."[52] He goes on to say, "in order that the *will* tend to anything, *it is requisite, not that this be good in very truth, but that it be apprehended as good*."[53] Now this is very interesting because it sheds light on why humans desire things that are, in reality, bad for them.

Personal experience makes it abundantly clear that humans often times desire that which is not good for them. There are extreme cases that exemplify this such as substance abuse or lifestyle choices that result in behaviors that have a consequence of jail time. But nearly every person can think of a time in their life when they desired something that turned out to not be in their best interest. Aquinas says that this is because human and animal appetites are not hardcoded in a failsafe way. They are not such that they cannot fail in desiring what is *actually* good. Rather, because human and animal appetites are based upon *apprehended* forms, the apprehended forms are able to lead us to desire things that in reality are not good, because of deficiencies in the apprehension. Therefore, unlike non-living objects (i.e., metallic objects), which unfailingly tend towards certain things, sensitive and intellectual beings tend towards certain things as a result of

---

[50] Aquinas, *ST* IaIIae.8.1 *respondeo*. Emphasis added.

[51] Aquinas says, "Now, the *object of the will is good*. Wherefore the *will can be directed to such opposite purposes as are contained under good*, such as to be moved or to be at rest, to speak or to be silent, and such like: for the *will can be directed to either under the aspect of good*." Ibid., IaIIae.8.1 *ad* 2.

[52] Ibid., IaIIae.8.1 *respondeo*. Emphasis added.

[53] Ibid. Emphasis added.

cognitive input. This draws out another layer to voluntary action, namely, voluntary action is dependent upon knowledge.

In discussing voluntary action's dependencies, Aquinas says, "Voluntariness *requires an act of knowledge* in the same way as it requires an act of will; namely, in order that it be in one's power to consider, to wish and to act."[54] He goes on to say, "It is essential to the voluntary act that its principle be within the agent, together with *some knowledge of the end*."[55] In other words, both will and intellect are required for an act to be considered voluntary. Apart from both, an act is not considered a voluntary act. In discussing people who have mental illnesses such that they are unable to utilize their reason to make decisions, Aquinas says,

> If concupiscence were to destroy knowledge altogether, as happens with those whom concupiscence has rendered mad, it would follow that concupiscence would take away voluntariness. And yet properly speaking it would not result in the act being involuntary, because in things bereft of reason, there is neither voluntary nor involuntary.[56]

This is why when mental competency is called into question, in relation to criminal behavior, a US court requires that a defendant be shown to be competent to stand trial. Those who are judged cognitively impaired, whether it be due to physical or emotional reasons, are deemed not competent to be held criminally responsible for their action. This is an acknowledgement that part of what makes an action voluntary is related to knowledge.

---

[54] Aquinas, *ST* IaIIae.6.3 *ad* 3. Emphasis added.

[55] Ibid., IaIIae.6.2 *respondeo*. Emphasis added.

[56] Ibid., IaIIae.6.7 *ad* 3. Emphasis added.

As we saw earlier, both animal and human appetites follow from the apprehended form.[57] This raises an interesting question, because Aquinas also notes that only human actions are considered voluntary.[58] Therefore, if only human actions are considered voluntary, and if both animal and human appetites follow from apprehended forms, and if every appetite follows from a form,[59] then why are animal and human actions different? If they both follow upon apprehended forms, then why is there voluntariness in humans but not in animals. Aquinas touches on this in his discussion between perfect and imperfect knowledge. He says,

> Now knowledge of the end is twofold; perfect and imperfect. Perfect knowledge of the end consists in not only apprehending the thing which is the end, but also in knowing it under the aspect of end, and the relationship of the means to that end. And such knowledge belongs to none but the rational nature. But imperfect knowledge of the end consists in mere apprehension of the end, without knowing it under the aspect of end, or the relationship of an act to the end. Such knowledge of the end is exercised by irrational animals, through their senses and their natural estimative power.[60]

In other words, both animals and humans apprehend and seek ends. Both know apprehended things as ends. But humans not only know apprehended things as ends, but also know the apprehended thing "under the *aspect* of end and the *relationship of the means to* that end."[61] Put another way, humans are able to reflect upon the fact that the apprehended form is an end, not merely seek it as an end. Furthermore, humans are able

---

[57] Recall Aquinas said, "the *sensitive appetite*, as also the *intellective or rational appetite*, which we call *the will*, follows from an *apprehended form*." Aquinas, *ST* IaIIae.8.1 *respondeo*. Emphasis added.

[58] Recall Aquinas said, "those acts are properly called human which are voluntary." Ibid., IaIIae.6.

[59] Recall Aquinas said, "every inclination [appetite] results from *a form*." Ibid., IaIIae.8.1 *respondeo*. Emphasis added.

[60] Ibid., IaIIae.6.2 *respondeo*.

[61] Ibid., Emphasis added.

to ponder about the available means to achieving that end, as well as mull over the relationships between those means and the end. This difference between perfect and imperfect knowledge impacts the kinds of judgments that these two kinds of beings can make.

In discussing free-will and judgments Aquinas says,

> Some things act without judgment; as a stone moves downwards; and in like manner all things which lack knowledge. And some act from judgment, but not a free judgment; as brute animals. For the sheep, seeing the wolf, judges it a thing to be shunned, from a natural and not a free judgment, because it judges, not from reason, but from natural instinct. And the same thing is to be said of any judgment of brute animals. But man acts from judgment, because by his apprehensive power he judges that something should be avoided or sought. But because this judgment, in the case of some particular act, is not from a natural instinct, but from some act of comparison in the reason, therefore he acts from free judgment.[62]

What we learn from this is that there are three kinds of actions in relation to judgment: (1) action without judgement, (2) action from non-free judgment, and (3) action from free judgment. Coupling this with what we learned about perfect and imperfect knowledge we can see that action without judgment is the result of that kind of being possessing no knowledge (i.e., rocks). Action from non-free judgement is the result of that kind of being possessing imperfect knowledge (i.e., animal). Action from free judgement is the result of perfect knowledge (i.e., human). Brennan has an interesting way of describing this difference. In commenting on what Aquinas says here, Brennan says, "The point about such *sensitive [non-free] judgments* is that they *represent an awareness of concrete relations only*. *Rational [free] judgments*, on the contrary, always *imply a knowledge of abstract relations.* The former are founded on a collation of particular images; the latter

[62] Aquinas, *ST* Ia.83.1 *respondeo*. Emphasis added.

on a comparison of universal ideas."[63] This helps illuminate why something may be able to interact with its environment in a highly complex way, yet not be considered to have free judgement, because all that is required to interact with one's environment is an awareness of concrete relations.

This all comes together in a really interesting way in relation to AI. As we saw earlier in the chapter, AI's appetite shares similarities with natural appetites in that it is hardcoded and has limited variability that is defined by the kind of algorithm it is. Now based upon what we have learned in this section about what constitutes a voluntary action, AI can also not be said to have voluntary action because AI's "knowledge," if it can even be called knowledge, is more like the imperfect knowledge of animals, than the perfect knowledge of humans. This means that any judgments that are made based upon this kind of knowledge are non-free judgments. They may be based off of a highly complex set of conditions, of which a human may not be able to trace the rationale, but that does not make them any less predefined than the irregularity of animal behavior. Put another way, the code of an algorithm is more like animal instinct than like human free judgment. The reason for this is that AI can only ever interact with concrete relations. It is not able to interact with abstract relations. As we saw that animals are able to apprehend ends and execute means to ends, even very complex means, so too AI can, in a sense, apprehend ends and determine the most efficient means to that ends, but in doing so AI is only ever interacting with the concrete relations, not abstract relations.

[63] Brennan, *Thomistic Psychology*, 131-132. Emphasis added.

Conclusion

Pulling this all together, we have seen that AI could never be considered alive. This was exemplified in a couple of different ways. We saw that there is a fundamental difference between self-nutrition and being battery powered. We also saw that silicon is not a viable option for the existence of life. Furthermore, the term “soul” is attributed to all living beings, not just humans. From all of this we are able to conclude that AI could never be considered to be or have a soul, because it differs in fundamental ways from living beings.

Next, we saw that although AI is able to interact with its environment, in a way reminiscent of animal behavior, its appetites are more like the natural appetites of non-cognitive beings than like the cognitive appetites of animals. This is because the range of options available to the AI is strictly limited by the kind of algorithm that it is. While algorithms have been created that can play multiple games, those algorithms are still limited to gaming in general, and an altogether different algorithm is required for other activities such as a chat bot or image recognition.

The discussion around hierarchy of being also showed us that there is a marked difference between perception and understanding. Although AI is able to take input and categorize it appropriately, it is not able to reflect upon the categories for their own sake. This ability to not only identify things as kinds for utilitarian purposes, but also to think about those kinds in distinction from their instantiation in a particular, for their own sake, highlights another area in which AI is different from humans.

Finally, through a look at human action, we have seen that human action is voluntary action, and that voluntary action is rooted in a combination of both appetite and

cognition. Since AI's appetite is more like natural appetites it is already at a disadvantage when comparing it to human action. Additionally, when comparing its cognitive processes in relation to that of humans, in relation to action, we see that the knowledge aspect of AI is more like animal knowledge than human. This is because it is dependent upon being able to make judgments based upon concrete, rather than abstract, relations. This illuminates why AI proponents believe that more efficient and cost-effective memory and CPU options will enable an AGI to be created. Furthermore, it also sheds light on another fundamental difference between AI and humans.

These differences undermine Levchuk's claim that AI could be evidence of human origins, because if AI is fundamentally different from humanity, then its prerequisites are also fundamentally different from human prerequisites. This means, that if an AGI is ever created, it would never cause "the concept of a divine spark in our souls [to] give way to evolutionary Darwinism once and for all," because one kind of being cannot be used as evidence for the requirements of another kind of being.[64]

[64] Levchuk, "AI Vs. God."

Chapter 4

Is human consciousness "a matter-embedded phenomenon"?

Returning to the article that inspired this project, Levchuk believes that the existence of religion is intricately tied to our understanding of consciousness. In discussing this she says, "Why has religion settled so deeply in the minds of our compatriots? . . . The simple answer is—consciousness."[1] She goes on to say that if "consciousness is a matter-embedded phenomenon, knowledge engineers should have no problems reverse engineering the brain, especially accounting for the advances in computing power and the speed of transistors."[2] She believes that if this is possible and an AGI is created then "it will be exactly the answer to the consciousness question that will end the centuries-old debate on the existence of God."[3] Thus, it is important that we take a look at consciousness since it is intricately linked to whether AI can be representative of human intelligence.

Much of what we discussed in the last chapter was focused on looking at the human from a third-person perspective. But there is something unique about a human in that it is not only able to be considered from the third-person perspective, it is also able to be considered from a first-person perspective, which is the hallmark feature of consciousness. Though the definition of consciousness is contested, discussions of consciousness typically focus on "what it *is like* to be" something. Some examples of this are: *what it is like* to be a dog or as we will see when we discuss hemisphere

[1] Levchuk, "AI Vs. God."

[2] Ibid.

[3] Ibid.

disconnection syndrome later in the chapter, *what it is like* to be the secondary hemisphere of a split-brain patient. What these questions are aimed at is understanding the subjective nature of experience.

Consciousness has received an array of attention in the literature under the headings of qualia, first-person privileged perspective, intentionality, subjectivity, privateness of thought, and the unity of experience. It is an essential aspect of any discussion related to AI for it gets at the heart of the issue. It is in this sphere that the key questions are raised, such as whether a species of being that was indistinguishable from humans could exist without consciousness (i.e., the zombie thought experiment[4]) and whether consciousness *just is* the collection of all intelligent capacities such that to be able to do everything a human can do would *just be* what it means to be conscious.

An exploration of consciousness is extremely important in relation to the AI conversation, because AI directly addresses the question at the heart of the zombie thought experiment, namely, could there exist a being that is functionally identical to a human that is not conscious. Some philosophers, like David Chalmers, think the zombie

[4] "So let us consider my zombie twin. . . . What is going on in my zombie twin? He is physically identical to me, and we may as well suppose that he is embedded in an identical environment. He will certainly be identical to me functionally: he will be processing the same sort of information, reacting in a similar way to inputs, with his internal configurations being modified appropriately and with indistinguishable behavior resulting. He will be psychologically identical to me, in the sense developed in Chapter 1. He will be perceiving the trees outside, in the functional sense, and tasting the chocolate, in the psychological sense. All of this follows logically from the fact that he is physically identical to me, by virtue of the functional analyses of psychological notions. He will even be 'conscious' in the functional senses described earlier—he will be awake, able to report the contents of his internal states, able to focus attention in various places, and so on. It is just that none of this functioning will be accompanied by any real conscious experience. There will be no phenomenal feel. There is nothing it is like to be a zombie." David Chalmers, "Is Consciousness Logically Supervenient on the Physical?" *The Conscious Mind in Search of a Fundamental Theory* (Oxford: Oxford University Press, 1996): 93-105, 95-96.

thought experiment is conceptually coherent, while others like Daniel Dennett[5] and Susan Blackmore[6] think that it is patently absurd. In discussing the logical possibility of zombies, Chalmers says,

> The idea of zombies . . . is a strange one. For a start, it is unlikely that zombies are naturally possible. In the real world, it is likely that any replica of me would be conscious. For this reason, it is most natural to imagine unconscious creatures as physically different from conscious ones—exhibiting impaired behavior, for example. But the question is not whether it is plausible that zombies could exist in our world, or even whether the idea of a zombie replica is a natural one; *the question is whether the notion of a zombie is conceptually coherent*. The mere intelligibility of the notion is enough to establish the conclusion.[7]

This is an important point, because it highlights a key aspect of the conversation, namely, that one's stance on the legitimacy of the experiment is revelatory of one's presuppositions. Owen Flanagan and Thomas Polger say that the experiment is important, because it "forces the question of the function of consciousness."[8] Blackmore's disagreement with the legitimacy of the experiment is grounded in her view of origins. She says,

> Imagine a replay of evolution in which some of our ancestors were zombies while others were conscious—we can call them conscies. Natural selection now gets to work on this mixed population of zombies and conscies, and what happens? Absolutely nothing happens because, by definition, zombies are indistinguishable from conscies. They look the same, act the same, and say the same kinds of things. *This means that natural selection would have nothing to work on. Any*

---

[5] Daniel Dennett, "The Unimagined Preposterousness of Zombies: Commentary on Moody, Flanagan, and Polger," *Brainchildren: Essays on Designing Minds*, (Cambridge: MIT Press, 1998): 171-180.

[6] "But if you believe that consciousness is inseparable from the skills we humans have, then zombies could not exist and the whole idea is daft. I think the whole idea is daft. Nevertheless, it remains extremely alluring, largely because it is so easy to imagine a zombie. Yet being easy to imagine something is not a good guide to the truth. So let's consider another aspect of the same problem—whether consciousness does anything." Susan Blackmore, *Consciousness: A Very Short Introduction*, 2nd ed. (Oxford: Oxford University Press, 2017), 33.

[7] Chalmers, "Is Consciousness Logically Supervenient on the Physical?," 96. Emphasis added.

[8] Owen Flanagan and Thomas Polger, "Zombies and the Function of Consciousness," *Journal of Consciousness Studies* 2 no. 4 (1995): 313-321, 314.

> *increase or decrease in zombies over conscies would be entirely random. This curious conclusion makes nonsense of the idea that consciousness is an optional extra, a useless by-product, or an epiphenomenon*. It is best to throw out the whole idea of zombies and move on. This leaves two other possibilities: either consciousness is an adaptation or it necessarily comes along with, or is an aspect of, other adaptations.[9]

Thus, her view of why zombies are impossible is because she believes that humans are the product of natural selection and therefore there must be a functional difference between beings with and without consciousness. This leads her to believe that any machine that could replicate the functions of humans would be conscious, at least to the same degree that humans are conscious, for she actually thinks that consciousness is an illusion.[10]

Though not immediately apparent, Aquinas has a lot to say about consciousness. Therese Cory has written extensively on this subject in her book *Aquinas on Human Self-Knowledge* and so she will be our guide through Aquinas' contribution to the consciousness conversation.[11] In doing so we will explore the difference between self-awareness and quidditative self-knowledge. We will answer questions such as (1) what does Aquinas say about self-awareness, (2) what does he think about quidditative self-knowledge, and (3) which of his arguments for the immateriality of the intellect stands the best chance of attracting an AI proponent into engagement. In addition to exploring Aquinas' view, we will also explore some discoveries from neuroscience and psychology that raise difficulties for an immaterial explanation of the mind.

---

[9] Blackmore, Consciousness: A Very Short Introduction, 147-148. Emphasis added.

[10] Ibid., 73-88.

[11] Therese Scarpelli Cory, *Aquinas on Human Self-Knowledge*, (Cambridge: Cambridge University Press, 2014).

It is worth reiterating that this is a project aimed at exploring whether the successful creation of an AGI would be evidence of atheism and so the following look at Aquinas' view of consciousness will be limited in its scope. I will not be justifying Aquinas' view of consciousness, nor will I be exhaustively explaining the nuances and details of it. I will be providing a summary overview of the key parts that relate to the AI conversation, with the explicit aim of trying to find a point of intersection from which Thomists and reductive materialists might begin to engage one another on this topic. One thing that has become abundantly clear as I have researched this subject is that the conversations regarding consciousness have become siloed within their respective philosophical communities. If there is any hope of moving the conversation forward, both sides must take the arguments of the other into account. This will be the aim of this chapter, to outline a Thomistic view of consciousness, alongside the reductive materialist concerns, because any solid theory of reality should be able to handle the concerns of all parties involved.[12]

What does Aquinas say about consciousness?

Aquinas' theory was radical for its time. Situated between "the Neoplatonic and Aristotelian psychological traditions, the former stressing that self-knowledge is natural to the human mind, and the latter asserting the dependence of self-knowledge on cognition of other things," Aquinas sought to find a middle ground from which to explain

[12] "Thomistic epistemology is capable of explaining what happened, thus validating: Plato's dictum according to which superior insights can explain inferior ones." Frederick Wilhelmsen, "The 'I' and Aquinas," *Ethical Wisdom East and/or West* 51 (1977): 47-55, 53.

the phenomenon that both sides considered most pressing.[13] From an attempt to reconcile the apparent tension between privileged self-access and self-opacity, Aquinas' theory was born.[14] Rather than picking one side or the other, Aquinas saw the value of the contributions of both and, as a result, his theory of self-knowledge possesses both aspects. He says,

> Each person can have a twofold knowledge of the soul, as Augustine says. One of these is the knowledge by which the soul of each man knows itself only with reference to that which is proper to it. The other is that by which the soul is known with reference to that which is common to all souls. This latter, which concerns all souls without distinction, is that by which the nature of the soul is known. However, the knowledge which each has of his soul, in so far as it is proper to himself, is the knowledge of the soul as it exists in this individual. Thus, it is through this knowledge that one knows whether the soul exists, as when someone perceives that he has a soul. Through the other type of knowledge, however, one knows what the soul is and what its proper accidents are.[15]

In other words, there are two key pieces at play in relation to consciousness for Aquinas: (1) self-awareness and (2) quidditative or scientific self-knowledge. Self-awareness has more to do with our cognizing our own existence, while quidditative self-knowledge has more to do with understanding the nature of what the thing that we discover in self-awareness actually is. We will flesh these out in more detail in a moment, but for now they are worth summarizing because they highlight how the debate is framed, which highlights something very important about the contemporary debate, namely, that there is a disagreement over what the content of the debate should even be about.

---

[13] Cory, *Aquinas on Human Self-Knowledge*, 2. For a summary of the historical context and development of Aquinas' theory, see part one of the same book.

[14] Ibid., 1.

[15] Aquinas, *DV*, 10.8 *respondeo*. Emphasis added.

In *Conversations on Consciousness*, Susan Blackmore interviewed twenty-one of the leading experts in the various fields related to consciousness studies. In her interview with Daniel Dennett, the question of the nature of the debate surfaced, and Dennett said,

> There's a bi-modal distribution between people who think that any theory of consciousness that leaves out the first person is a hopeless theory, and those who think that any theory of consciousness that doesn't leave out the first person is a hopeless theory. *You've got to leave the first person out of your final theory. You won't have a theory of consciousness if you still have the first person in there, because that was what it was your job to explain. All the paraphernalia that doesn't make any sense unless you've still got a first person in there, has to be turned into something else.* You've got to figure out some way to break it up and distribute its powers and opportunities into the system in some other way.[16]

So right on the surface of it, Dennett would disagree with Aquinas' framing of the question. Aquinas recognizes that self-awareness or first-person perspective is an essential aspect of the discussion and that it should not be sidelined in the quest for quidditative knowledge.

Interestingly enough, this disagreement over the nature of the conversation is not a philosopher-scientist issue, as both Aquinas and Dennett are professional philosophers.[17] Nor is the disagreement merely a materialist-immaterialist issue as Francis Crick, a Nobel prize winning physics and one of the discoverers of the structure of DNA, expressed the need for multiple layers of explanation, even as he argued for the essentialness of a materialist explanation. In discussing Dennett's multiple drafts theory of consciousness, during the interview with Susan, the following exchange occurred:

---

[16] Interview with Daniel Dennett in Susan Blackmore, *Conversations on Consciousness* (Oxford: Oxford University Press, 2005), 87. Emphasis added.

[17] Though a Dominican priest, Aquinas is heralded as "the greatest figure of thirteenth-century Europe in the two preeminent sciences of the era, philosophy and theology, he epitomizes the scholastic method of the newly founded universities." Thus, it would seem legitimate to consider him a professional philosopher. Robert Pasnau, "Thomas Aquinas", *The Stanford Encyclopedia of Philosophy* (Spring 2023 Edition), Edward N. Zalta & Uri Nodelman (eds.), https://plato.stanford.edu/archives/spr2023/entries/aquinas/.

> Sue: Well one idea that I've been playing with for experiments is as follows. If Dan Dennett's multiple drafts theory is right, then there is no fact of the matter about which of the multiple things going on in the brain is conscious and which isn't. So…
>
> Francis: Now let me say why I think all that's nonsense; because essentially it's purely psychology and you're not talking about neurons. It must be an experiment that deals with neurons from our point of view.
>
> Sue: So do you think that the only legitimate experimental way forward is on neurons, and that psychology can't provide useful experiments?
>
> Francis: *No, but Dennett is mistaken because he isn't using a combination of the two*. Therefore, if you're basing your work on Dennett's ideas, you'll be liable to be criticized because Dennett simply isn't paying attention to neurons.
>
> And let me say that he agrees with this—he has said that neurons are not his department. So our view is that if you won't explain it in terms of neurons it's like saying that you're interested in evolution but genes are not your department.
>
> It's important to have the psychological stuff as well, but that's another level of explanation, and *both levels of explanation have got to be right*.
>
> Sue: And would you go for the lowest possible level of explanation? Is that the sort of explanation that would make you most happy?
>
> Francis: Oh yes. Eventually you've got to get down to neurotransmitters and things like that, you see. And it's a nice question whether consciousness is due to the concentration of calcium in a particular type of cell. *That's not the whole explanation, but it's part of the explanation, and it may be a crucial part*.[18]

Even as Francis critiques Dennett for his lack of materialist commitment, in his theory of consciousness, Francis affirms the value of psychological explanations. Thus, it is worth noting that, even in relation to the framing of the question, there is much work to be done to find a common ground between all the contributors to the discussion. However, trying to find common ground between all parties is not the goal of this project, as some

[18] Interview with Francis Crick in Blackmore, *Conversations on Consciousness*, 78. Emphasis added.

materialists may not be entirely appeased by our findings, even if properly argued. Nevertheless, we press on to explore Aquinas' view of consciousness.

Self-*Awareness*: Existence of the Soul

In discussing self-awareness, Cory says that it is related to "cognition of oneself as an individual, i.e., cognition '*that* the soul exists' (*quia/an/quod est*), which we call *self-awareness*."[19] Similarly Aquinas says that "the knowledge which each *has of his soul*, in so far as it is *proper to himself*, is the knowledge of the soul as it exists in *this individual*. Thus, it is through this knowledge that one knows *whether the soul exists*, as when someone *perceives that he has a soul*."[20] This means that what we are looking at in this section is not *what* the soul is but rather the ways in which we know *that* the soul is. This is important because these are the kinds of arguments that Dennett rejects when he says, "You've got to leave the first person out of your final theory. You won't have a theory of consciousness if you still have the first person in there, because that was what it was your job to explain."[21]

What is interesting is that Dennett acknowledges that we have self-knowledge when he says, "I think the reason that we find consciousness so hard is that *we have evolved a certain capacity for self-knowledge, a certain access to ourselves which gives us subjective experience—which gives us a way of looking out at the world from where we are*."[22] Furthermore, he asks the right question in relation to it when he goes on to say,

---

[19] Cory, *Aquinas on Human Self-Knowledge*, 63-64. Emphasis added.

[20] Aquinas, *DV*, 10.8 *respondeo*. Emphasis added.

[21] Interview with Daniel Dennett in Susan Blackmore, *Conversations on Consciousness* (Oxford: Oxford University Press, 2005), 87. Emphasis added.

[22] Ibid., 79-80. Emphasis added.

> *How can something have that perspective?* It might be just a thing, but it's a thing with a point of view, and *with the capacity to reflect on that point of view and talk about it*. Each one of us is trapped within a point of view. I can't ever get inside your head, and you can't ever get inside mine. *The undeniable fact that we have these perspectives is not closely parallelled with anything else we know about anything else*.[23]

What Dennett brings up here is introspection or what Cory will call the duality of conscious thought. He is referring to the subject-object distinction in intellectual cognition or higher consciousness. This is the ability to see self and other (or I-thou). This is interesting because, as we will see, one of Aquinas' arguments for the immaterial mind is based upon introspection or this ability to reflect back upon oneself in the process of thinking about other things.

However, Dennett does not come to the conclusion that we will see Aquinas come to. Rather Dennett gets stuck because of his evolutionary presupposition. When he brushes up against this presupposition it brings him back to a denial of the validity of self-awareness and a certain scoping of the search for consciousness project. This is seen when he says,

> Now, we are, in a sense, artefacts (and I mean that in the good sense of the term). *We have been created by the process of evolution*, both genetic and cultural. And what we're now trying to do [in relation to consciousness studies] is to reverse engineer ourselves, *to understand what kind of a machine we are that this [consciousness] can be true of us*.[24]

With all this in mind, in this section we are going to look at some Thomist reasons for how we know that the soul exists. This is important to the AI conversation because even Dennett acknowledges that self-awareness exists. The disagreement with Dennett is

---

[23] Interview with Daniel Dennett in Susan Blackmore, *Conversations on Consciousness* (Oxford: Oxford University Press, 2005), 80. Emphasis added.

[24] Ibid., 80. Emphasis added.

over what self-awareness tells us. Does it speak to the real existence of something unique that could not be mechanically reverse engineered?

Aquinas believes that there are two kinds of self-awareness: habitual and actual. In discussing this he says, "With reference to the first type of cognition [self-awareness] we must make a distinction, because one can know something *habitually* or *actually*."[25] *Actual* self-awareness is when the soul is known through its acts. Aquinas says,

> Concerning the actual cognition by which one actually considers that he has a soul, I say that the soul is known through its acts. For one perceives that he has a soul, that he lives, and that he exists, because he perceives that he senses, understands, and carries on other vital activities of this sort. For this reason, the Philosopher says: "We sense that we sense, and we understand that we understand, and because we sense this, we understand that we exist." But one perceives that he understands only from the fact that he understands something. For to understand something is prior to understanding that one understands. Therefore, through that which it understands or senses the soul arrives at actual perception of the fact that it exists.[26]

This is what Cory will call the duality of conscious thought. We will return to this kind of self-awareness more fully in a moment. *Habitual* self-awareness is tied to self-presence. Aquinas describes it when he says,

> Concerning habitual knowledge I say this, that the soul sees itself through its essence, that is, the soul has the power to enter upon actual cognition of itself from the very fact that its essence is present to it. This is like the case of one who, because he has the habit of some knowledge, can by reason of the presence of the habit perceive those things which fall under that habit. But no habit is required for the soul's perception of its existence and its advertence to the activity within it. The essence alone of the soul, which is present to the mind, is enough for this, for the acts in which it is actually perceived proceed from it.[27]

---

[25] Aquinas, *DV*, 10.8 *respondeo*. Emphasis added.

[26] Aquinas, *DV*, 10.8 *respondeo*. Emphasis added.

[27] Ibid., Emphasis added.

Cory describes *actual* self-knowledge as "a prephilosophical cognition of oneself acting" and *habitual* self-knowledge as "the soul's essential self-presence."[28]

Thus, Aquinas' view of self-awareness is based upon two aspects of his philosophical psychology: (1) habitual knowledge and (2) intellection. From these two components, Aquinas builds a theory of self-awareness that includes (1) habitual, (2) implicit, and (3) explicit aspects. His view of habitual self-awareness "makes implicit self-awareness possible" and his view of implicit and explicit self-awareness is a direct result of his view of intellection and the duality of conscious thought.[29]

Habitual Self-Awareness

In discussing how the mind knows itself Aquinas deals with habitual self-awareness. Returning to the quote from above, he says,

> *The soul sees itself through its essence*, that is, the soul has the power to enter upon actual cognition of itself from the very fact that *its essence is present to it*. This is like the case of one who, because he *has the habit of some knowledge, can by reason of the presence of the habit perceive those things which fall under that habit*.[30]

In other words, the soul habitually sees itself, because it is present to itself. He likens this self-presence to habitual knowledge, even though he says that "no habit is required for the soul's perception of its existence and its advertence to the activity within it."[31] Thus, to understand what Aquinas means in this passage, we need to touch on what he thinks it

---

[28] Cory, *Aquinas on Human Self-Knowledge*, 63-64. Emphasis added.

[29] Ibid., 168-169.

[30] Aquinas, *DV* 10.8 *respondeo*. Emphasis added.

[31] Ibid.

means to have habitual knowledge and also what he thinks it means for something to be present to us.

In discussing omnipresence in the *Summa Theologica*, he addresses the various ways in which something can be present to something else. He says,

> A king, for example, is said to be in the whole kingdom *by his power*, although he is not everywhere present. Again a thing is said to be by its presence in other things which are *subject to its inspection*; as things in a house are said to be present to anyone, who nevertheless may not be in substance in every part of the house. Lastly, a thing is said to be by way of substance or essence *in that place in which its substance may be*.[32]

In other words, there are three ways in which something could be present to something else. The first way, that we will look at, is the one most obvious to us and that has to do with physical proximity. Aquinas says that a thing can be present to us because we are "in that place in which its substance may be."[33] This is the most common understanding of "present to" and the one least helpful in relation to understanding how an immaterial soul could be present to itself.

The second way in which something can be present to us is that it can be present in a non-physical way by virtue of the power it wields over that which it is present to. Aquinas says, "A king . . . is said to be in the whole kingdom by his power."[34] Thus, if the soul is able to exert power over itself then it is present to itself in this way. This means that when we discussed humans having voluntary action and being masters of self in chapter three, this aspect of presence, through power, plays a part in that.

---

[32] Aquinas, *ST* Ia.8.3 *respondeo*. "A thing can be said to be present to another, when in its sight, though the thing may be distant in substance." Ibid., Ia.8.3 ad 2. Emphasis added.

[33] Aquinas, *ST* Ia.8.3 *respondeo*. Emphasis added.

[34] Ibid., Emphasis added. This idea is also reflected when Aquinas discusses how angels could be in a place. He says, "An angel is said to be in a corporeal place by application of the angelic power in any manner whatever to any place." Ibid., Ia.52.1 *respondeo*. Emphasis added.

Finally, "a thing is said to be by its presence in other things which are *subject to its inspection*."[35] This means that something can be present to something else by virtue of its ability to be inspected by that thing. At first blush this might seem to imply physical proximity, for the example Aquinas uses is of things in a house in which the inspector is present but not everywhere present. However, given habitual knowledge, this could also imply things which are subject to inspection even when they are outside of physical proximity. In order to understand this, we will need to understand what it means to have habitual knowledge.

In defining habitual knowledge, Aquinas says,

> Actual apprehension and retention differ in the possible intellect, not because the species are there somehow in a bodily manner, but only in an intelligible way. However, *it does not follow that one understands according to that species all the time, but only when the possible intellect becomes that species perfectly in act. Sometimes it has the act of this species incompletely, that is, in some way between pure potency and pure act. This is habitual knowledge.* The reduction from this to complete act takes place through the will.[36]

Elsewhere, when discussing Augustine's comparison of the trinity and the mind, he goes on to say of habitual knowledge,

> For *the mind* perfectly imitates the Trinity in this, that it *actually remembers, actually understands, and actually wills*. This is so because in the uncreated Trinity the middle Person is the Word. Now, there can be a word only with actual cognition. Hence, it is according to this kind of perfect imitation that Augustine puts the image in *memory, understanding, and will*. In it, *memory refers to habitual knowledge, understanding to actual cognition which proceeds from the habitual knowledge of memory,* and will to the actual movement of the will which proceeds from thought.[37]

---

[35] Aquinas, *ST*, Ia.8.3 *respondeo*. Emphasis added.

[36] Aquinas, *DV*, 10.2 *ad* 4. Emphasis added.

[37] Ibid., 10.3 *respondeo*. Emphasis added.

Between these two passages we get an idea of what is meant by habitual knowledge. Though not exactly memory, for that is a sensitive power corresponding to particular forms for Aquinas, habitual knowledge is like memory. Before understanding ever occurs the possible intellect is in "pure potency" to the universal. While understanding is taking place, the universal form (or species) is "perfectly in act" (or in "pure act"). Not only are there states of "pure potency and pure act," but there also exists a third state. That third state is "some way between pure potency and pure act" and it is what Aquinas calls habitual knowledge.[38]

The reason that Aquinas considers this third state important is because it explains why some things are known better than others, after having spent time studying them. In replying to Avicenna's view that habitual knowledge is not the result of "certain species [being] retained in the intellectual part," but rather that it is merely an aptitude for turning the agent intellect, Aquinas says,

> If some species were not conserved in the possible intellect, but there were in it only the aptitude of turning to the agent intellect, man would have an equal aptitude for any intelligible thing. Therefore, from the fact that a man had learned one science he would not know it better than other sciences.[39]

In other words, if there is nothing akin to memory in the intellect then every time understanding takes place the process is like the first time, wherein the agent intellect must abstract from the phantasms anew. This would result in no memory of concepts and ideas, but only memory of particulars. This is because "our understanding can actually understand *nothing before it abstracts from phantasms*. Nor can it have *habitual*

[38] Aquinas, *DV*, 10.2 *ad* 4.

[39] Aquinas, *DV*, 10.2 *respondeo*. Emphasis added.

knowledge of things other than itself, *which are not within it, before the abstraction*."[40] In other words, the intellect can only understand that which is within it. This means that for the intellect to be able to understand without always having to return to phantasms then there must be something stored or preserved of previous instances of understanding in the possible intellect. This storage of things previously understood is habitual knowledge.

In discussing this ability to recall that which was previously understood, Aquinas says,

> *The mind knows nothing better than that which is within it*, for this reason, that it does not have within itself something of the things outside of it in order to proceed from this to knowledge of those things. *But the mind can issue into actual cognition of those things which are within it from the things which are present to it internally*, even though these are known through some other things.[41]

Here he says that the mind can bring to pure act, things which are "within in from the things which are present to it internally."[42] He also says, "just as it is not necessary always actually to understand that of which we have *habitual knowledge through species existing in the understanding*, so, too, it is not necessary always actually to understand the mind, *knowledge of which is habitually in us because its essence is present to our understanding*."[43] With these two quotes we return to the previous "present to" conversation. Recall the third kind of "present to" wherein "a thing is said to be by its presence in other things which are *subject to its inspection*."[44] As we saw with Aquinas's example of the things in the home, this idea of being subject to inspection could have a

---

[40] Aquinas, *DV*, 10.8 *ad* 1. Emphasis added.

[41] Ibid., 10.9 *ad* 2. Emphasis added.

[42] Aquinas, *DV*, 10.9 *ad* 2.

[43] Ibid., 10.8 *ad* 11. Emphasis added.

[44] Aquinas, *ST* Ia.8.3 *respondeo*. Emphasis added.

physical proximity aspect to it. But in these last two quotes we see that there is also a sense in which being present by way of being subject to inspection could also be immaterial. To exist in the understanding is to be subject to inspection, for there is no way to inspect without understanding, even if one is speaking in terms of inspecting the physical.

Therefore, if something can be in act in the intellect without physicality, such as when it is brought to act through habitual knowledge, rather turning to the phantasm, and that is considered being "present to" the understanding then it seems that there are two senses in which something can be present to something else in a non-physical way. One through power, as we saw earlier, and two, through being subject to inspection, as we have seen through an exploration of habitual knowledge.

In relation to Aquinas' comments Cory says,

> the notion of "intellectual presence" [presence by means of being subject to inspection] or "having something intellectually within sight" in Aquinas is grounded in the intellect's being disposed toward a given object, whether or not it is currently thinking about that object. The notion of "habitually seeing" something, then, is not as peculiar as it initially seems: It simply refers to my subjective familiarity with that thing, i.e., my disposition for finding it without prompting.[45]

This is important to draw out for a number of reasons. First, it shows us our first link between the nature of the intellectual power and self-awareness. As we will see when we come to implicit and explicit self-awareness, the nature of the intellect plays a key role in what Aquinas has to say about consciousness. Second, this feature of self-awareness, the habitual aspect, will be important when we come to implicit and explicit self-awareness, because it is the foundation upon which those are able to be built. As we will see in the

[45] Cory, *Aquinas on Human Self-Knowledge*, 119.

next section, implicit self-awareness is revealed in the duality of conscious thought and the duality is dependent upon habitual self-awareness. Were the essence of the soul not present to itself, then there could not be a duality to conscious thought, which would prevent the ability for there to be implicit self-awareness in every act of the intellect. Additionally, were the soul not present to itself, it would not be able to pivot from implicit self-awareness to explicit self-awareness within the same act of the intellect, because it would have to seek out the essence of the soul in the way that it seeks out the essence of other things, which would be to perform a subsequent exercise of the intellect. This presence allows the soul to turn to look at itself when it desires.

Duality of Conscious Thought

Not only does Aquinas think that "the soul sees itself through its essence," but he also thinks that "we only know the intellect through our knowledge that we are using it."[46] At first glance these may appear contradictory, but this second statement highlights a different aspect of Aquinas' view, namely, that implicit and explicit self-awareness are dependent upon the intellection of other things. Though I am always habitually aware of myself, I am not always cognizing myself. The act of cognizing myself, whether implicitly or explicitly, happens in the process of cognizing other things. In discussing this, he says,

> Our intellectual potency is, as such, only potentially intelligible; in order to be understood it must be actualized through an idea drawn from sensible images. *A thing is knowable only in the degree that it is actual; hence our intellectual potency attains to self-knowledge only through possessing an intelligible object in a concept, and not by directly intuiting its own essence.* This is why the process of self-knowledge has to start from the exterior things whence the mind draws the

[46] Aquinas, *InDA*, 724.

> intelligible concepts *in which it perceives itself*; so we proceed from objects to acts, from acts to faculties, and from faculties to essence.[47]

This is really interesting because it highlights Aquinas' view of intellection, which is that "the actually understood object and the actually understanding subject are one being," when understanding takes place.[48] This is because the intellect is both actual and potential. It is actual in its ability to abstract concepts, preventing it from being wholly dependent upon the influence of external reality (we are able to think about things other than those which are in our immediate vicinity), but it is also potential in that it is able to receive the forms of other things from which it is able to think about them.[49] In the

[47] Aquinas, *InDA*, Text 414b32–415a22, Book II, Chapter III, continued Lectio 6, Note 308. "Thus, the Philosopher says: 'The intellect is intelligible just as the other intelligible things are.' The Commentator also affirms this in his explanation: 'Intellect is understood through an intention in it, just as other intelligible things.' This intention is nothing but the intelligible species. But this intention is in the intellect as actually intelligible. In other things, however, it is not actually but only potentially intelligible." Aquinas, *DV* 10.8 *respondeo*. "Thought is in a sense potentially whatever is thinkable, though actually it is nothing until it has thought?" Aristotle, *De anima* III.4. 430a (Jonathan Barnes version). "So the understanding and the understood are one being." Aquinas *InDA*, 724. Emphasis added.

[48] Aquinas, *InDA*, 724

[49] "In any nature which alternates between potency and actuality we must posit (1) a factor akin to the matter which, in any given class of things, is potentially all the particulars included in the class; and (2) another factor which operates as an active and productive cause, like art with respect to its material. Since then the intellectual part of the soul alternates between potency and act, it must include these two distinct principles: first, a potentiality within which all intelligible concepts can be actualized (this is the potential intellect already discussed); and then, also, a principle whose function it is to actualize those concepts. And this latter is the agent intellect,— being 'a sort of state'." Aquinas, *InDA*. 728. "In this case the agent intellect is called a state to distinguish it from the intellect in potency." Aquinas, *InDA*. 729. "The agent intellect, on the other hand, actualises the intelligible notions themselves, abstracting them from matter, i.e. bringing them from potential to actual intelligibility." Aquinas, *InDA*. 730. "The reason why Aristotle came to postulate an agent intellect was his rejection of Plato's theory that the essences of sensible things existed apart from matter, in a state of actual intelligibility. For Plato there was clearly no need to posit an agent intellect. But Aristotle, who regarded the essences of sensible things as existing in matter with only a potential intelligibility, had to invoke some abstractive principle in the mind itself to render these essences actually intelligible." Aquinas, *InDA*. 731. "because everything that is understood is only understood as illuminated by the light of the agent intellect and received into the possible intellect." Aquinas, *InDA*. 724, 725.

process of receiving the form, the intellect becomes the matter to the form-matter composite, which is what allows for intellection to take place.[50]

While not a perfect analogy, the composite nature of cognition makes me think about balloon animals. If you think of the deflated shapeless balloon as the potential intellect, it has to be inflated with the form of the animal in order to be fully seen for what it is. It does not lack existence prior to its inflation, nor does it lack its own characteristics, in that it is the kind of thing that can be inflated and shaped into a variety of things. However, it really is not able to be fully seen until it is inflated and shaped. In actualizing the capacities of the balloon that are not actualized in its deflated state, the balloon is able to be seen more fully. Similarly, in the actualization of the potential intellect by other forms, the potential intellect is able to be seen. In discussing this Aquinas says,

> The reason why the potential intellect cannot be known immediately, but only through a concept, is the fact that it is potential also as an intelligible object; for, as it is proved in Book IX of the Metaphysics, intelligibility depends upon actuality. And there is a like dependence in the field of sensible realities too. In this field what is purely potential, i.e. bare matter, cannot act of itself, but only through some form conjoined with it; whereas sensible substances, being compositions of potency and act, can act, to some extent, of themselves. So, too, the potential intellect, being purely potential in the order of intelligible things, neither understands nor is understood except through its own concepts.[51]

---

[50] Matter in this sentence is not meant to refer to physicality, rather it is referring to potency. In a composite the matter refers to the potentiality that is actuated by the form. Thomas Howe, in his philosophy of language class lectures, discusses how a form-matter composite exists even in words, wherein the meaning is the form and the particular word is the matter. Howe's example illustrates how matter does not necessarily equate to physicality in a Thomistic framework. Thomas Howe, *Philosophy of Language Class Lecture Notes* from his Philosophy of Hermeneutics Class in Spring 2020, at Southern Evangelical Seminary in Charlotte, North Carolina. This idea of intellect as pure potentiality similar to matter's being pure potentiality in sensible reality is exemplified in the quote from the next footnote.

[51] Aquinas *Sentencia libri de anima*. 724, 725. Emphasis added.

Thus, if the potential intellect is only able to be understood through its composition with forms of other objects, that means that in the process of cognizing other things there is always an implicit awareness of the self, or as Aquinas, in commenting on Aristotle, puts it, "Once in act, the mind is able to think not only of other things, but also of itself."[52]

The interesting thing about this is that if the mind is able to implicitly cognize itself in the process of cognizing other things, that means that through its cognition of other things it is able to pivot focus to explicit cognition of itself.[53] Put another way, cognition is always two-fold, there is always an implicit and explicit aspect and there are always two essences revealed in those aspects: subject and object. The subject would be the cognizer and the object would be that which is cognized. However, since it is one act that is taking place, which contains both subject and object, implicit self-awareness can pivot to explicit self-awareness, wherein one focuses on self rather than the object of cognition. In discussing this Cory says,

> In Aquinas, then, intellectuality entails the capacity to experience the world from one's own "viewpoint" as subject, because intellectual cognition is always ineliminably twofold, illuminating the knowing intellect and its known object in relation to each other. The necessary correlation of subject and other in intellectual cognition opens up a new perspective on intellectual intentionality as Aquinas construes it. If subject and other are necessarily experienced correlatively, then not only do we experience ourselves subjectively in contrast to the "other," but also the reverse, i.e., we experience the other as object of thought in contrast to ourselves as subjects. In other words, not only does every intellectual act include self-awareness, but its inclusion of self-awareness is essential to its intentionality. To attend to items in the world around us is to grasp

[52] Aquinas *Sentencia libri de anima*, 704.

[53] "If the Thomistic ego, understood as a consciousness of a self, is a moment in an act pivoting on itself in its capture of the real, a pivoting which is one with the capture, then the absence of any articulated theory of the *cogito* in St. Thomas is intelligible both philosophically and historically." Wilhelmson, "The 'I' and Aquinas," 52.

> them as other, as Aquinas points out: "To intend means stretching, as it were, toward something other.[54]

The duality of conscious thought is very interesting in relation to the AI discussion, because it illuminates a key characteristic of the nature of thought, at least as it relates to Aquinas' view. If Aquinas is correct in that the nature of intellectual thought is a hylomorphic composite (i.e., the union of an abstraction (form) with the potential intellect (matter)) then there is something intimate about thought in relation to the thinker that is more than the mere processing of data. In discussing the compositional nature of thought, Cory says, "Aquinas holds that just as natural form is individuated by matter, so too *the species is individuated by my intellect. It belongs to the character of this species, then, to be mine; it exists only as 'instantiated' in the 'matter' of my own intellect*."[55] This means that, for Aquinas, there are no bare thoughts, all thoughts are *my* thoughts in that they are a composite of *my* intellect's abstraction with *my* intellect.[56] So integral to the thought is the one performing the act, that to replace the thinker with another thinker

---

[54] Cory, *Aquinas on Human Self-Knowledge*, 204. Emphasis added. "Intentional existence, as understood by St. Thomas, is a thoroughly relational act. Like all relations, the act terminates and that term is 'the other as other,' *scire est esse aliud in quantum afiud est*. If knowing is structurally a 'being-other-as-other,' then my knowing of myself knowing is thoroughly a function of an activity that is not ego-directed but other directed. The situation is not equivalent to a waking up of a hitherto dormant ego but of an active constituting of the ego in the very act of knowing the other. In Aquinas' own language, the intellect-in becoming the other-*expresses to itself its own conformity to the real*. The production of the *verbum* is one with concomitant knowing, knowing in exercised act: this knowing in exercised act is the ego. This 'ego' is simply spiritual existence totally open to itself in its very becoming what is not 'itself' but an 'other.' 'I' truly know and the 'I' knowing is thus a dimension of knowing-being." Wilhelmson, "The 'I' and Aquinas," 51. Emphasis added.

[55] Cory, *Aquinas on Human Self-Knowledge*, 165. Emphasis added.

[56] It is important to note that thought does not equal abstraction/universal. The definitions of those terms are not univocal. We are not intellects, we are persons. It is not the intellect that knows, but the person who knows through the intellect. Similarly, a person does not just hold a universal up in their mind. They have a thought about a universal. A thought could be a judgment that the particular in front of them is of this kind of universal or that this universal is different from another or any number of other things. The point worth making here is that thoughts are about universals. They are acts performed against or with universals. They are not the universals themselves. This distinction is important because of something I will say in a moment about transplanting thoughts and them being different for having a different subject.

would be to make the thought a different thought. Put another way, a thought could not be transplanted from one person to another and still be actually the same even if numerically different, because there would be a different intellect coupled with the abstraction in that case.[57] The reason this is the case is because part of the thought itself is the one doing the thinking, therefore in the process of transplanting, part of the thought would change as a result of there being a different "I." This is very different from data packets which are actually the same though numerically different as they are copied to different computers (i.e., uploading/downloading files).

Furthermore, if Aquinas is correct about the hylomorphic nature of thought then there are implications for not only the contents of the act of thinking, but also for the act itself. If Aquinas is correct then the process of thought entails a joining of subject and object in the creation of the thought, which means that in the process of thought a change takes place. Put in Thomistic terms, an intentional (rather than substantial) change takes place as the potential intellect takes on the abstracted form. This is how the habitual

[57] This is not to say that meaning is not transmissible from person to person. If that was the case, then communication would be impossible, and you would not be able to understand what I have written. What this is getting at is the reality that the intellect and universal are united in thought such that the intellect is forever changed as a result of taking on the abstracted form. Thought changes the knower and the person doing the thinking is integral to the thought. *I* am thinking about the dog and in doing so both the subject (*I*) and the object (dog) are a part of the thought. You can also think about the same dog, but in that case the subject (*you*) is different even though the object is the same. Furthermore, the abstraction is different because your abstraction is based upon your intellect's having interacted with your phantasms, while mine is based upon my intellect's having interacted with my phantasm. Your collection of phantasms may result in a more complete abstraction of dog than mine, due to you having a larger set of phantasms. Therefore, while we are both interacting with an abstraction that connects up with the real form of the thing in the world (i.e., the same dog/the same object in the world) the content of our thoughts are not equivalent for two reasons: (1) I am not united with your thought about the dog any more than you are united with my thought about the dog. If a thought were to be transplanted there would be a different subject despite the same object. (2) Our individual abstractions of dog may not be equally complete given the differences in quantity and quality of the dog phantasms from which we are both abstracting. This is not the case with AI wherein there is no subject in the processing of the data therefore the same object can be transplanted from one AI to another without there being any difference. Furthermore, AI literally passes the same object around for processing and therefore there is no difference from one machine to the other in terms of the data it is using for the processing.

knowledge, about things in the world, that we discussed earlier is created. Thus, thought is creative in that it is the joining together of two things (i.e., potential intellect and abstracted form) to create a composite substance. Thought changes the person thinking, through an accidental modification of the potential intellect, which is why the more we think about something the easier it gets. This is because part of combining the potential intellect with the abstracted form entails storage of that abstraction. In discussing this Aquinas say, "if we take memory only for the power of retaining species, we must say that it is in the intellectual part."[58] He goes on to say, "Therefore there can be no other difference of powers in the intellect, but that of passive and active. Wherefore it is clear that *memory is not a distinct power from the intellect: for it belongs to the nature of a passive power to retain as well as to receive*."[59]

This is very different from software wherein an algorithm processes the object without any reference to the subject. While there is a subject-object distinction in AI, the AI is not aware of the subject in the process of handling the object. While the AI could call a method that might give it the unique identifier of the machine or process where the execution is taking place, this is not the same as seeing itself and the object in relation to one another in the process of "seeing" the object. While one might be able to argue that explicit self-awareness is possible in the calling of the method that reveals the processor of the execution, implicit self-awareness is arguably impossible for an AI. This is because, as we saw, implicit self-awareness is the result of the duality of conscious thought. It is the result of seeing ourselves *through* the object we are thinking about. It is

[58] Aquinas, *ST* Ia.79.6.

[59] Ibid., Ia.79.7. Emphasis added.

the result of seeing the intellect *through* the act of intellection. While AI might be able to reference "itself" that is a different act of execution wherein process is directed at the AI as object instead of as subject.

Self-*Knowledge*: Nature of the Soul

Recall from the beginning of the chapter that there are two ways in which we can know about the soul: "One of these is the knowledge by which the soul of each man *knows itself only with reference to that which is proper to it* [self-awareness]. The other is that by which the soul is known *with reference to that which is common to all souls* [self-knowledge]."[60] In the previous section we discussed the first kind: self-awareness. Recall that self-awareness is "the knowledge which each *has of his soul*, in so far as it is *proper to himself*, [it] is the knowledge of the soul as it *exists* in *this individual*. . . . it is through this knowledge that one knows *whether the soul exists*, as when someone *perceives that he has a soul*."[61] In other words, in self-awareness we become aware of the existence of our soul, but self-awareness does not result in knowledge of the soul's nature. It is more like the phantasms of the sensible powers than the abstractions of the intellectual power, in that it provides the raw data from which intellectual abstractions about the universal nature of the human soul are made. But that does not mean it is not valuable, nor does it mean that it does not provide us with important information. Rather, self-awareness provides the "raw experiential data" from which self-knowledge eventually comes.[62] Cory says that "the raw experiential data" of self-awareness, "becomes organized over

---

[60] Aquinas, *DV*, 10.8 *respondeo*. Emphasis added.

[61] Ibid. Emphasis added.

[62] Cory, *Aquinas on Human Self-Knowledge*, 176.

time by reasoning, until we identify the genus and difference and distinguish the essential properties from the accidents, arriving at a definition that sets this essence apart from every other essence."[63] This genus and specific difference, that is the result of the data from self-awareness having been organized by the intellect, is self-*knowledge*.

In this section we are going to discuss self-knowledge which is related to "that which is common to all souls."[64] According to Aquinas, understanding is achieved when one has quidditative knowledge of that thing. In discussing this he says, "In order to know *what* anything is, our intellect must penetrate its *quiddity or essence either directly or by means of other things that adequately reveal its quiddity*."[65] This means that in order to know *what* the human soul is, we must look at the universal rather than the particular. Self-awareness has to do with the *individual* soul, *my* individual soul. Self-knowledge has to do with understanding my soul as an instance of the *generic* human soul.

Aquinas says that there are two ways in which self-knowledge can be attained. In discussing this he says,

> If we speak of the knowledge of the soul when the human mind is limited to *specific or generic knowledge*, we must make another distinction. For the concurrence of two elements, *apprehension and judgment* about the thing apprehended, is necessary for knowledge. Therefore, *the knowledge by which the nature of the soul is known can be considered with reference to apprehension and with reference to judgment*.[66]

---

[63] Cory, *Aquinas on Human Self-Knowledge*, 176.

[64] Aquinas, *DV*, 10.8 *respondeo.*

[65] Aquinas, *SBDT* 6.3 *respondeo*. Emphasis added.

[66] Aquinas, *DV*, 10.8 *respondeo.* Emphasis added.

So, we can learn about the *nature* of the soul through (1) apprehension and (2) judgment. Apprehension has to do with knowledge that is acquired through the apprehension of other things, while judgment has to do with knowledge that is acquired "in the contemplation of inviolable truths."[67] Both of these ways may seem indirect, but the reason this is the case is because Aquinas believes that the intellect is pure potentiality. In discussing this he says,

> For, as first matter is in potency to all sensible forms, *so our possible intellect is in potency to all intelligible forms*. Thus, it is, in fact, *pure potency in the order of intelligible things*, as matter is in the order of sensible reality. Therefore, *as matter is sensible only through some added form, so the possible intellect is intelligible only through a species which is brought into it*.[68]

Since the intellect is potential, and thus requires the forms of things in order for its own nature to be revealed, the intellect cannot penetrate its own essence directly. Therefore, its essence must be discovered through reasoning, whether it be by way of apprehensions of other things or judgments the result of which are from "contemplation of inviolable truth."[69]

In discussing how the mind knows itself through apprehension, Aquinas says, "If, then, we consider this knowledge with reference to *apprehension*, I say that we know the nature of the *soul through species which we abstract from the senses*. For our soul holds the last place among intellectual things, *just as first [prime] matter does among sensible*

---

[67] Aquinas, *DV*, 10.8 *respondeo.*

[68] Ibid. Emphasis added.

[69] Ibid. Aquinas says that knowledge of things is dependent upon previous knowledge: "For if a person knows that man exists and wants to find out what man is by definition, he must know the meaning of the term 'man.' And this is possible only if he somehow forms a concept of what he knows to exist, even though he does not know its definition. That is to say, he forms a concept of man by knowing a proximate or remote genus and accidental characteristics which reveal him externally. For our knowledge of definitions, like that of demonstrations, must begin with some previous knowledge." Aquinas, *SBDT* 6.3 *respondeo*.

things."[70] From this we learn that the nature of the soul is such that it requires other species in order for it to be knowable. This lends credence to Aquinas' claim that the possible intellect "is, in fact, *pure potency* in the order of intelligible things, *as matter is* in the order of sensible reality."[71]

In order to better understand Aquinas' comparison of the mind to prime matter, it will be helpful to understand what is meant by prime matter. In discussing prime matter Aquinas say, "prime matter *cannot be defined or known in itself* but *only through* the composite."[72] Bernard Wuellner, former Chairman of the University of Detroit Philosophy Department, says that prime matter is "pure passive potency of substance, without any form, species, or privation, and receptive of any forms or subsequent privations."[73] In relation to the mind, this means that just as prime matter can receive any form in the order of sensible things and, as a result, substantially change from one thing to another, similarly the mind can receive any form in the order of intelligible things and, as a result, intentionally change from one thing to another. This will be relevant when we discuss intentional existence in a moment.

Now this idea of the intellect being pure potentiality and having no form of its own is interesting as it relates to AI. Recall our earlier discussion of Dennett's claim that the goal of AI is to "reverse engineer ourselves, *to understand what kind of a machine we*

---

[70] Aquinas, *DV*, 10.8 *respondeo.* Emphasis added.

[71] Ibid. Emphasis added.

[72] Aquinas, *DPN*, 14. Emphasis added.

[73] Bernard J. Wuellner, *Dictionary of Scholastic Philosophy,* (Milwaukee, WI: The Bruce Publishing Company, 1956), 74.

are that this [consciousness] can be true of us."[74] If in fact consciousness is predicated on a mind and if a mind is pure potency, meaning that it has no form of its own, then it is no more possible to have standalone pure potency in the order of intelligible things then it is to have it in the order of sensible things. In discussing the inability of prime matter to exist in a free state, namely a state apart from any form, Aquinas says, "[Prime] matter according to itself *does not have being, nor is it knowable*."[75] This is because "the cause of anything as its 'essence', i.e. form, *is the same as the cause of its being,* for *everything has actual existence through its form*."[76] Thus prime matter cannot have being while it is not coupled with a form because existence comes *through* the form. Furthermore, Oderberg provides a reason for why prime matter could never exist in a form free state. He says,

> To encounter anything in this world, it must be spatio-temporally bounded, occupying a finite region of space and time. . . . But if we were to encounter free prime matter, it could have no spatio-temporal boundaries, since only form—actual organisation—can provide that. *It is, however, metaphysically impossible to encounter, literally, anything material that has no such boundaries*.[77]

Therefore, it is a logical contradiction to believe that something that is pure potency could be spatio-temporally bound. This is because something cannot both be and not be

---

[74] Interview with Daniel Dennett in Susan Blackmore, *Conversations on Consciousness* (Oxford: Oxford University Press, 2005), 80. Emphasis added.

[75] Aquinas, *ST* Ia.15.3.ad 3. See also: "Because prime matter is not a being in actuality, but merely in potentiality, it does not exist in reality through itself." Ibid., Ia.7.2 ad 3. "Prime matter can never exist through itself. Indeed, since it does not have any form by its nature, it does not have being in actuality, but only in potentiality, since being in actuality comes only through a form. For the same reason, nothing that exists in actuality can be called prime matter." Aquinas, *DPN* 2.114–119. Emphasis added.

[76] Aquinas, *InDA* II.319. Emphasis added. Aquinas draws a distinction between essence (form) and existence. This quote is not to say that there is not distinction between these. As we will see in the next chapter the act of existence of any being is distinct from its form, but it is *through* the form that the act of existence comes.

[77] Oderberg, "Is Prime Matter Energy?" 8. Emphasis added.

at the same time and in the same way. It is not logically possible for something to both have a form (be in act) and not have any form (not be in act i.e., be pure potency) at the same time. Therefore, if consciousness is dependent upon a mind and mind is pure potentiality, then Dennett's desire to reverse engineer consciousness is unattainable.

Not only do we learn that the intellect is pure potency from a study of the mind by way of apprehension. We also learn the process by which self-knowledge is attained. In discussing this Aquinas say,

> A thing is knowable only in the degree that it is actual; hence our intellectual potency attains to self-knowledge only through possessing an intelligible object in a concept, and not by directly intuiting its own essence. This is why the process of self-knowledge has to start from the exterior things whence the mind draws the intelligible concepts in which it perceives itself; so we proceed from objects to acts, from acts to faculties, and from faculties to essence.[78]

Aquinas thinks that we can achieve self-knowledge through a process which mirrors the duality of thought that was a part of self-awareness.[79] Here "he traces a path from *the nature of objects of intellectual acts* through the nature of the intellectual power, to the intellectual soul's *immaterial nature*."[80] This path is essentially a "four-stage sequence, 'intelligible object → species-informed act → intellect → soul's essence,'" in which the nature of the soul is exposed.[81] This path exposes a potential point of intersection with those that would view AI as conscious.

---

[78] Aquinas, *InDA*, II.6.308. Emphasis added. See also: *QDDA* 16, *ad* 8; *Sent* III.23.1.2, *ad* 3; *QDDA* 3, *ad* 4; *InDA* III.3; *ST* Ia.87.1. *DV* 10.8, *ad* 5; *DV* 10.9, *ad* 4, *ad* 10, and *ad* 2; *SCG* 2.98.

[79] "This more narrowly specified four-stage sequence, "intelligible object → species-informed act → intellect → soul's essence," has a familiar ring. In fact, it discursively retraces, step by step, the logical structure of a single act of prephilosophical self-awareness: i.e., by grasping an extramental object, I grasp my act of thinking, which manifests my thinking intellect, which manifests my soul as the principle of thought." Cory, *Aquinas on Human Self-Knowledge*, 178.

[80] Ibid., 177. Emphasis added.

[81] Cory, *Aquinas on Human Self-Knowledge*, 178.

It might be that those who think that consciousness *just is* the collection of all intelligent capacities such that to be able to do everything a human can do would *just be* what it means to be conscious, would be all right with this approach even if they disagree with Aquinas' conclusion.[82] They would probably agree that we understand what something is by looking at its acts. A dog acts differently from a honeysuckle and also from a human.

The first step in the process for Aquinas is what a thought is. Aquinas says that "what is understood are universals."[83] This is interesting because it exposes an area of tension between Thomists and AI proponents, namely, a disagreement over what a thought is, as well as over what a universal is.[84] An often-used argument for the

[82] "Now if either kind of indistinctness is merely traceable to inadequate sensory data in this particular situation, there is an easy solution: I can put on my glasses or wait for Socrates to get close enough to be recognizably human. But if my understanding of 'human' is still indistinct in itself (as is very likely unless I have learned how to define 'human'), the solution is more difficult. The first step – if applicable – is to introduce specification into the indistinct essential content. According to Aquinas, the reason that intellectual content does not self-differentiate is that the universal wholes we grasp contain their parts only potentially. Because this indistinct essential content, such as undifferentiated 'animal,' is partly actual and partly potential, I can actually grasp the universal without actually grasping its parts. To acquire distinct essential content, I actualize the potential parts of the universal whole 'animal' so as to distinguish 'human,' 'bear,' 'raccoon,' etc. The more parts I actualize, the more distinct the content of my knowledge is. Learning about essences, then, is a process of differentiation-by-actualizing, which requires reasoning, further experience, and perhaps assistance from teachers. The second step is to determine why humans are distinct from other animals, by selecting the specifying difference 'rationality' from among all the other accidents in the descriptive content. It is not sufficient to include 'rationality' in my descriptive understanding of humanity; I must recognize it as the feature that properly distinguishes humanity from all other essences in the same genus – the 'specific difference' in the definition. When my grasp of an essence meets both of these conditions, the content of my knowledge is distinct, properly distinguishing that essence from all other essences. At this moment I have achieved 'quidditative knowledge' of the essence, articulable in a definition." Ibid., 80.

[83] Aquinas, *QDDA* 16, ad 8. Aquinas, *Commentary on the Sentences of Peter Lombard*, II.19.1.1 respondeo.

[84] Turing's imitation game implies that thought is data analysis and processing, such that to think is determined by one's ability to intentionally interact with one's environment. Thus, objects of thought are data packets which may or may not include abstractions or particulars. See: Turing, "Computing Machinery and Intelligence."

immateriality of the intellect is its engagement with universals,[85] however, the nature of universals is a highly contested area of philosophy.[86] This is a very important part of the AI conversation, because object-oriented programming coupled with reflection can result in programs that are able to create new classes that were not written by the programmer.[87] Thus, Aquinas' inclusion of this step as part of the process is very important, because the greater the disagreement in this area the greater chances of a disagreement in the nature of the intellect. Therefore, we have discovered the first gating factor: the nature of thought and the nature of universals.

According to Aquinas, universals are not objects that are naturally "*actually* thinkable" and that exist "in their own right outside the mind."[88] Rather they have "no existence apart from perceptible realities" and are not "*actually* thinkable" in and of themselves.[89] Because of this he finds it necessary to posit the existence of an agent intellect to take the potentially thinkable and make it actually thinkable. He says,

> Because Aristotle asserted that these universals do not subsist except in sensible objects, *which are not actually intelligible*, he necessarily had to posit some power, which *would make the objects that are intelligible in potency to be*

---

[85] "But the operation of the intellect belongs to it separately, so that it does not communicate in this operation with a bodily organ. And this is clear for three reasons. First, because this operation covers all corporeal forms as its objects; therefore, it is necessary that the principle of this operation be free from all material forms. Second, because understanding concerns universals, whereas in a corporeal organ only individuated intentions can be received. Third, because the intellect understands itself; but this does not occur in a power whose operation is performed by means of a corporeal organ." Aquinas, *Sent* II.191.1.

[86] It is beyond the scope of this project to engage the universals debate. For a summary of the problem of universals see: Klima, "The Medieval Problem of Universals," *Stanford Encyclopedia of Philosophy*. For an overview of nominalism in relation to universals see: Rodriguez-Pereyra, "Nominalism in Metaphysics," *Stanford Encyclopedia of Philosophy*.

[87] For a brief overview of Marvin Minskey's Frames see: Crevier, *AI*, 245-246. For a thorough discussion by Minskey see: Minsky, "A Framework for Representing Knowledge," *MIT-AI Laboratory Memo 306* (June 1974). https://web.media.mit.edu/~minsky/papers/Frames/frames.html.

[88] Aquinas, *QDSC*, 8 *respondeo*. Emphasis added.

[89] Aquinas, *QDSC*, 8 *respondeo*. Emphasis added.

> *actually intelligible, by abstracting* the species of things from matter and from individuating conditions; and this power is called the *agent* intellect.[90]

Thus, the second step in the process is related to the intellectual act itself—the process by which a thought comes into existence.[91] One thing that is important to understand is the relationship between potentiality and actuality. A potentiality cannot actualize itself, because in order to do so would require it to pre-exist its own existence (or put another way, for it to already be in act). This would defy the law of non-contradiction—for something cannot both be and not be in the same way at the same time.

Now the thinkable is different from the perceptible in that the perceptible has extramental existence and therefore is able to actualize perception, while the thinkable, though related to the same object as the perceptible, does not have extramental existence in its own right and thus has no power to actualize thought. In discussing this Aquinas says,

> Now a sense which is in potency is reduced to act through objects that are actually sensible, which are outside the soul, and hence it is not necessary to posit an agent sense. And similarly it would not be necessary to posit an agent intellect if the universals . . . subsisted of themselves outside the soul, as Plato asserted. But because . . . these universals do not subsist except in sensible objects, which are not actually intelligible, he necessarily had to posit some power, which would make the objects that are intelligible in potency to be actually intelligible.[92]

Thus, because there is movement in thought (i.e., we are not always thinking, nor are we always thinking about the same thing) something must be responsible for that change. This change is the intellectual act wherein the agent intellect makes the potentially thinkable actually thinkable. Now in the intellectual act a composite of the intelligible

---

[90] Aquinas, *QDSC*, 8 *respondeo*. Emphasis added.

[91] "To determine what the intellectual act must be like in order to be able to grasp such objects." Cory, *Aquinas on Human Self-Knowledge*, 179-180.

[92] Aquinas, *QDSC*, 9 *respondeo*. Emphasis added.

form and the potential intellect is created by the agent intellect, however this composite is not a substance.[93] Put another way, in the intellectual act, while a new composite is generated, this composite does not have natural existence (*esse naturale*), rather it has intentional existence (*esse intentionale*), and this is where the earlier discussion about the duality of conscious thought comes back into play.[94]

Natural existence is the kind of existence that extramental objects have. They are a composition of form and matter, wherein the form brings all of its causal powers to the table. Intentional existence differs in that in this kind of existence the form does not bring all its causal powers to the table. We know this because when a form that has intentional existence is coupled with matter it does not result in a substantial change.[95] An example of this is a ring and a ring impression. A ring has a certain form and has the power to impress that form into wax, at which time it conveys its form to another substance. However, the form of the ring in the impression does not have the same kind of existence as in the ring, for it is not able to then go on and impress the initial form into another

---

[93] Aquinas says that "everything which is in potency can be called matter." Therefore while a composite is typically spoken of in terms of substantial form and primer matter in relation to physical things, it can also be used to refer to the actualization of potency in an immaterial way. Aquinas, *De Principiis Naturae*, 5.

[94] "Intentional, not indeed natural, assimilation produces knowledge. For a stone does not belong to the soul in such a way that we by means of it know the external stone, as Empedocles held. Rather, the form of stone belongs to the soul. And we should say the like in reply to objection is." Aquinas, *DM* 16.9 *ad* 9.

[95] For more information on intentional existence see: "By a 'sense' is meant what has the power of receiving into itself the sensible forms of things without the matter. This must be conceived of as taking place in the way in which a piece of wax takes on the impress of a signet-ring without the iron or gold; we say that what produces the impression is a signet of bronze or gold, but its particular metallic constitution makes no difference: in a similar way the sense is affected by what is coloured or flavoured or sounding, but it is indifferent what in each case the substance is; what alone matters is what quality it has, i.e. in what ratio its constituents are combined." Aristotle, *De anima* II.12. "Thus color is in a colored body as a quality complete in its natural being, but it is in the medium incompletely, according to an intentional being." Aquinas, *SLDS*, Chapter 4, Commentary on 438b2. See also: Aquinas, *ST* Ia.18.4 *ad* 2; Aquinas, *ST* Ia.56.2 *ad* 3; Aquinas, *ST* Ia.67.3 *respondeo*. Aquinas, *Sent* I.8.5.2 *ad* 4.

substance. This is not to say that the impression of the ring does not have its own formal powers, for the impressed form could be used to create a new ring. However, it lacks the powers of the original form in that it cannot do what the ring itself can do.[96]

In thought, rather than a ring being impressed on wax, the form of the thing thought about is impressed upon the potential intellect by the actual intellect resulting in a union of subject and object, which is the object of thought discussed in step one. Aquinas says, "the form of the understood becomes the form of the intellect according as it is the intellect in act."[97] Elaborating on this more he says, "in the human intellect the similitude of the thing understood is other than the substance of the intellect and is like its form. Whence from the intellect and the similitude of the thing is effected a perfect one, which is the intellect understanding in act. And the similitude of this [thing] is received from the thing."[98] Now this is interesting because the earlier section on the duality of conscious thought comes into play again here. Recall that Aquinas says,

> The reason why the potential intellect cannot be known immediately, but only through a concept, is the fact that *it is potential* also as an intelligible object; for, as it is proved in Book IX of the Metaphysics, *intelligibility depends upon actuality*. And there is a like dependence in the field of sensible realities too. In this field *what is purely potential, i.e. bare matter, cannot act of itself, but only through some form conjoined with it*; whereas sensible substances, being *compositions of potency and act, can act*, to some extent, of themselves. So, too,

[96] "With this we can return to Aristotle's example of the seal and wax. The point of the analogy, which has often been lost in the commentary tradition, is not only that the form of the seal is received without its matter, nor only that the wax does not become metallic, but that even the form that is received is weak and not capable of acting in the manner in which it did in the original metal seal. Wax cannot impress wax. Intentional being is a weak form of being, sufficient to found the relation of knowledge, but insufficient to cause further physical change." Andrew Murray, "*Intentionale* in Thomas Aquinas," Paper presented at the "Plato and Aristotle, Platonism and Aristotelianism" Conference, *Manly*, (January 29-31, 1993). https://andrewmurraysm.files.wordpress.com/2018/10/murray-intentionaleinaquinas.pdf, 3-4.

[97] Aquinas, *Sent* IV.49.2.1, *ad* 10.

[98] Aquinas, *Sent* III.3.3.3, *ad* 1.

> *the potential intellect, being purely potential in the order of intelligible things, neither understands nor is understood except through its own concepts*.[99]

For Aquinas, thought is a composition of the potency of the intellect and the act of the universal nature of whatever it is that is understood. The fact that thought is a composite has implications for the kind of thing that the intellect can be. To be the potency of *a* composite does not necessitate the intellect be immaterial, for prime matter is the potency of material substances. However, material substances have natural existence, as discussed above, which means that the forms in those substances have causal power (i.e., they make the material to actually be whatever the kind of thing that the form is). But the intellectual act does not result in a substantial change, the intellect does not literally become a dog, or a brick, or whatever is being thought of, thus for thought to be a composite and the intellectual act not amount to a substantial change, the intellect must be immaterial, especially given what we know about the duality of thought, thus the third step in the process is establishing the immateriality of the intellect.

Returning to our discussion of the duality of conscious thought, both the subject and the object are visible within one intellectual act. Aquinas says that the intellect "neither understands nor is understood except through its own concepts," meaning that in order to see the intellect, the intellect must be in act, it must be thinking about something.[100] In discussing this Aquinas says,

> The potential intellect is itself intelligible, not indeed immediately, but like other intelligible things, through a concept. To prove this he has recourse to the principle that the actually understood object and the actually understanding subject are one being. . . . Now the actually understood is so in virtue of an abstraction from matter; for, as we have seen, things become objects of the understanding just in the degree that they can be separated from matter. So he

[99] Aquinas, *InDA* 724, 725. Emphasis added.

[100] Aquinas, *InDA* 724, 725.

> says ‘in things separated from the material’. So the understanding and the understood are one being, provided the latter is actually understood; and the same is true of the object and subject of sensation. Speculative knowledge and what is knowable ‘in this way’ (i.e. in act) are identical. Therefore the concept of the actually understood thing is also a concept of the understanding, through which the latter can understand itself. That is why all the foregoing discussion of the potential intellect has been carried on in terms of the latter’s act and object. For we only know the intellect through our knowledge that we are using it.[101]

If the only way to think about the thing that is thinking is for that thing to first be thinking about something, then in any one thought there are two forms, that of the thing being thought about and that of the thing doing the thinking. Furthermore, to be thought about requires that the thing being thought about be separated from matter, as he says above, thus in order to have the form of the thinker also as part of the thought, requires that the thinker be immaterial too. Aquinas calls this ability to see oneself in one’s thoughts about other things reflexivity and it is the foundation of his view of consciousness. In discussing this he says,

> There are two ways that the soul can reflect either on itself or on those things that belong to it by knowledge. In one way, when the cognitive power knows its own nature or the nature of the things that are in it; and it is only the intellect that can know “whatnesses” of things. . . . The other way that the soul *reflects upon its own acts* is by knowing that those acts exist.[102]

Now in order to be able to reflect upon its own acts the intellect must be immaterial, because were the power that was reflecting upon itself material, then the matter would get in the way of the reflexivity.[103] According to Aquinas, “The action of no body is self-

---

[101] Aquinas, *InDA*, 724. Emphasis added.

[102] Aquinas, *Sent* III.23.1.2 *ad* 3. Emphasis added.

[103] Aquinas’ claim that the intellect is immaterial is not uncontested. See Pasnau, *Thomas Aquinas on Human Nature*, 48–57 and 361–6; Joseph A. Novak, “Aquinas on the Incorruptibility of Soul,” *History of Philosophy Quarterly* 4 (1987): 405–21; Richard Cross, “Is Aquinas’s Proof for the Indestructibility of the Soul Successful?” *British Journal of Philosophy* 5 (1997): 1–20. For supporters of Aquinas see Herbert McCabe, “The Immortality of the Soul,” in *Aquinas*, ed. Anthony Kenny (London: Macmillan, 1969), 297–306; and Joseph Owens, “Aquinas on the Inseparability of Soul from Existence,” *The New Scholasticism* 61

reflexive. For it is proved in the Physics that no body is moved by itself except with respect to a part, so that one part of it is the mover and the other the moved. But in acting *the intellect reflects on itself, not only as to a part, but as to the whole of itself*."[104] An example might serve to clarify this point, parts are able to touch other parts, but they are not able to touch themselves. For example, the tip of your right index finger is not able to touch the tip of your right index finger. It may be able to touch a variety of places upon your body, but the spot that is doing the touching is not able to touch the very same spot. Material beings are not truly able to reflect back on the self, as a whole, or even the same part, they are only ever able to reflect back on a different part of the same whole. Now by going through another part they may be able to return back to themselves, in the same way that a circuit can complete a loop, but it is only by leaving the self and coming back through something else that this is done in material things, which is not truly self-reflexivity.

Thus, the argument for the immateriality of the intellect most likely to engage reductive materialists is grounded in self-reflexivity and it is an argument that is essential

---

(1987): 249–70. See also Gyula Klima and Robert Pasnau debate during the 2001 meeting of the Society for Medieval Logic and Metaphysics, which was published in *The Immateriality of the Human Mind, the Semantics of Analogy, and the Conceivability of God*, ed. Gyula Klima and Alexander W. Hall, Proceedings of the Society for Medieval Logic and Metaphysics 1 (Newcastle upon Tyne: Cambridge Scholars Publishing, 2011), 25–60.

[104] Aquinas, *SCG* 2.49. Emphasis added. "However, this cannot exist such that some power using a physical organ is reflected on its proper act, because it is necessary that the instrument by which it knows that it knows itself would be an intermediary between that very power and the instrument by which it first knew it. But one power using a physical organ can know the act of another power, inasmuch as the impression of the lower power overflows into the higher, as we know that our sight sees by the common sense. Now, since the intellect is a power not using a physical organ, it can know its own act, as it receives in some way from the object and is informed by the species of the object. But the act of the will perceives the motion of the will by overflow into the intellect by the fact that they are bound together in the one essence of the soul, and according to this, the will moves the intellect in some way when I understand, because I will. And the intellect moves the will when I will something, because I understand that it is good. And thus, by the fact that the intellect knows the act of the will, it can know a habit existing in the will." Aquinas, *Sentences* III.23.1.2 *ad* 3. See also: Aquinas, *DV*, 1.9.

to a Thomistic view of consciousness. With it we understand that for Aquinas self-knowledge is rooted in understanding that the intellect is immaterial. In discussing this Cory says,

> He thinks that the major obstacle to quidditative self-knowledge is a failure to understand the human soul's specifying difference distinctly, i.e., a failure to recognize that immateriality is essential to intellectuality. *The immaterial nature of thought is not evident in prephilosophical experience, and one can discover it only by reasoned argument* (as Aquinas himself repeatedly seeks to do). *Without grasping the immateriality of thought, one cannot understand distinctly what it is to think. Someone who defines the human soul as a "life-principle capable of thought," while conceiving of thought as something material, is unwittingly conceiving of the human soul as a 'life-principle capable of imagination.*'
>
> Thus for Aquinas, it is only when the philosopher understands thinking as the immaterial act of grasping dematerialized essences, that she distinctly understands what it means to be intellectual.[105]

This is a very clear way of differentiating between reductive materialists and Thomists in this matter: thought vs. imagination. It is only by properly understanding what thought is and that there is a duality to it, that one is able to come to realize the specific difference of human cognition, namely, that we are able to see ourselves in our thoughts of other things. We are not only able to interact as though there is a subject-object distinction in the world, but we are able to think about that distinction, as well.

But how does this view hold up to the criticisms of an immaterial mind? It is not enough to have a logically consistent philosophy of consciousness if that philosophy is not also able to handle the data that is thought to support alternative views. Thus, we must explore some of the evidence used to disprove the immateriality of the mind.

---

[105] Cory, *Aquinas on Human Self-Knowledge*, 185. Emphasis added.

What are some difficulties for an immaterial mind from science?

While Aquinas' argument for the immateriality of the intellect is logically consistent, it is not easily accepted outside of Thomistic circles. Large quantities of money are poured into the fields of neuroscience, cognitive science, artificial intelligence, and a host of related fields based upon the belief that there is something to be understood about the nature of the mind from a physical perspective. If Aquinas' view of the immateriality of the mind is accurate, then there are implications for whether AI could legitimately be considered to be conscious. If Aquinas is correct about the immateriality of the mind, then his view should be able to take the findings of these fields into account. Thus, we will spend the remainder of the chapter exploring some of the questions raised against an immaterial mind by contemporary scholars from a variety of fields.

Dissociative Identity Disorder

One challenge raised against an immaterial mind is that of dissociative identity disorder (DID) or what is more commonly known as multiple personality or split personality disorder. The American Psychology Association defines it as, "A dissociative disorder characterized by the presence in one individual of two or more distinct identities or personality states that each recurrently take control of the individual's behavior."[106] It was first documented by Dr. Morton Prince,

> whose case history of his patient 'Miss Beauchamp' (with personalities called Christine, Sally, and 'the Idiot,' among other names) was one of the first in-depth examinations of the phenomenon, published in *The Dissociation of Personality* in 1906. Subsequent case histories, especially the books The Three Faces of Eve

[106] "Dissociative Identity Disorder," *American Psychological Association*, https://dictionary.apa.org/dissociative-identity-disorder.

> (1957) and Sybil (1973) . . . contributed to popularizing . . . the phenomenon during the late 20th century.[107]

In some instances, DID personalities seem to be conscious during the manifestation of the other personalities, while in others they seem wholly unaware and have huge gaps of missing time. This has led some to believe that DID is "not alternating consciousness (as we might interpret Ansel Bourne's case) but simultaneous consciousness, or 'co-consciousness,' with what Prince calls a 'subconscious self' or a 'subconsciousness,' having its own stream of conscious experiences while another controls the body."[108]

DID has been used as an example of multiple-ego theory somewhere between ego theory and bundle theory by Prince, Hodgson, and Myers.[109] It has been thought to be evidence of a secondary consciousness underlying primary consciousness by William James.[110] It has been used to argue for bundle theory by Harré and Gillett. The variation of these answers is rooted in a fundamental difference in the views of self: ego vs. bundle theories.

---

[107] "Dissociative Identity Disorder," *American Psychological Association*, https://dictionary.apa.org/dissociative-identity-disorder.

[108] Susan Blackmore and Emily Troscianko, *Consciousness: An Introduction*, 3rd ed. (Abingdon: Routledge, 2018), 441.

[109] "All the evidence pointed conclusively to the view that Sally, by all odds the most interesting of the personalities, was some sort of a dissociated group of conscious states." Mortom Prince, *The Dissociation of a Personality: A Biographical Study in Abnormal Psychology*, 2nd ed. (New York: Longmans, Green, and Co., 1913), 234. See also: Richard Hodgson, "A Case of Double Consciousness," *Proceedings of the Society for Psychical Research* 7 (1891): 221–258. Frederick Myers, *Human Personality and its Survival of Bodily Death* (London: Longmans, Green, and Co., 1903).

[110] "One conclusion was forced upon my mind at that time, and my impression of its truth has ever since remained unshaken. It is that our normal waking consciousness, rational consciousness as we call it, is but one special type of consciousness, whilst all about it, parted from it by the filmiest of screens, there lie potential forms of consciousness entirely different. We may go through life without suspecting their existence; but apply the requisite stimulus, and at a touch they are there in all their completeness, definite types of mentality which probably somewhere have their field of application and adaptation. No account of the universe in its totality can be final which leaves these other forms of consciousness quite disregarded. How to regard them is the question." W. James, *The Varieties of Religious Experience: A Study in Human Nature*, (New York: Longmans, Green and Co., 1902), 388.

In modern philosophy David Hume is credited as the first bundle theorist. He says, "When I enter most intimately into what I call myself, I always stumble on some particular perception or other, of heat or cold, light or shade, love or hatred, pain or pleasure. I never can catch myself at any time without a perception, and never can observe anything but the perception."[111] From this he concludes that there is no real self and that we are just a collection of experiences. Given what we discovered in Aquinas about how it is only in the act of thinking about other things that the thinker can be seen, Hume's comments are understandable. The self-opacity that leads him to posit bundle theory actually makes sense in light of Aquinas' theory of the duality of conscious thought and therefore is not in conflict with it even if his conclusion is.

But that does not really answer the questions raised by DID. If in fact the intellect is singular and immaterial and controls intellectual thought, wherein self is seen through the acts performed, then what do we do with multiple selves? If there is one overarching immaterial mind, then how do we account for people's lack of awareness of conscious behavior performed by their own bodies, while manifesting one personality but not the other? Neither the duality of conscious thought, nor any of Aquinas' comments about self-knowledge, appear to be able to account for the conscious experience that takes place in DID patients. If in fact the intellect is wholly distinct from the brain and does not connect up to the brain at any singular place, as Descartes[112] thought, then how do we

---

[111] David Hume, *A Treatise of Human Nature* Volume 1. Edited by David Norton and Mary Norton, (Oxford: Clarendon Press, 2007), Section VI.

[112] "It is not [the figures] imprinted on the external sense organs, or on the internal surface of the brain, which should be taken to be ideas—but only those which are *traced in the spirits on the surface of the gland* [pineal gland] H (where the seat of the imagination and the 'common' sense is located). That is to say, it is only the latter figures which should be taken to be the forms or images which the rational soul united to this machine will consider directly when it imagines some object or perceives it by the senses." Descartes, *Treatise on Man*, XI:176, CSM I:106.

account for multiple selves seeming to be looking out from the same pair of eyes and experiencing the world differently through the same body with their own memories (both sensible and intellectual) and their own timelines, without any awareness of each other?

A possible Thomistic response might be that the division of personalities could be attributed to a physical abnormality wherein different collections of phantasms are stored in two disconnected places in the brain. Such a situation could result in the intellect only having access to one collection of phantasms at a time for abstraction purposes. This would make sense given sensible memory of particulars is physically stored in the brain while intellectual memory of universals is immaterially stored in the intellect. If something like this is the case, then it might explain the appearance of two distinct timelines and sets of memories despite a shared immaterial intellect.

As a result of examples like DID, some Thomistic philosophers, like Eleonore Stump, have come to the conclusion that Aquinas was "wrong in his view that the intellect uses no bodily organ."[113] In discussing this with her via email she said,

> Aquinas supposed that the intellect made no use of a material organ, but we now have ample evidence to indicate that he was wrong on this score. Aquinas also supposed that the intellect did not make use of a material organ in the way that vision does; and we have ample evidence that he was right on this score. If a child loses his eyes, he will never see; if he loses his left hemisphere, he will learn to talk using his right hemisphere. So configuration, or form, as Aquinas would have said, makes more difference to intellect than it does to vision.[114]

---

[113] Stump, *Aquinas*, 264. See also "Although Aquinas mistakenly supposes that the intellect is tied to no particular bodily organ, he nonetheless holds that the intellectual soul is the form constituting the human body as a whole. On his view, therefore, mental states will be implemented in the matter of the body. His account of the soul is consequently compatible with supposing that mental states are implemented in neural stuff" on page 213.

[114] Email exchange with Eleanor Stump that took place between October 4, 2021 and January 3, 2022.

When further pressed on the implications of this for the immateriality of the intellect, she said,

> We think that the key to what the brain is able to do lies more in its configuration than in the particular matter the brain uses to do what it does. That is, if you remove the left hemisphere of the brain in a very young child, the remaining right hemisphere will do much of what is ordinarily done by the left hemisphere. But a configuration is not itself a material thing. So Aquinas is right in one sense—the intellect is something immaterial—and wrong in another sense—the brain carries out intellectual activities.[115]

In other words, Stump thinks that a reconciliation of Aquinas' immaterial intellect with contemporary neuroscience and psychology rests in his hylomorphism more than it does in a dualist sounding view of the intellect, to which we will turn in the next chapter.[116]

Hemisphere Disconnection Syndrome

Another challenge raised against an immaterial mind is that of hemisphere disconnection syndrome (HDS), which is also known as split-brain syndrome. HDS is found in people who have had their corpus callosum surgically severed.[117] People with HDS are able to live practically normal lives, however when their cognitive activity was closely studied it was discovered that,

> Everything indicates that the hemisphere that is talking to the examiner did in fact not see the left-field stimulus and truly had no experience with, nor recollection of, the given stimulus. The other, the right or non-lingual hemisphere, however, did see the projected stimulus in this situation and is able to remember and recognize the object and can demonstrate this by pointing out selectively the

---

[115] Email exchange with Eleanor Stump that took place between October 4, 2021 and January 3, 2022.

[116] Dualism in relation to Aquinas' immaterial intellect is worth noting because there is debate over how Aquinas and Aristotle should be categorized. JP Moreland considers himself a Thomistic Substance Dualist, while Christopher Shields considers Aristotle the first functionalist (and his thoughts are echoed in the *Stanford Encyclopedia of Philosophy*). In the next chapter, we will explore the nuances of hylomorphism that distinguish it from functionalism as well as substance dualism to show how it is a truly a unique solution that sits at the intersection of materialism and dualism.

[117] R.W. Sperry, "Hemisphere Deconnection and Unity in Conscious Awareness," *American Psychologist* 23 no. 10 (October 1968): 723-733, 723.

> corresponding or matching item. This other hemisphere, like a deaf mute or like some aphasics, cannot talk about the perceived object and, worse still, cannot write about it either.[118]

This has resulted in questions about the actual unity of conscious experiences. Roger Sperry and Christof Koch concluded this means that in people with HDS there are two conscious entities that run in parallel, though one is more dominate than the other.[119] Michael Gazzaniga and Donald MacKay have also done research in order to explore whether there is more than one consciousness in these patients and at various times have landed on either side of the debate.[120]

---

[118] Sperry, "Hemisphere Deconnection,", 725. Left-field stimulus refers to stimulus that was generated by the left eye. The left eye's information is processed by the right side of the brain and the right eye's information is processed by the left side of the brain. Furthermore, language is processed by the left side of the brain. Thus, in hemisphere disconnection syndrome only visual information from the right eye is able to be linguistically processed and thus spoken about with the examiner due to the fact that both are processed in the same hemisphere of the brain.

[119] "Observations like the foregoing lead us to favor the view that in the minor hemisphere we deal with a second conscious entity that is characteristically human and runs along in parallel with the more dominant stream of consciousness in the major hemisphere." Sperry, "Hemisphere Deconnection and Unity in Conscious Awareness," 732. "How does it feel to be the mute hemisphere, permanently encased in one skull in the company of a dominant sibling that does all of the talking? Given the right's inability to speak, is it less self-conscious than its twin? Is its content of consciousness more closely related to that of great apes and monkeys that can't talk? Imagine the silent storms raging across the remaining interbrain connections, giving control of this or that part of the body to one or the other hemisphere. Will some future technology permit direct access to the right hemisphere and its conscious mind?" Christof Koch, *The Quest for Consciousness: A Neurobiological Approach,* (New York: W. H. Freeman, 2004), 294.

[120] "Philosophers who have discussed split-brain subjects have variously suggested that: (1) split-brain subjects are really two persons having two separate minds (Pucetti 1972); (2) that the responses produced by the right hemisphere are those of an unconscious automaton (Parfit 1987); (3) that it is indeterminate how many persons split-brain subjects are and that the concept of a person is thrown into jeopardy by the experimental results (Nagel 1971); (4) that split-brain subjects have a unified phenomenal consciousness but a disunified access consciousness (Bayne & Chalmers 2003); (5) that split-brain subjects are single persons who undergo two separate streams of consciousness that remain two from the time of the commissurotomy (Parfit 1987); (6) that split-brain subjects are single persons whose phenomenal consciousness is briefly split into two under certain special experimental conditions, but whose consciousness at other times is unified (Marks 1980). (7) that split-brain subjects experience a single, unified stream of consciousness that is sequentially informed by one hemisphere or the other, but not both at once (Bayne 2010)." Michael Tye, "Philosophical Problems of Consciousness," *The Blackwell Companion to Consciousness,* 2nd ed. Edited by Susan Schneider and Max Velmans, (Oxford: Wiley Blackwell, 2017): 17-31, 27-28.

How do we make sense of the seeming lack of awareness of information processed by the opposite side of the brain if in fact distinctly human functions are wholly immaterial? For example, language is typically considered a uniquely human ability and thus related to the intellectual and immaterial powers. Yet if it is controlled by a particular part of the brain and has no access to information from the opposite hemisphere then how do we account for this? If the intellect is an overarching immaterial power that does not connect to the brain at any single place, as Descartes posited, then how could it have access to information received from one side of the brain but not the other? We cannot explain this in the same way we would agnosia or blindsight without also positing that the immateriality of the intellect is localized to a particular part of the brain.[121] Interestingly enough Neurosurgeon Michael Egnor, in an interview on how Split-Brain actually supports Thomism touches on this question. He says,

> Arjuna Das: Why would it be that the person *could push the button* [indicating they saw a vowel in at least one of their visual fields] with one hand, despite it being in a different visual field but they *couldn't say the letter*?
>
> Michael Egnor: Because *saying the letter is still a material process*. *Language is still a material thing*. You can disconnect material things but *you can't disconnect concepts*. The concepts get across, but the material ability doesn't get across. That is, *the left hemisphere can't make the right hemisphere speak but information in the left hemisphere of a conceptual nature can easily get across* without a material connection.[122]

In other words, Egnor thinks that though the particular letter seen by the other hemisphere is not transmittable to the opposite hemisphere, the fact the particular letter is

---

[121] For further information on Thomistic thoughts on Blindsight and Agnosia see: Stump, *Aquinas*, 246-247.

[122] Michael Egnor and Arjuna Das, "How the Split Brain Emphasizes the Reality of the Mind," *Mind Matters* (August 11, 2021), https://mindmatters.ai/2021/08/how-the-split-brain-emphasizes-the-reality-of-the-mind, 01:10:07. Emphasis added.

or is not a vowel is transmittable. This he attributes to the fact that "vowel" is a concept, while the individual letter is not. Thus, the intelligible is transmittable immaterially while the material form is not. In discussing this he goes on to say,

> Arjuna Das: So, how would you make it a conceptual versus a material perception? What exactly is the difference? Why can't a letter be interpreted as a conceptual concept and then you could pick out the letter?
>
> Michael Egnor: The difference is between a universal and a particular. Conceptual things deal with universals, and particulars deal with individual things. For example, if I look at the letter a and realize that it's a vowel, two different mental processes are going on. The perceptual process is that I see the letter a and it looks like an a, it's got the shape, it's made in a certain color, a certain size. The intellectual process is that I understand that it's a vowel. Understanding that it's a vowel is not a perception, it's intellectual. The perception is actually seeing the letter.[123]

Thus, it seems that rather than undermine the immateriality of the mind, HDS actually seems to undergird it.

Conclusion

As we have seen Aquinas has a robust theory of consciousness that includes answers to questions related to the opacity of self-knowledge as well as those related to the obviousness of self-awareness. Through his view of the duality of conscious thought and habitual self-awareness he is able to make a case for an immaterial intellect that is knowable through its actions. However, as we have also seen, there are some discoveries in contemporary psychology and neuroscience that are not easily reconciled with an immaterial intellect.

---

[123] Michael Egnor and Arjuna Das, "How the Split Brain Emphasizes the Reality of the Mind," *Mind Matters* (August 11, 2021), https://mindmatters.ai/2021/08/how-the-split-brain-emphasizes-the-reality-of-the-mind, 01:10:39. Emphasis added.

All of this is extremely important because it has direct implications for what AI can be and its implications for the theism. If in fact the human intellect is immaterial, then it could never be reverse engineered. Nor could AI ever truly be said to be conscious. Thus, disproving the idea that consciousness is a matter embedded phenomenon that is able to be reverse engineered. Furthermore, if the intellect is immaterial then that means that AI could never be considered a representative of human consciousness and therefore could not speak to the pre-requisites of human origins. However, since there are some remaining difficulties for an immaterial intellect it will be helpful to do more exploration. If Stump is right that Aquinas was both right and wrong about the immateriality of the intellect, then a better understanding of his hylomorphism will be helpful. It is to a clarification of the uniqueness of hylomorphism that we will turn in the next chapter.

Chapter 5

What can we learn about Hylomorphism from Perception?

Thus far we have looked at what makes a human unique from the third-person perspective in chapter three. This has been helpful in highlighting key differences between humanity and AI, such that we have been able to see that regardless of whether an AGI is ever created, it could never speak to human origins. We then looked at humanity from the first-person perspective, in chapter four, which showed us that for a being to be truly self-reflective requires that it have an immaterial intellect. In both of these chapters, we focused on the aspects of cognition that are uniquely human, however, contemporary philosophy of mind includes the cognitive powers that Aristotle and Aquinas believe all animals share.

The powers of perception, or Aquinas and Aristotle's sensitive powers, are not unique to humanity and yet are extremely valuable in the AI and the existence of God conversation for a number of reasons. First, if AI cannot perceive, then it does not have the sensible forms (i.e., phantasms) from which to abstract in the process of intellection. Second, if Aristotelian-Thomistic (AT) PoM does not demarcate the cognitive powers in the same way as the contemporary mind-body problem, then it truly does provide a unique perspective to the mind-body problem. This is important because it means that AT PoM should not be dismissed by materialists based upon their objections to dualism but should be given serious consideration. Finally, the process of perception itself, the taking of form without matter, reveals something about the metaphysical make up of reality, in that it is hylomorphic, which has implications for the question of the existence of God.

Thus, the purpose of this chapter is to explore what we can learn about hylomorphism from perception.

Understanding what is meant by hylomorphism is really important, because it has been nearly universally misunderstood.[1] Hylomorphism originated with Aristotle and was further developed by Aquinas. It is a way of looking at corporeal being that finds its place between reductive materialism and substance dualism on the material-immaterial spectrum of views.[2] William Jaworski, a philosophy professor at Fordham University summarizes hylomorphism well when he says,

> Hylomorphism claims that structure (or organization, form, arrangement, order, or configuration) is a basic ontological and explanatory principle. Some individuals, paradigmatically living things, consist of materials that are structured or organized in various ways. You and I are not mere quantities of physical materials; we are quantities of physical materials with a certain organization or structure. That structure is responsible for us being and persisting as humans, and it is responsible for us having the particular developmental, metabolic, reproductive, perceptive, and cognitive capacities we have.[3]

Aristotle neither over emphasizes the material, nor the immaterial. Aristotle rejected the over emphasis of the material in his rejection of Democritean's reductive materialism as well as the over emphasis of the immaterial in his rejection of Platonic idealism.[4] Instead

---

[1] For more information, Sorabji gives an overview of the variety of interpretations of Aristotle in "Body and Soul in Aristotle." This will also be discussed more fully in the following pages. Richard Sorabji, "Body and Soul in Aristotle," *Philosophy* 49 no. 187 (January 1974): 63-89.

[2] Christopher Green, "The thoroughly modern Aristotle: Was he really a functionalist?" *History of Psychology* 1 (1998): 8-20, 8.

[3] William Jaworski, "Hylomorphism and Mind-Body Problems," *The Brains Blog*, March 10, 2016, https://philosophyofbrains.com/2016/05/10/hylomorphism-and-mind-body-problems.aspx, 1. Christopher Green agrees when he says, "Aristotle did not believe that matter and form were "added" together, like so many things in a recipe. . . . Matter and form were tools of conceptual analysis; ways of getting at the definitions and explanations of things. This metaphysical framework, in which things are analyzed with respect to their form and matter, is called 'hylomorphism.'" Green, "The thoroughly modern Aristotle: Was he really a functionalist?" 8.

[4] "Aristotle rejects Democritean reductive materialism and Platonic idealism in favor of a position in which the organization, or form, of matter is key to understanding the nature of a thing, even when that "thing" is the psuchê." Green, "The thoroughly modern Aristotle: Was he really a functionalist?" 8.

he favors "a position in which the organization, or form, of matter is key to understanding the nature of a thing, even when that 'thing' is the *psuchê*."[5]

Hylomorphism is so middle of the road that nearly every classification on the spectrum either sees himself or his opponent when studying it. J.P. Moreland considers himself a substance dualist Thomist.[6] Jonathan Barnes holds to an interpretation of Aristotle that could be called property dualism in his argument against Aristotle being a physicalist.[7] Nussman, Putnam, Burnyeat, Cohen, and Wilkes consider Aristotle and Aquinas to be functionalists,[8] and Bernard Williams thinks that hylomorphism is a "polite" form of reductionism.[9] Given the vast disagreement on the nature of Aristotle and Aquinas' system, it seems important that we explore what is meant by hylomorphism to see if it has anything unique to provide to the contemporary mind-body problem.

We do not have the time to cover all of these views and so we will focus on the one most relevant to the AI conversation. Of these views, AI is posited on the grounds of functionalism and so we will use a discussion that took place around whether Aristotle

---

[5] Green, "The thoroughly modern Aristotle: Was he really a functionalist?" 8.

[6] J.P. Moreland, "In Dense of a Thomist-like Dualism," *The Blackwell Companion to Substance Dualism* (Hoboken: Wiley Blackwell, 2018): 102-122.

[7] "νοῦς is an attribute of substances and not a substance itself. Aristotle thus emerges as a fairly consistent upholder of an attribute theory of mind; and that, I suggest, is his greatest contribution to mental philosophy." Barnes, "Aristotle's concept of mind," 113. Christopher Green takes this to mean that Barnes is a property dualist. Green, "The Thoroughly Modern Aristotle: Was he really a functionalist?" 10.

[8] There is a lively debate about whether Aristotle is a functionalist and what his functionalism looks like in terms of contemporary functionalism. Much of this debate will be brought into this chapter. For more information see: Martha Nussbaum and Hilary Putnam, "Changing Aristotle's Mind," *Essays on Aristotle's De Anima,* (Oxford: Oxford University Press, 2003): 30-60. M.F. Burnyeat, "Is an Aristotelian Philosophy of Mind Still Credible?" *Essays on Aristotle's De Anima* (Oxford: Oxford University Press, 2003): 18-29. S. Marc Cohen, "Hylomorphism and Functionalism," *Essays on Aristotle's De Anima* (Oxford: Oxford University Press, 2003): 61-75. Kathryn Wilkes, *Physicalism* (Abingdon: Routledge, 1978).

[9] Bernard Williams, "Hylomorphism," *Oxford Studies in Ancient Philosophy* 4 (1986): 189–199.

and Aquinas are functionalists in order to parse out what exactly, if anything, is the difference between them and contemporary functionalism.[10] Approaching hylomorphism in this way will allow us to run it alongside some of the key ideas behind AI PoM, because AI PoM is rooted in functionalism.

What is Functionalism?

Functionalism is the view that mental capacities should be understood in terms of functionality rather than in terms of purely physical states. In discussing this Robert Van Gulick says,

> Functionalism at its core is the thesis that minds and mental kinds are to be understood in terms of the roles or functions that specific states and processes play within suitably organized systems. From a functionalist perspective, minds differ from non-minds not in any distinctive substance or fundamental substrate, but in their systemic organization and the roles played by their parts and sub-parts within it. A minded system is simply one that is organized in the right sort of way, though just which ways those are is a difficult and disputed matter.[11]

[10] A case for strong AI has been made from a variety of philosophical backgrounds, but the one that is most relevant to the existence of God question is functionalism, which is the view of Daniel Dennett an outspoken promoter of both strong AI and atheism. Furthermore, many of the most popular physicalist theories of intentionality are functionalist. For more information see: Konstantine Arkoudas and Selmer Bringsjord, "Philosophical Foundations," *The Cambridge Handbook of Artificial Intelligence* (Cambridge: Cambridge University Press, 2018): 34-63

[11] Robert Van Gulick, "Functionalism," *The Oxford Handbook of Philosophy of Mind* (Oxford: Oxford University Press, 2009): 128-151 128. Emphasis added.

Functionalism is the child of behaviorism[12] and physicalism,[13] both of which it borrows from and attempts to correct, but the two largest factors in the development of functionalist theories were cognitive psychology and computer technology. In discussing the rise of functionalism Van Gulick says,

> The rise of cognitive psychology and of attempts to build data-driven models of mental processes put the emphasis on the systemic organizational aspect of mind. *General advances in computer technology and the widespread acceptance of the software-hardware metaphor also suggested an analogous realization view of the mind-body relation. Software is to hardware as function is to structure, and as mind is to brain.* Brain processes provide the substrate for the mental processes they realize. The notion of the *mind as an information-processing system*, which arose in the 1960s, reflected the influence of both *computational* and cognitivist trends.[14]

Though there are a variety of forms of functionalism, the one most relevant to our conversation is *computational* functionalism, because it is what undergirds the strong view of AI. "When AI is defined as the field devoted to engineering artifacts able to pass TT, TTT, and various other tests, it can be safely said that we are dealing with weak AI. . . Weak AI aims at building machines that *act* intelligently, *without taking a position*

---

[12] "One very well-known sort of materialist theory of the mind (perhaps, better, an 'anti-theory' of mind) is behaviorism. Behaviorism[2] holds that all mental talk (e.g., 'Horatio wants to play baseball.') is really just talk about dispositions to behave in certain ways (e.g., 'Given appropriate conditions, Horatio is likely to play baseball.'). (Some behaviorists have argued that they are not materialists, but are 'agnostic' about all metaphysical questions, in the manner of the logical positivists. For my present purposes they count as materialists in at least the minimal sense that they do not propose any non-material substances, and are inclined to treat the investigation of animal behavior in precisely the same way they would treat the behavior of non-living entities, such as planets, stars, and chemicals.)" Green, "The thoroughly modern Aristotle: Was he really a functionalist?" 9.

[13] "Another materialist theory of mind, called physicalism, was also popular in the middle of the 20th century. One form of physicalism[3] popular in the 1950s held that anything one says about the mind can -- and should, if one wants to be scientific -- be redescribed as something about the activity of the brain. This is a strongly reductive form of materialism in that it claims that descriptions of mental events can be 'reduced' to descriptions about neurological ones. Put another way, it claims that mental events and brain events are identical. For this reason this form of physicalism is sometimes called identity theory. One important implication of physicalism is that there is no such thing as consciousness, one of the primary attributes of Descartes' res cogitans (but see Place,1956)." Green, "The thoroughly modern Aristotle: Was he really a functionalist?" 9.

[14] Van Gulick, "Functionalism," 130-131. Emphasis added.

on whether or not the machines actually are intelligent."[15] This version of AI is not the focus of this project as its focus is on creating tools for the use of humans. On the other hand, AGI is focused on "building persons."[16] In discussing the goals of strong AI research, John Haugeland says,

> The fundamental goal of [AI] research is not merely to mimic intelligence or produce some clever fake. Not at all. 'AI' wants only the genuine article: *machines with minds,* in the full and literal sense. This is not science fiction, but real science, based on a theoretical conception as deep as it is daring: namely, we are, at root, *computers ourselves*. That idea—that *idea that thinking and computing are radically the same*—is the topic of this book.[17]

Behind strong AI research and the computational theory of mind (i.e., computational functionalism) is the transportability thesis. This is the view that

> minds can, in principle, be "transported" into any physical system that can be arranged so as to preserve the functional relations. Thus, a human mind could, for instance, be instantiated in an electronic computer, provided the computer was programmed properly (the famous artificial intelligence researcher Marvin Minsky has even suggested this as a solution to the problem of human mortality!).[18]

In his famous "Robots: Machines or Artificially Created Life?" article, Hilary Putnam discusses some objections to his transportability theory, which will help bring things more into focus. In discussing whether sensations are identical with brain-states, he says,

> Psychological states are characterizable only in terms of their relations to each other (as well as to behavior, etc.), and not as dispositions which can be

---

[15] Arkoudas, "Philosophical Foundations," 35. Emphasis added. TT stands for Turing Test and TTT stands for Total Turing Test. In summarizing TTT Arkoudas says, "Accordingly, Harnad (1991) insists that sensorimotor capability is required of artifacts that would spell success for AI, and he proposes the Total TT (TTT) as an improvement over TT. Whereas in TT a bodiless computer program could, at least in principle, pass, TTT-passers must be robots able to operate in the physical environment in a way that is indistinguishable from the behaviors manifested by embodied human persons navigating the physical world." Ibid.

[16] Ibid.

[17] John Haugeland, *Artificial Intelligence: The Very Idea* (Cambridge: MIT Press, 1989), 2. Emphasis added.

[18] Green, "The thoroughly modern Aristotle: Was he really a functionalist?" 19.

> 'unpacked' without coming back to the very psychological predicates that are in question. But this is not fatal to our case. A robot, too, can have internal states that are related to each other (and only indirectly to behavior and sensory stimulation) as required by a psychological theory. Then, when the robot is in the internal state that realizes the predicate 'knows that p' we may say that the robot 'knows' that p.[19]

This exposes a unique aspect of functionalism in that it does not express a one-to-one correlation between the physical and the psychological. Putnam is quite adamant that "if Materialism is taken to be the denial of the existence of 'nonphysical' attributes, then Materialism is false even for robots!"[20] He goes on to say that when he says that "something 'looks red' to a ROBOT, all that I mean is the ROBOT is in a certain kind of *physical* state (admittedly, one specified by its *psychological* significance, and *not by a direct physical-chemical description*)."[21] With this we have the first rough sketch of the transportability thesis, namely, that psychological states are transportable between different kinds of beings, irrespective of their physical constitution. This is not to say that Putnam believes that psychological states are non-physical, merely that they are not identical with their physical manifestation.

A non-psychological example of the transportability thesis might be hunger, or the awareness of the need for nourishment. The physical manifestation of the need for nourishment in a plant, an animal, and a human differ significantly, but that they all possess the nutritive power, and with that power the ability to communicate to the necessary parts the need to find sustenance. This is something of which both Aristotle and Aquinas would agree. Putnam applies this principle to psychological states as well,

---

[19] Hilary Putnam, "Robots: Machines or Artificially Created Life?" *Mind, Language, and Reality* Vol 2 (Cambridge: Cambridge University Press, 1975): 386-407, 391. Emphasis added.

[20] Ibid., 393.

[21] Ibid., Emphasis added.

claiming that they are not identical with their physical states, such that a human and a conscious intelligent non-human being could both be said to be angry, even if they share none of the same physiology.

Now this is really interesting, because it led Putnam to conclude that mental states are *compositionally plastic* but not computationally plastic, a position he later repudiated when he and Martha Nussbaum jointly responded to a criticism which lumped their views together.[22] Plasticity (or the ability for something to be plastic) has to do with flexibility. Compositional plasticity is the original transportability thesis. It is the idea that the composition or physiology of a being is not identical with a mental state; that a kind of mental state could exist in two beings of entirely different physiologies (i.e., anger, thought). In technological terms, it is the view that the same software can run on different hardware.

Computational plasticity goes even further and says that a kind of mental state is not even the same amongst beings of the same physiology. In technological terms, given two machines with the same hardware that exemplify a given state, it is not even the same software that generates that state in both. In discussing this Putnam and Nussbaum say,

> Putnam also proposed a theory of his own as to what our organization to function is, one he has now given up; but this theory we did not, of course, attribute to Aristotle. This is the theory that our functional organization is that of *a Turing machine*. Putnam has now given this up because he believes that there are good arguments to show that mental states are not only *compositionally plastic but also computationally plastic*, that is, reasons to believe that physically possible creatures which believe that there are a lot of cats in the neighbourhood, or whatever, *may have an indefinite number of different 'programs', and that the hypothesis that there are necessary and sufficient conditions for the presence of such a belief in computational, or computational-cum-physical, terms is*

[22] Nussbaum and Putnam, "Changing Aristotle's Mind," 52.

> *unrealistic in just the way the theory that there is a necessary and sufficient condition for the presence of a table stateable in phenomenalist terms is unrealistic*: such a condition would be infinitely long, and not constructed according to any effective rule, or even according to a non-effective prescription that we can state without using the very terms to be reduced. *Putnam does not believe that even all humans who have the same belief* (in different cultures, or with different bodies of background knowledge and different conceptual resources) *have in common a physical-cum-computational feature which could be 'identified with' that belief. The 'intentional level' is simply not reducible to the 'computational level' any more than it is to the 'physical level'*."[23]

In other words, mental states are not identical with the physical states of the brain (i.e., the hardware), nor are they identical with the process that would generate them (i.e., the software).[24] Put another way, mental states are not identical with either their physical manifestation nor the process by which their manifestation is achieved. As a result of his new belief, that mental states are not only compositionally but also computationally plastic, he also started to see parallels between his new view and Aristotle.

Putnam, in an attempt to find a way to solve the problem of how language attaches to the world, found hylomorphism attractive.[25] He liked the idea that there were

---

[23] Nussbaum and Putnam, "Changing Aristotle's Mind," 52. Emphasis added.

[24] Computational plasticity is described by Putnam in the following way: "Throughout this paper I have stressed the possibility that a robot and a human may have the same 'psychology' - that is, they may obey the same psychological laws. . . . Thus, to say that a man and a robot have the same 'psychology' (are psychologically isomorphic, as I will also say) is to say that the behavior of the two species is most simply and revealingly analyzed, at the psychological level (in abstraction from the details of the internal physical structure), in terms of the same 'psychological states' and the same hypothetical parameters." This view is often categorized as the mind as software view. Putnam, "Robots: Machines or Artificially Created Life?" 394. For questions related to functionalism and token identity theory see the "Type and Token Identity Theories" section of J. J. C. Smart, "The Mind/Brain Identity Theory," *The Stanford Encyclopedia of Philosophy* (Winter 2022 Edition), Edward N. Zalta & Uri Nodelman (eds.), https://plato.stanford.edu /archives/win2022/entries/mind-identity. However, one must keep in mind that the computational aspect of Putnam's functionalism makes it distinct and in contrast to basic functionalism, which is typically merely focused on compositional plasticity. Thus while compositional plasticity marries well with Token Identity theory, computational plasticity brings something unique.

[25] "In spite of these differences, it is worth insisting that Aristotle and Wittgenstein are both speaking to what we have come to call the problem of intentionality, that is, the problem of how either mind or language hooks on to the world. Aristotle takes the problem to be primarily one of how mind can hook on to the world; Wittgenstein, initiating a linguistic turn, takes the problem to be how language can hook on to the world. But the problems are recognizably linked. Moreover, in spite of all the differences I

real forms in things that could be attached to language.[26] The most interesting thing about Putnam's interest in hylomorphism is that Putnam was one of the founders of functionalism which, as we have seen, is the foundation upon which AGI research is built. Now Putnam rejected his original version of functionalism for a variety of reasons, not all of which are relevant to this discussion, and transitioned to a modified view which he called liberal functionalism.[27] Part of the reason he adjusted his view was because he came to believe something like Aristotle and Aquinas's hylomorphism, as seen through the process of perception, had something significant to lend to the mind-body conversation.[28] Thus, to better understand what hylomorphism can contribute to the AI conversation, it will be helpful to look at it through the lens of the mind-body problem and perception.

Thomistic Perception and the Mind-Body Problem

The mind-body problem is a bifurcation of "mental" acts from "physical" acts in a way that is quite foreign to Aristotle and Aquinas. Putnam observed that we "cannot find the modern 'mind-body problem'" in Aristotle and that though "Aquinas had an elaborate

---

have mentioned, there is a recognizably common intuition that they share; the intuition that mind and language could not hook on to the world if that which is to be hooked on to did not have intrinsic or 'built-in' form." Hilary Putnam, "Aristotle after Wittgenstein," *Words and Live: Hilary Putnam* (Cambridge: Harvard University Press, 1994): 62-84, 63-64.

[26] This will be discussed more fully in the section later in this chapter on the irreducibility of form as well as in discussions of intentionality.

[27] For a discussion of the reasons that Putnam rejected his original functionalism in favor of a more Aristotelian view see: Hillary Putnam, "Perception without Sense Data," *Naturalism, Realism, and Normativity* (Cambridge: Harvard University Press, 2016): 152-168; Hilary Putnam, "'Naïve Realism' and Qualia," *Naturalism, Realism, and Normativity* (Cambridge: Harvard University Press, 2016): 169-198.

[28] Putnam and Nussbaum in a shared defense of Aristotle's application to functionalism against a critique by Myles Burnyeat say about their own view that they "had written separately a shared view of Aristotle: namely, a defense of the Aristotelian form-matter view as a happy alternative to materialist reductionism on the one hand, Cartesian dualism on the other—an alternative that has certain similarities with contemporary functionalism." Nussbaum and Putnam, "Changing Aristotle's Mind," 22.

psychology" he did "not divide things up as we now do."[29] In recalling his training in PoM Putnam says,

> What interests me when I read the writing of my former self is how obvious it seemed to me that the mind-body problem concerned, in the first instance at least, sensations, and how the "usual arguments for dualism" were *all arguments against identifying sensations with anything physical*. Nor was I alone in this impression. A glance at the various anthologies on the mind-body problem reveals that it was just about universal in those years. *Everybody "knew" the mind-body problem had to do with whether sensations were material or not*.[30]

Another person involved in the discussion surrounding understanding how hylomorphism might contribute to the mind-body conversation is Richard Sorabji. He, like Putnam, sees a difference in the way Aristotle breaks up the discussion from the contemporary division. He says,

> If one calls anger a physiological process, one cannot continue to call it distinctively mental. Or if one does, *one is departing from a Cartesian concept of mental acts, and will then have to explain what one means by 'mental'.* For Descartes, *mental activities have no affinity (affinitas) with bodily activities*. And the *mind itself has properties which are actually incompatible with those of the body, for the body is extended and divisible, the mind neither extended nor divisible*.[31]

He also notices that one of the central tenants to post-Cartesian PoM is self-awareness or consciousness and that it does not play the same role in Aristotle's philosophy. Remarking on this, he says,

> Aristotle is unlike Descartes in several fundamental ways. For one thing, the topic of *self-awareness* does not play the same role in his account of the soul. *Descartes*

---

[29] Hilary Putnam, "How Old Is the Mind?" *Words and Live: Hilary Putnam* (Cambridge: Harvard University Press, 1994): 3-21, 4.

[30] Ibid., 8. Emphasis added.

[31] Sorabji, "Body and Soul in Aristotle," 71-72. Emphasis added. He goes on to say, "There is another way in which Aristotle is fundamentally unlike Descartes. He does not divide up the world at the same points. We have already noticed that he does not treat mental acts as a single group, but makes a sharp distinction between perception and thought. Nor does he follow Descartes in trying to separate off from the group nutrition (note 9), or in distinguishing between corporeal acts of walking or seeing, which do not belong to the group, and seeming to see or seeming to walk, which do belong (note 29)." Sorabji, "Body and Soul in Aristotle," 72.

> *defines the mind as a conscious being (2nd Meditation, HR I, p. 152), and consciousness (cogitatio) as 'all that is in us in such a way that we are immediately aware (conscii) of it'*. Because of this, the notion of self-awareness is central in Descartes' view of the soul. *But Aristotle's remarks on self-awareness are brief, sporadic, and by no means centrally placed*.[32]

Myles Burnyeat, who rejects Aristotle as a valid option, also sees a difference in Aristotle's division from the contemporary landscape. He says,

> Aristotle's conception of the material or physical side of the soul-body relation is one which no modern functionalist could share; no modern functionalist could share it because no modern philosopher, whatever his persuasions, could share it. Modern philosophies of mind have taken shape, very largely, as so many ways of responding to Cartesian dualism . . . *our conception of the physical is irreversibly influenced by the demolition of the Aristotelian philosophy through Descartes and others in the seventeenth century.*[33]

What is most interesting about Burnyeat's observation is that he fleshes it out in terms of a difference in the body part of the division, rather than in the mind part of the division. Recall from a moment ago Putnam and Sorabji identified that Aristotle fleshes out the mind differently than the contemporary mind-body problem does. What is interesting about this quote from Burnyeat is that he thinks that Aristotle fleshes out the body part differently than the contemporary mind-body problem does too. We will address this in the section on suitable matter later in this chapter. The diversity of views about how Aristotle differs from the contemporary mind-body problem led to an interesting exchange between Putnam, Nussbaum, Sorabji, Coulter, and Green on what exactly is meant when Aristotle and Aquinas say that perception is "taking on form without matter" that will be a significant part of our discussion.[34] We will return to this in a moment, but

---

[32] Sorabji, "Body and Soul in Aristotle," 72. Emphasis added.

[33] Burnyeat, "Is an Aristotelian Philosophy of Mind," 19. Emphasis added.

[34] Aristotle says, "By a 'sense' is meant what has the power of receiving into itself the sensible forms of things without the matter." Aristotle, *DA* II.12. Aquinas, *InDA*, *Lectio* 24.

before we do, we need to explore Aristotle and Aquinas and the contemporary mind-body division a little more.

Unlike in the contemporary mind-body division, wherein perception is part of the mind part of the division, for Aristotle and Aquinas perception is materially bound.[35] In discussing this Aquinas says, "*The operation of this power in the sensitive soul is not apart from the body*; for anger, joy, and passions of a like nature are *accompanied by a change in the body*."[36] Aristotle conveys something similar when he says,

> If we consider the majority of [the affections of the soul], there seems to be no case in which the soul can act or be acted upon *without involving the body*; e. g. anger, courage, appetite, and *sensation* generally. Thinking seems the most probable exception; but if this too proves to *be a form of imagination or to be impossible without imagination, it too requires a body as a condition of its existence*. . . . It therefore seems that all *the affections of soul involve a body*— passion, gentleness, fear, pity, courage, joy, loving, and hating; in all these there is a concurrent affections of the body.[37]

What is most interesting about these two passages is that they claim that some things (i.e., the perceptive powers) that are typically attributed to the mind, in contemporary PoM, are materially bound.[38] Aristotle says that sensation and imagination require a body, which

---

[35] In the section that follows I am strictly speaking of the sensitive cognitive powers, not the affections of the soul. While Aristotle and Aquinas include things like anger, joy, fear, and pity in these quotes, they are beside the point I wish to make, and I would have excluded them where it possible to do so without corrupting the quote. The point of this section is to demonstrate that the sensitive cognitive powers, which are part of the contemporary mind-body problem, are not a problem for AT PoM, because AT PoM does not segregate them away from the body like the contemporary mind-body problem does.

[36] Aquinas, *ST* Ia.75.3 *ad* 3. Emphasis added.

[37] Aristotle, *DA*, 403a. Emphasis added. He also says that "the affections of soul are inseparable from the material substratum of animal life, to which we have seen that such affections, e. g. passion and fear, attach, and have not the same mode of being as a line or a plane." Aristotle, *DA*, 403b. "From this it indubitably follows that the soul is inseparable from its body, or at any rate that certain parts of it are (if it has parts)— for the actuality of some of them is nothing but the actualities of their bodily parts. (5) Yet some may be separable because they are not the actualities of any body at all. Further, we have no light on the problem whether the soul may not be the actuality of its body in the sense in which the sailor is the actuality9 of the ship." Ibid., 413a.

[38] There are many other things in this passage other than just the perceptive powers, but for the purpose of this chapter we are only going to focus on the perceptive powers.

means that Aristotle's mind cannot be incompatible with the body, nor can his view of the body be merely divisibility and extension in space.[39] The reason for this is because for both Aristotle and Aquinas sensation/perception entails a change in the body. In discussing this Aquinas says,

> Sensation and the consequent operations of the sensitive soul are evidently *accompanied with change in the body*; thus in the act of vision, the pupil of the eye is affected by a reflection of color: and so with the other senses. Hence it is clear that *the sensitive soul has no 'per se' operation of its own, and that every operation of the sensitive soul belongs to the composite*.[40]

He thinks this is evidenced by the fact that the senses can be overloaded or damaged. In discussing this he says, "the impression of the object on the sense *is accompanied with change in the body*; so that *excessive strength of the sensible corrupts sense*."[41] In other words, when we listen to music that is too loud for too long, we can damage our hearing both in the short term and also potentially in the long term. When we walk into a bright area after having been in the dark, we cannot see at first. The fact that our senses can be overwhelmed and consequently be damaged either temporarily or permanently is evidence that they are accompanied by changes in the body.

Thus, perception could not take place apart from the body and therefore would be more likely to fall into the body part of the mind-body division, if Aristotle and Aquinas were forced to fit their view into the contemporary mind-body schema. Before even

---

[39] "For Descartes, mental activities have no affinity (affinitas) with bodily activities. And the mind itself has properties which are actually incompatible with those of the body, for the body is extended and divisible, the mind neither extended nor divisible." Sorabji, "Body and Soul in Aristotle," 71-72.

[40] Aquinas, *ST* Ia.75.3 *respondeo*. Emphasis added. "The operation of this power in the sensitive soul is not apart from the body; for anger, joy, and passions of a like nature are accompanied by a change in the body." Ibid., Ia.75.3 *respondeo*. "But one cannot sense without a body." Aquinas, *ST* Ia.76.1 *respondeo*. Aristotle says something similar when he says, "Sensation is held to be a qualitative alteration, and nothing except what has soul in it is capable of sensation." Aristotle, *DA*, 415b.

[41] Aquinas, *ST* Ia.75.3 *ad* 2. Emphasis added.

diving into the details of Thomistic perception we see that hylomorphism cannot be dualism, as it is defined by the mind-body problem, because, as it relates to perception, hylomorphism agrees more with materialism than dualism, by placing the perceptive powers in the body. This means that AT PoM does truly have something unique to bring to the mind-body conversation, since it does not demarcate the cognitive powers in the same way as the contemporary mind-body problem.

Taking on Form without Matter

Perception for an AT PoM is the taking of the form of the thing in the world without taking its matter. In nutrition a body takes both the form and matter of the thing and utilizes both. However, in perception, the matter is left behind in the process of utilization. In discussing this Aristotle says, "By a 'sense' is meant what has the power of receiving into itself the sensible forms of things without the matter."[42] He goes on to say, "By 'an organ of sense' is meant that in which ultimately such a power is seated."[43] But why does this matter?

In a paper titled, "Is an Aristotelian PoM Still Credible?" Burnyeat not only took issue with Putnam, Nussbaum, and Sorabji's interpretation of Aristotle's view of perception (while also lumping them together), but with Aristotle's view of perception altogether. He rejected an Aristotelian PoM because he believed that Aristotle's view of the physical was incompatible with the post-Cartesian view of the physical. He says,

> *Our conception of the physical is irreversibly influenced by the demolition of the Aristotelian philosophy* through Descartes and others in the seventeenth century. Aristotle's solution to the mind-body problem . . . becomes less attractive when we find *that it is worked out in terms of, and cannot be understood apart from,*

[42] Aristotle, *DA*, II.12.

[43] Ibid., II.12.

> *various physical assumptions which we can no longer share*: assumptions, indeed, of such a kind that we can scarcely even imagine what it would be like to take them seriously. *Aristotle's philosophy of mind is no longer credible because Aristotelian physics is no longer credible*, and the fact of that physics being incredible has quite a lot to do with there being such a thing as the mind-body problem as we face it today.[44]

He goes on to say

> I remain convinced, however, that whatever the meaning of the phrase 'taking on form without matter', it picks out the most basic level of interaction between a perceiver and the object perceived. Accordingly, if taking on form without matter is not the physiological process that Sorabji describes, then in Aristotle's view there is no physiological process which stands to a perceiver's awareness of colour or smell as matter to form. . . . The Sorabji interpretation of taking on form without matter is essential support for the Putnam-Nussbaum interpretation of Aristotle as a functionalist. Without Sorabji, the functionalist can point to no material process that serves for Aristotle as the realization of perception. Without Sorabji, therefore, the Aristotelian theory of perception is neither functionalist nor a theory that any of us could believe.[45]

This is really important because it highlights where contemporary PoM conversation stands as it relates to Aristotelian explanations. There is a desire by some to see Aristotelian interpretations as functionalist, conveniently allowing for a common area of discussion between Thomists and strong AI proponents. Yet others see Aristotelian options as irrelevant due to their interpretation of Aristotelean physicality as incompatible with post-Cartesian ideas about the physical. Burnyeat is in this camp and he hangs his hope of Aristotelian PoM's failing upon Sorabji's interpretation of the claim that sensation is the reception of form without matter.[46]

---

[44] Burnyeat, "Is an Aristotelian Philosophy of Mind Still Credible?" 19. Emphasis added.

[45] Ibid., 18.

[46] "By a 'sense' is meant what has the power of receiving into itself the sensible forms of things without the matter." Aristotle, *DA*, 424a. "But sensation need not be found in all things that live. For it is impossible for touch to belong either (1) to those whose body is uncompounded or (2) to those which are incapable of taking in the forms without their matter." Ibid., 434a. "The senses receive forms without matter." Aquinas, *InDA* II.551.

Understanding what is meant by taking on form without matter seems to be a crucial question when it comes to AI discussions, because of the role that the sensitive form plays for the human intellect. As we saw in chapter three, what makes humans unique from other animals are the rational powers—the intellect and will. But the intellect and will are not all of what is involved in the human's ability to interact with the world. The rational powers owe their ability to engage the world to the work of the sensitive powers or what is often called either sensation or perception.[47] In discussing this, Aristotle says, "no one can learn or understand anything *in the absence of sense*, and when the mind is actively aware of anything it is necessarily *aware of it along with an image [phantasm];* for images are like sensuous contents except in that they contain no matter."[48] Aquinas says that "*the body is necessary for the action of the intellect*, not as its origin of action, but on the part of *the object*; for the *phantasm* [sensitive form] is to

[47] There is debate in the literature about the difference between sensation and perception. Some people use one or the other to indicate the cognitive powers of the sensitive soul. These are the powers that are related to sensation and qualia—the powers shared by humans and animals. Perception seems to be the word most used by non-thomists while sensation is the word more often used in translations of Aristotle and Aquinas. I will use them interchangeably and use the one most relevant to the quote that I am interacting with at the time, but the change in word choice does not indicate a different concept, merely an attempt to interact with the given quote in a way that is not distracting from the point at hand.

For Aristotle and Aquinas, sensation and perception have to do with the following powers: (1) the five external senses (i.e., seeing, hearing, tasting, touching, smelling), (2) a common sense in which these are all brought together, (3) the imagination wherein the internal "image" or phantasm is created and stored, (4) memory wherein past phantasms are recalled, (5) estimation wherein practicality and usefulness are determined (this is instinct in brute animals and practical reasoning in humans). All of these powers are shared by brute animals and humans, though the imaginative and estimative powers are perfected in humans and able to influenced by the rational powers (intellect and will). Aristotle discusses the sensitive powers in *De Anima* starting in Book II 416b and going through Book III 429a. Aquinas discusses them in *In Aristotelis De Anima Commentarium* starting in Book II *Lectio* 10 and going through Book III *Lectio* 4. He also discusses them in *ST* Ia.78-81 as well as *SCG*.2.58, 66, 72, 82, 83. For a good analysis of the sense powers as they relate to humans see Robert Brennan's *Thomistic Psychology: A philosophic Analysis of the Nature of Man* pg. 11-23, 111-146.

[48] Aristotle, *DA*, 431b. Emphasis added.

the intellect what color is to the sight."[49] In other words, if perception were never to take place then intellection would have no data from which to abstract, meaning that some perception is a prerequisite of any intellection.

This is important to the AI discussion, because if AI cannot perceive, then it's simulation of the intellectual powers cannot be said to be true intellection. If the process of intellection utilizes the output of perception, then without perception AI cannot do intellection either. Thus, a proper understanding of what is meant by taking form without matter is essential to understanding whether or not AI could ever actually be considered intelligent. If receiving input from microphones, video cameras, and sensors is not functionally equivalent to *receiving form without matter*, then no calculations, manipulations, and projections done with that input could be called intellection. Put another way, if AI cannot perceive then it would not have the necessary object upon which an intellect could abstract, thus further highlighting key differences between AI and humanity and calling into question its ability to speak to human origins.

In defining the sense powers Aristotle says, "by a 'sense' is meant what has the power of *receiving into itself the sensible forms of things without the matter*."[50] He goes on to say that "sensation need not be found in all things that live. For it is impossible for touch to belong either (1) to those whose body is uncompounded or (2) to those which are incapable of *taking in the forms without their matter*."[51] Aquinas echoes this view when

---

[49] Aquinas, *ST* Ia.75.2 *ad* 3. Emphasis added. "The intellect requires the operation of the sensitive powers in the production of the phantasms." Aquinas, *ST* Ia.75.3 *ad* 2.

[50] Aristotle, *DA*, 424a. Emphasis added.

[51] Ibid. Emphasis added.

he says that "the senses *receive forms without matter*."[52] But what is meant by this phrase "form without matter?" In an attempt to clarify this Aristotle says,

> By a 'sense' is meant what has the power of receiving into itself the sensible forms of things without the matter. This must be conceived of as taking place in the way in which a piece of wax takes on the impress of a signet-ring without the iron or gold; we say that what produces the impression is a signet of bronze or gold, but its particular metallic constitution makes no difference: in a similar way the sense is affected by what is coloured or flavoured or sounding, but it is indifferent what in each case the substance is; what alone matters is what quality it has, i.e., in what ratio its constituents are combined.[53]

He goes on to say, "sensation depends . . . on a process of movement or affection from without, for it is held to be *some sort of change of quality*" and that "seeing is due to an affection or *change of what has the perceptive faculty*."[54] Commenting on this portion of Aristotle, Aquinas says,

> The *disposition* of the wax to the image *is not the same* as that of the iron or gold to the image; hence *wax, he says, takes a sign, i.e. a shape or image,* of what is gold or bronze, *but not precisely as* gold or bronze. For the wax *takes a likeness of the gold seal in respect of the image, but not in respect of the seal's intrinsic disposition* to be a gold seal. *Likewise the sense is affected by the sense-object* with a colour or taste or flavour or sound, '*not in respect of what each is called as a particular thing'*, i.e. it is not affected by a coloured stone precisely as stone, or sweet honey precisely as honey, because *in the sense there is no such disposition to the form as there is in these substances*; but it is affected by them precisely as coloured, or tasty, or as having this or that 'informing principle' or form. For *the sense is assimilated to the sensible object in point of form, not in point of the disposition of matter*.[55]

---

[52] Aquinas, *InDA* II.551. Emphasis added.

[53] Aristotle, *DA*, 424a. "The senses receive forms without matter, as wax receives the mark of a ring without the iron or gold. This, however, would seem to be common to all cases of passive reception; every passive thing receives from an agent in so far as the agent is active; and since the agent acts by its form, not its matter, every recipient as such receives form without matter. Which indeed is sensibly apparent; e.g. air does not receive matter from fire acting upon it, but a form. So it would seem not to be peculiar to sensation that it receives form without matter." Aquinas, *InDA* II.551.

[54] Aristotle, *DA*, 416b, 419a. Emphasis added.

[55] Aquinas, *InDA* II.554. Emphasis added.

From these quotes we can identify the following characteristics about sensation/perception: (1) a change of quality takes place in the being doing the sensing and (2) that change is not a substantial change.[56] We know that sense perception is not a substantial change, because of the ring impression in the wax metaphor. When a ring is pressed into wax, the wax changes though it is not changed *into* a ring. The wax takes on the form of the ring in an *intentional* way. What is meant by intentional existence is essentially that the same piece of matter can simultaneously have two different forms, but in different ways: (1) the substantial form—the form that causes it to be *what* (*quid*) it is (i.e., the form of wax)—and (2) the accidental form—the non-essential form that it possesses for use (i.e., the impressed form of the ring). When the wax is impressed with the ring, while the wax may now have a new shape, it does not become a ring. That would be a substantial change. The form of the ring in the wax has accidental existence in that its existence is owed to the wax; it does not have existence in itself, and the wax will continue to exist no matter how many different impressions it gains or loses. The wax still has the quiddity of wax; and it is because of its quiddity that it is able to receive the form of the ring. It is because of the kind of thing that it is that it can be impressed by a

[56] A substantial *change* is when a particular bit of matter *changes* forms. This happens to living beings at death and to artifacts at construction and deconstruction. Aquinas calls death a substantial corruption: "Furthermore, if the soul were in the body as a pilot in a ship, it would follow that the union of soul and body would be an accidental one. Then death, which brings about their separation, would not be a substantial corruption; which is clearly false. So it follows that the soul is a particular thing and that it can subsist of itself, not as a thing having a complete species of its own, but as completing the human species by being the form of the body. Hence it likewise follows that it is both a form and a particular thing." Aquinas, *QDDA*, I, *respondeo*. "Death is a substantial change. In a human death, something has stopped being, absolutely speaking. That something is the composite of body and soul: the human person." Patrick Toner, "St. Thomas Aquinas on Death and the Separated Soul," *Pacific Philosophical Quarterly* 91 (2010): 587-599, 592. Oderberg defines a substantial changes as "the ceasing to exist of one substance and its replacement by another." David Oderberg, *Real Essentialism* (New York: Routledge, 2007), 72. He also says, "Positively speaking, a substantial change is an actualization of the potentiality which some substance has with respect to some new substance: walls can be turned into rubble but not into fish. It is the potentiality which stretches across the change, becoming actualized by it, and so there cannot have been pure annihilation and creation when one substance is turned into another." Oderberg, *Real Essentialism*, 74.

ring. This leads us to our next point of discussion, taking on form without matter also requires suitable matter for reception.

But before we discuss the suitability of matter for reception in sensation, the idea of intentional existence is interesting in relation to AI, because this means that what is received in the input process is very different when you compare human sense input with AI input. When AI takes the form of things that it captures through cameras or microphones, it does not take them into intentional existence. What happens is that a new corporeal substance is generated (i.e., a file that resides on a server or a data packet that is stored in a database). These new substances are then utilized by the algorithm and may even be used in order to modify the algorithm (in terms of weighting). However, when they are used, they do not become a part of the algorithm in the way that an impression becomes a part of the wax. Rather the way in which they "become a part" of the algorithm is by losing their distinctness. Though the file or data packet is not gone, as it can be utilized by many algorithms. The algorithm does not recall the files or data packets it utilized in the training process, like a person can recall a memory. Rather the files or data packets are used in order to set goals and weights and so the way in which they exist in the algorithm is more like the way that food exists in a body after the body has processed it through nutrition. This means that while AI has information to perform calculations on, that information is not of the same kind as sensible forms, because it exists in a different way. The data upon which AI is able to do its abstractions is collections of form-matter compositions with their own existence, rather than sensible forms with intentional existence. This highlights another key difference between humanity and AI further undermining AI's ability to speak to human origins.

Furthermore, this process of taking on form without matter reveals something about the metaphysical makeup of reality. If in perception the form is received, but the matter is left behind, then this reveals a hylomorphic structure to reality.

Perception and Suitable Matter

Burnyeat claims that the reason that an Aristotelian PoM is irrelevant in contemporary context is because he believes that Aristotle's view of the physical has been disproven and he thinks that Aristotle's view of the physical is essential to Aristotle's view of perception. He says,

> Modern philosophies of mind have taken shape, very largely, as so many ways of responding to Cartesian dualism, but all the fire has been aimed at the mind side of that dualism. . . . Our conception of the mental may be open for discussion and revision, *but our conception of the physical is irreversibly influenced by the demolition of the Aristotelian philosophy through Descartes and others in the seventeenth century*.[57]

He takes issue with functionalist attempts to partner with Aristotle because he thinks they are downplaying the role Aristotle's physics plays in his view of perception. In discussing this he says

> *Just so, the functionalist says that his psychological states, construed as functional states, must be realized in some material or physical set-up, but it is not essential that the set-up should be the flesh and bones and nervous system of Homo sapiens rather than the electronic gadgetry of a computer.* The artefact model is maintained, Putnam says explicitly that it is purely contingent that human beings are not artefacts, and Nussbaum gives her scholarly endorsement to this being Aristotle's view. Apply this to the case of perception. *If the artefact model prevails, it is a contingent matter whether perception, construed as a functional state, is realized in a physiological set-up such as modern science describes or in the physiological set-up that Aristotle described. It will not then be essential to Aristotle's account of perception that it involves the particular physiological processes he invokes to explain it. We can discard his story about the sense-organ taking on form without matter, on the grounds that it is antiquated physiology, substitute our own physiology, and still claim in good*

[57] Burnyeat, "Is an Aristotelian Philosophy of Mind Still Credible?" 19. Emphasis added.

> *conscience to have an Aristotelian theory of perception.* We must be able to do this if Aristotle is a functionalist and functionalism is Aristotelian, because *the whole point of functionalism is to free our mental life from dependence on any particular material set-up*.[58]

This is really interesting as it relates to AI because my entire project has been to look at the thoughts of AI proponents through an Aristotelian/Thomistic PoM. Much of AI philosophy is predicated on Putnam's functionalism (both his original as well as his later liberal functionalism) and Putnam, as well as Nussbaum and Cohen, see functionalism as Aristotelean. Yet Burnyeat disagrees because he thinks that Aristotelian perception has "dependence upon [the] particular material set-up" of the thing perceiving.[59] He disagrees that Aristotle's perception could be realized in the "electronic gadgetry of a computer" as opposed to the "flesh and bones and nervous systems of Homo sapiens."[60] Though he completely rejects Aristotelian PoM himself, Burnyeat is an ally in showing that hylomorphic perception is not independent of particular material constraints. On the other hand, Putnam is an ally in showing that hylomorphic perception is rooted in *suitable* matter and that matter is more than just extension in space. The contemporary dialog between these two sides is helpful in sorting out the question of matter's role in perception in the contemporary landscape because of their unique focus on Aristotelian perception. The reason that this matters to the AI conversation is that if perception has material dependencies such that it must be realized in "flesh and bone and nervous system," then AI could never be said to perceive because of its material set-up.

---

[58] Burnyeat, "Is an Aristotelian Philosophy of Mind Still Credible?" 20. Emphasis added.

[59] Ibid.

[60] Ibid.

Putnam, Nussbaum, and Cohen view Aristotle as being a liberal functionalist[61] who would conceivably support a version of the transportability thesis. In discussing this Cohen says,

> Aristotle surely did not believe that the human form was likely to supervene on anything other than flesh-and-bones. *At some abstract level, however, the possibility is at least conceivable to him. The reason it is conceivable is that he maintains that definitions must always be in terms of function, not matter. What makes something human is not what it is made of but what it does.* Here again he seems *sympathetic to compositional plasticity*.
>
> So the key elements of a materialistic variety of functionalism appear to be present in Aristotle's account. Psychical faculties and states *require some material embodiment, but not any particular kind of embodiment*. Their *definitions are always to be given in terms of form and function, never in terms of material composition*. They are multiply realizable, in that *the same faculty or state may be found in different kinds of creatures with significantly different physiological makeups*.[62]

Yet the transportability thesis is used by AI proponents to suggest that an AGI could be intelligent, so what do we do? Is Aristotle's view of the physical such that it is irreconcilable with contemporary PoM? Is his view of the mental such that it is wholly indifferent to the body in which it is realized? The answer to both of these is no. Burnyeat rejects Aristotle's physical, because he rejects his physics, but Aristotle's physical

---

[61] In defining liberal functionalism, Putnam says, "That form of functionalism, computational functionalism, I gave up even before I gave up internal realism, and in the Dewey Lectures (written after giving up internal realism) I argued that it is hopelessly solipsistic. In fact, my finding solipsism unavoidable in any picture that limits mental life to what happens inside our heads was the impetus for seeking a way to come closer to naive realism without coming so close as to deny the phenomenal characters of experience. And in my Prometheus Prize Lecture in 2010, I proposed a naturalist but antireductionist view I called "liberal functionalism." That view agrees with my former computational functionalism that the question psychology needs to address is the description of the various functions (or rather functionings) of an organism, rather than the question of its physical or biological makeup, but it rejects completely both the restriction to computer programs as the sole admissible way of describing those functions (which is not to say that computer programs can never be relevant); it also rejects the idea that what goes on between the sensory receptors" and the "signals from the brain to the motor organs" is all that psychology is concerned with, as my computational functionalism assumed." Putnam, "Perception without Sense Data," 165-168.

[62] Cohen, "Hylomorphism and Functionalism," 3-4. Emphasis added.

account is not dependent upon his physics. Aristotle views perception as realized in a variety of animal matter. In a way Aristotle affirms a qualified version of the transportability thesis. So, he would not be in agreement with Burnyeat's position. But neither is Aristotle all the way to the opposite side with Putnam either.

Aristotle thinks that perception is realized in perceptive matter, but in a way that realizes that certain matter is suited for certain tasks. Aquinas, commenting on Aristotle, explains the physical requirements of sensation in this way, "Aristotle assigns to sense an organ, observing that the 'primary sensitive part', i.e. organ of sense, is *that in which a power of this sort resides, namely a capacity to receive* forms without matter."[63] He goes on to say, that plants do not feel, because "they lack the proportion needed for sensation. . . . *They have no intrinsic principle for receiving forms* 'apart from matter', that is to say, no sense. They are affected and *undergo changes only materially*."[64] Ears hear, they do not see; eyes see, they do not taste, etc. There are material conditions to perception, but the material is not all that perception is. Sight is realized differently between eagles, bats, and humans, but it is sight, nonetheless.

Putnam uses the example of the strawman from Wizard of Oz to make his point when he says that not just any matter is suitable for the brain, as the straw appears to be for the scarecrow. He says,

> Burnyeat goes wrong at the very beginning—wrong in a way that corrupts the way he sees contemporary issues, not just the way he reads Aristotle. It is because he is in the grip of what Husserl called the 'objectivist' picture, the picture according to which Newton (or, as Husserl would have it, Galileo) discovered for us *what external objects really are (they are what is described, and, 'in themselves', no more than what is described, by the formulae of mathematical physics), that he sees no way of reading Aristotle but a Frank Baumian [author of*

[63] Aquinas, *InDA* II.555. Emphasis added.

[64] Ibid., II.557. Emphasis added.

> *the Oz books] way, and no way in which Aristotle could be relevant to anything we are interested in today*. . . . In the world of Frank Baum, matter—*the straw in the Scarecrow's head, or, perhaps, the sack that contains the straw—can have the property of 'seating', or being the location of, thoughts and feelings without having any other particularly relevant properties.* Some scarecrows don't think thoughts and have feelings, and one scarecrow magically does, and that's all one can say about it. *On Burnyeat's reading of Aristotle, we are all like the Scarecrow.*[65]

In other words, by viewing all matter through a post-Cartesian lens of merely extension in space, without consideration for relevant properties, contemporary PoMs must explain the emergence of mind in reductivist terms. Without recognizing that certain matter must be suitable for certain functions, they get stuck in the mind-body problem.

However, Putnam points out that for Aristotle the matter is suitable to the function it is to realize, but that function is not limited to the matter, for it could be realized in different matter (i.e., different animals). Furthermore, to be non-reductivist does not make one against seeking understanding of the neurological aspects of mind. He says,

> *If 'explaining the emergence of mind' means explaining how the brain works*, how 'memory traces' are laid down, how the 'representations' from the right eye and the 'representations' from the left eye are processed to 'compute' the three-dimensional layout in front of the viewer . . . how the various areas of the left lobe that collectively function as the 'speech centre' (in humans who have not developed speech in the right lobe as the result of massive and early damage to the left lobe), etc., then—as long *as this work is not understood in a reductionist way*, as telling one what 'seeing a chair', or 'remembering where Paris is', or 'thinking there are a lot of cats in the neighbourhood' is—*why on earth should an 'Aristotelian' object to it?* . . . On the other hand, if 'explaining the emergence of mind' means solving Brentano's problem, that is, *saying in reductive terms* what 'thinking there are a lot of cats in the neighborhood' is, and what 'remembering where Paris is' is, etc., *why should we now think that that's possible? If an Aristotelian is one who rejects that programme as an unreasonable programme for metaphysics, then yes, we are 'Aristotelians.'*[66]

---

[65] Nussbaum and Putnam, "Changing Aristotle's Mind," 50. Emphasis added.

[66] Ibid., 51. Emphasis added.

This is because Aristotle's hylomorphism agrees that all the perceptive powers have a material realization making them able to be studied by the natural sciences. This means that rather than Aristotle's view of perception being wholly untouchable by the natural sciences his is actually more discoverable through the natural sciences then any dualist PoM, because the perceptive powers are materially bound for him, each in a specific corresponding organ that makes them able to be investigated with reliability and consistency. Aristotle's perception is not magic, it is wholly able to be investigated by the natural sciences.

Furthermore, recall from earlier, we discovered that taking on form without matter means that what is perceived is taken in intentional existence, rather than the form from the perceived resulting in a new substance (i.e., a file or a data packet). This then has applications for the suitable matter conversation, for this means that the kind of matter that is involved in perception must be the kind that can receive something intentionally. This means that microphones and cameras are not suitable matter for *perception* even if they are capable of capturing the forms of things around them and preserving them for algorithmic use. This means that if AIs matter is not able to receive forms in intentional existence then it can never really be considered as able to perceive and therefore cannot be consider a representative of human perception.

This view of suitable matter leads us to our next point, which is that there are requirements for the matter and requirements are information or blueprints for what the matter must be like in order for it to possess the function that is required. We know this is the case because when a piece of matter is not configured correctly, regardless of how close it may be, it does not work. An ear with a miniscule defect can result in the inability

to hear. Furthermore, for a given kind of thing (i.e., a human or a bat), hearing is realized in a very specific kind of material make up. Thus, while the function of hearing may be transportable to different material realizations in different kinds of corporeal beings, each kind of being has a specific material realization of that function and specific requirements for that material realization. This specificity, information, and blueprint is a large part of what Aristotle would call form and it is to that we now turn.

Irreducibility of Form

Form for Aristotle and Aquinas is not something that exists independent of the corporeal substances in which it inheres. For Aristotle and Aquinas, form is an integral part of a corporeal being that is one of the two principles of any composite being. Commenting on Aristotle's discussion of this in *De Anima,* Aquinas says,

> *We can speak of the principle of life and sensation from two points of view, formally or materially,* just as we speak of . . . becoming healthy either with respect to health itself, or with respect to some part of the body, or to the whole of it. In both these cases, *one of the principles is formal and the other material*.[67]

In other words, there are multiple levels of explanation or causality to any corporeal being or principle and these varied layers are irreducible and not equivalent. To better understand what is meant by this let us turn to Aristotle, who in discussing this, says, "The essence of a house is assigned in such a formula as 'a shelter against destruction by wind, rain, and heat'; the physicist would describe it as 'stones, bricks, and timbers'; *but there is a third possible description which would say that it was that form in that material*

[67] Aquinas, *InDA* II.272. Emphasis added.

with that purpose or end."[68] This gets at the heart of the issue between reductive and non-reductive explanations of mind.

Reductive explanations of mind seek to look at the house merely as "stones, bricks, and timbers."[69] We saw an example of this in the last chapter when we saw that Dennet believes that while you still have a first-person explanation of mind your job is incomplete.[70] Reductive philosophers of mind do not allow for an explanation that contains purpose or teleology, for those are intentional explanations. Reductivists view the goal as being to explain intentionality in terms of physicality. The problem with this is that one can never explain "a shelter against destruction by wind, rain, and heat" in terms of "stones, bricks, and timbers." Put another way, one could never get the concept of "a shelter . . . " from the raw physical materials. Discussing Aristotle's example Sorabji says,

> Aristotle would not agree that perception is *simply* a physiological process. For this 'simply' (Slakey's word) would *ignore the formal cause*. A house is not simply bricks; it is also a shelter. *And this further description is a very important one. Indeed, the formal description of perception is, if anything, more important than the material description*. . . . Aristotle would reject the view of some materialists that talk of sensations or houses could be replaced by talk of physiological processes or bricks, without impairing our ability to describe and explain. *Formal descriptions cannot be replaced by material descriptions in this way*.[71]

---

[68] Aristotle, *DA*, 403b. Emphasis added.

[69] Interview with Daniel Dennett in Susan Blackmore's *Conversations on Consciousness*, 87.

[70] "You've got to leave the first person out of your final theory. You won't have a theory of consciousness if you still have the first person in there, because that was what it was your job to explain. All the paraphernalia that doesn't make any sense unless you've still got a first person in there, has to be turned into something else. You've got to figure out some way to break it up and distribute its powers and opportunities into the system in some other way." Ibid. Emphasis added.

[71] Sorabji, "Body and Soul in Aristotle," 79. Emphasis added.

Thus, while studying the raw physical components of the corporeal substance is valuable and important and should be done, there is a problem with claiming that the physical is all there is to know. Reductive explanations cut off intentionality, because physical processes cannot explain purpose or ends.

In all corporeal beings, form is the cause of the physical. That is to say that though there are two principles to corporeal beings, one is logically prior to and configures the other. This ties into the earlier suitable matter discussion. One causes the other to be configured in a particular way. In discussing this Aquinas says, "*the cause of anything as its 'essence', i.e. form*, is the same as the cause of its being, for *everything has actual existence through its form*," not its matter.[72] In another place he says,

> A thing is one, according as it is a being. Now *the form*, through itself, *makes a thing to be actual since it is itself essentially an act*; nor does it give existence by means of something else. Wherefore *the unity of a thing* composed of matter and form, *is by virtue of the form itself*, which by reason of its very nature *is united to matter as its act*. Nor is there any other cause of union except *the agent, which causes matter to be in act*, as the Philosopher says, Metaph. viii (Did. vii, 6).[73]

This draws upon the concept of act and potency, wherein something cannot actualize itself. Only that which is in act is capable of bringing about that which is in potency. Newton's first law of motion, that objects at rest tend to stay at rest unless put into motion by something in motion, demonstrates this. If you think of a Newton's cradle (aka Newton's Pendulum)—the set of balls suspended on strings that when pulled back and released swing back and forth—these demonstrate the idea nicely. If left alone the balls

---

[72] Aquinas, *InDA* II.319. Emphasis added. Aquinas draws a distinction between essence (form) and existence. This quote is not to say that there is not distinction between these. As we will see in the next chapter the act of existence of any being is distinct from its form, but it is *through* the form that the act of existence comes.

[73] Aquinas, *ST* Ia.76.7 *respondeo*. Emphasis added.

do not move; they are in potency. They have the potential to swing back and forth but they are not actually doing so. When you pull one of the balls up and release it such that it swings into the others you are actualizing the existent potency of the balls and cradle. In turn, the actualized ball actualizes the others such that the outside balls pendulum-swing back and forth. Metaphysical potency and act work in a similar way. Only that which is in act has the ability to actualize the potency in something else.

But what is also interesting about potency and act is that only existent potencies are capable of being actualized. Returning to the Newton's cradle example, metal balls do not have the potency to swing in a pendulum shape on their own. If they were laid on a table and something actualized them; they would roll off the table; they would not swing like a pendulum. Thus, the behavior is the result of the form not the particular piece of matter. In discussing this Putnam and Nussbaum say, "the relationship between form and matter is one of constitution or realization, not of either identity or mere correlation."[74] Newton's cradle does not behave as it does because of the sum of the behaviors of its parts. It is by virtue of the form of the cradle that the behavior occurs. In discussing this idea, Jaworski says,

> *Structure matters*: it operates as an irreducible ontological principle, one that accounts at least in part for what things essentially are.
>
> *Structure makes a difference*: it operates as an irreducible explanatory principle, one that accounts at least in part for what things can do, the powers they have.
>
> *Structure counts*: it explains the unity of composite things, including the persistence of one and the same living individual through the dynamic influx and

[74] Nussbaum and Putnam, "Changing Aristotle's," 35-36.

> efflux of matter and energy that characterize many of its interactions with the wider world.[75]

In other words, the structure is what is responsible for the behavior and purpose. The structure is what causes the material parts to be unified and causes the entity to be what it is.

If we return to our house vs. bricks analogy from earlier, the bricks of a house can be removed and put into another structure, such as a wall or office building or sewer system. It is not the matter that is responsible for the structure being a house, it is the form that was imposed upon the matter that is responsible. The matter is valuable and important, for it possesses the potencies which the form can actualize, but it is not the whole story.[76] As we discussed earlier suitable matter is required and we see that in the concept of potency. While a home is not merely bricks, making the form irreducible, neither is the home possible without the bricks, meaning the potencies of the material are irreplaceable. One cannot build a home from cookie dough. Though one can construct a gingerbread house from it, one cannot construct "a shelter against destruction by wind, rain, and heat" from it. Thus, while the form is that which actualizes the composite, the matter is equally important for it possesses the potencies to be actualized, without which there could be no composite. Both aspects are equally important.

---

[75] William Jaworski, *Structure and the Metaphysics of Mind: How Hylomorphism Solves the Mind-Body Problem* (Oxford: Oxford University Press, 2016), 3. Emphasis added.

[76] What I am not saying here is that in natural substances matter preexists chronologically from form and that form merely configures pre-existent matter. We will see in the next chapter that even prime matter has potency that is actualized by form, because prime matter is pure potentiality. We will also see that though prime matter never exists in a free state it does have some characteristics, a minimum of which is that it is preserved in a substantial change.

Conclusion

As we have seen in this chapter perception has a lot to offer in terms of its ability to expose the nature of hylomorphism. Neither Aristotle nor Aquinas conform to the mind-body problem as it is defined today. They break the mold with hylomorphism's situation of the perceptive powers in matter, making them incompatible with dualist PoMs. Yet neither do they easily fall into reductive materialist categories due to their insistence on corporeal reality being a composition of form and matter, wherein form is more than mere configuration, due to its causal powers. This means that hylomorphism does provide a unique angle from which to address the mind-body problem. Furthermore, it highlights a key difference between AI and human perception, such that AI could not be said to perceive, since it does not take in the form intentionally, but rather generates a new composite in its process of reception.

Thus, if corporeal reality is a composition of form and matter, then where does that leave the claim that the successful creation of an AGI would establish atheism to be true? What we are going to look at in the next chapters is how a compositional view of reality reveals the existence of God through looking at a hylomorphic view of personhood.

Chapter 6

What does Metaphysical Personhood tell us about the Existence of God?

One final area of philosophy of mind relevant to the AGI conversation has to do with personhood. The term itself is not universally agreed upon, for there are multiple types of personhood discussed in the literature: "moral, metaphysical, physical, and legal."[1] In discussing the range of questions and ideas related to the topic of personhood, Philip Smith, a philosophy professor at Providence College, says, "*What kind of concept is personhood? Is it functional, relational, psychological, philosophical, religious, or moral?* An underlying assumption of this study is that *personhood is fundamentally a metaphysical reality*, an endowment rather than an achievement."[2] These different types of personhood impact discussions related to the nature of personhood and when personhood begins. The majority of the discussion in the literature, thus far, has taken place in relation to fetal life. However, the nature of personhood is also significant in relation to AGI. Much of the conversation around AGI and personhood has been related to the legal aspect.[3] However, any legal determination must rest in reality, therefore a metaphysical understanding of personhood is foundational to any moral, physical, or legal discussion.

---

[1] "Concept of Personhood," *University of Michigan School of Medicine* (website) https://medicine.missouri.edu/centers-institutes-labs/health-ethics/faq/personhood.

[2] Philip Smith, "The Beginning of Personhood – A Thomistic Perspective," 207. Emphasis added.

[3] Visa A.J. Kurki, "The Legal Personhood of Artificial Intelligence," A Theory of Legal Personhood (Oxford: Oxford University Press, 2019): 175-190; David Gunkel and Jordan Wales, "Debate: What is Personhood in the Age of AI?" *AI & Society* 36 (2021): 473-486; Sergio M.C. Avila Negri, "Robot as Legal Person: Electronic Personhood in Robotics and Artificial Intelligence," *Hypothesis and Theory* 8 (December 23, 2021).

What is more, a metaphysical discussion of personhood allows us to loop back to our original intention, which is to see whether an AGI could be evidence of atheism. By looking at personhood from a metaphysical angle, we will be able to explore some foundational metaphysical topics. These metaphysical topics will reveal things about reality that will speak directly to the question of the existence of God. Therefore, we are going to take the same approach as Smith and look at personhood from a metaphysical perspective. The purpose of this chapter is to understand the implications of a Thomistic metaphysical view of personhood on questions related to the existence of God.

Smith, in an effort to "develop a [Thomistic] position on the beginning of personhood," for the purpose of discussions related to fetal life, put together a series of questions that we can utilize for our own purposes. In discussing how we should go about clarifying personhood, he says,

> The methodological device used in this study of the problem of human beginnings will be to break the topic down into the following questions: *Is [it] alive? Is [it] a human being? Is [it] an individual* human being? Is [it] a person? This last question really contains two distinct ones: *What is a person* and when can that term be legitimately applied. . . ?[4]

We have already touched on the question of "is [it] alive?" in chapter three. We have also touched on the question of whether or not AI could be considered a human being, in the variety of ways in which AI differs from humanity. Therefore, we will forego an extensive discussion of these question in this chapter.

Where we will actually find a lot of value is in a modified version of the third question (i.e., is it an individual human being?). The question of individuality has value in relation to AGI, because it exposes the substance and artifact difference, which is an

[4] Smith, "The Beginning of Personhood – A Thomistic Perspective," 196-197. Emphasis added.

important topic when it comes to AGI. In discussing this Aquinas says, "The individual in itself is undivided, but is distinct from others."[5] He goes on to clarify individuality as it relates to substances and accidents when he says,

> The individual composed of matter and form substands in relation to accident from the very nature of matter. Hence Boethius says (*De Trin*.): 'A simple form cannot be a subject.' Its self-subsistence is derived from the nature of its form, which does not supervene to the things subsisting, but gives actual existence to the matter and makes it subsist as an individual. On this account, therefore, he ascribes hypostasis to matter, and {*ousiosis*}, or subsistence, to the form, because the matter is the principle of substanding, and form is the principle of subsisting.[6]

From this we can see that subsistence is a key aspect of individuality. While matter is the principle of individuation in corporeal beings, it is not the matter itself that makes the thing individual. It is the principle of subsisting that makes the being individual, which has important implications for consistency with other Christian doctrines.[7] This means that in order to understand what it means for an individual to be a complete substance that subsist in itself we need to explore what it means to be a complete substance and what it means for a thing to subsist in itself. This is important to the personhood conversation as it relates to AGI, because, as we will see, if an AGI is not an individual, then it cannot be a person.

---

[5] Aquinas, *ST* Ia.29.4 *respondeo*.

[6] Ibid., Ia.29.2 *ad* 5.

[7] God is an individual, but he is also incorporeal. If individuality is derived from matter, then there would be difficulty in reconciling the individuality and incorporeality of God. But if individuality is derived from the principle of subsistence, then this problem is resolved. In discussing this Aquinas says, "But God cannot be called an 'individual' in the sense that His individuality comes from matter; but only in the sense which implies incommunicability. 'Substance' can be applied to God in the sense of signifying self-subsistence." Ibid., Ia.29.3 *ad* 4.

What is a person?

Aquinas says that "it is with respect to the intellective soul that we are said to be men [human]."[8] Elsewhere he says, "understanding is found only in rational animals, that is, in men."[9] Thus, what makes something a human being is for it to be a being with a certain kind of form. The form for human being is "rational animal." This is important because it demarcates human beings from all other kinds of corporeal and non-corporeal beings.

Aquinas believes that there are more kinds of intellectual souls then just human, which is why the *animal* aspect is just as important to the definition as the *rational* aspect when it comes to the form of the human being. The animal aspect is just as important to the definition in relation to AI, because it makes it clear that unless something can also qualify as an animal, even if it were to be able to qualify as an intellectual being, it could never be a *human* being. To be a human being is to have a certain kind of form, namely, a human form, because the form is the definition of the thing. In discussing this Aquinas says, "all knowledge and every definition comes by way of the form."[10] Therefore, if AI does not have a human form, then it is not eligible to speak to the prerequisites of human origins.

Aquinas defines person in the following way, "The individuals of the *rational nature* have a special name even among other *substances*; and this name is '*person*.'"[11] As we just saw, one aspect of the human form is rationality which means that a human is

---

[8] Aquinas, *SCG* 58.3.

[9] Aquinas, *Commentary on De Anima*, Lecture 4, Block 631.

[10] Aquinas, *DPN*, 14.

[11] Aquinas, *ST* Ia.29.1 *respondeo*. Emphasis added.

a person, by Aquinas's definition.[12] But what we can also learn from Aquinas' definition is that he does not restrict personhood to only humans. Aquinas, as well as classical Christian doctrine, attribute personhood to other beings as well.[13] What is valuable from the realization that Aquinas does not equate personhood exclusively with humanity is that the transportability thesis discussed in the previous chapter applies to rationality too. If Aquinas were to speak on AGI and rationality, he would not object to AGI rationality on the grounds that it is realized in a different kind of body or even in a different way. This is because he believes that rationality is realized differently in different modes of being.[14]

Another thing that we can learn from Aquinas' definition of person is that it is a substance, which has implications for the AGI conversation. In discussing this Aquinas says, "The 'individual substance,' which is included in the definition of a person, implies *a complete substance subsisting of itself* and separate from all else."[15] This means that an important aspect of understanding personhood is rooted in understanding what it means to be a "complete substance subsisting of itself." This will take us into two discussions

---

[12] "First, we may so understand it as if it belonged to human nature to be in a person, and in this way it is true, for whatever subsists in human nature is a person." Aquinas, *ST* IIIa.16.12 *respondeo*. "It belongs to every man to be a person, inasmuch as everything subsisting in human nature is a person." Aquinas, *ST* IIIa.16.12 *ad* 1.

[13] Within the Christian tradition the personhood of God is foundational, especially as it relates to Trinitarian theology. Aquinas discusses the persons of God at length in the *Summa Theologiae* and many of the ancient creeds articulate three distinct persons in one being (i.e., The Athanasian Creed and The Creed of Chalcedon). While the accuracy of Trinitarian theology is beyond the scope of this project, it is brought up in order to highlight that person and human being are not synonymous terms. Aquinas, *ST* Ia.27, 29, 30, 32-34, 36, 39-43. "Creed of Chalcedon," http://www.prca.org/about/official-standards/creeds/ecumenical/chalcedon. "Athanasian Creed," http://www.prca.org/about/official-standards/creeds/ecumenical/athanasian.

[14] Aquinas argues that since humans are mutable beings we have discursive knowledge, while God, who is immutable, does not have discursive knowledge, since he "sees all things in one (thing), which is Himself." Thus, rationality in God, angels, and humans differs in how it is realized. Aquinas, *ST* Ia.14.7 *respondeo*. For more information on angelic knowledge see: Aquinas, *ST* Ia.54-58.

[15] Ibid., IIIa.16.12 *ad* 2. Emphasis added.

that will help clarify whether AGI could ever be considered a person. First, by understanding what a substance is we will be able to determine whether AGI could be a substance. Since a person is a substance, if AGI could not be a substance, then it could not be a person. Second, by understanding what is meant by "subsisting of itself" we will be able to determine whether the conclusion that AGI could never be a substance is concluded arbitrarily. This will be clarified through an exploration of the act of existence of a substance vs. artifact.

What is a complete substance?

Aquinas defines substance as "an essence that has the property . . . of existing of itself; this existence, however, is not its essence."[16] In Thomistic metaphysics, form is that which makes something *what* it is and essence is that form in the mind, to which existence gives actuality.[17] Substances are basic essences. In discussing this Aquinas says,

> in every class of things that which exists of itself and is a being in an unqualified sense is prior to that which exists by reason of something else and is a being in a qualified sense. But substance is a being in an unqualified sense and exists of itself, whereas all classes of beings other than substance are beings in a qualified sense and exist by reason of substance. Therefore substance is the primary kind of being.[18]

---

[16] Aquinas, *ST* Ia.3.5 *ad* 1.

[17] Aquinas says, "The notion of the species attaches to human nature according to the existence it has in the intellect. For human nature exists in the intellect in abstraction from all that individuates; and this is why it has a content which is the same in relation to all individual men outside the soul; it is equally the likeness of all of them, and leads to a knowledge of all insofar as they are men." Aquinas, *De Ente et Essentia*, 59-60.

[18] Aquinas, *Commentary on the Metaphysics* trans. John P. Rowan (1961), VII.1.1248. Emphasis added.

In other words, within the category of essence there is division: (1) accidents, those that modify something else, and (2) substances, those which accidents modify and from which accidents draw their existence.[19]

This division more formally understood has to do with an essence's dependence or independence. The less dependent an essence is upon another essence for the way in which its existence is possessed, the more basic that essence is. In discussing this Aquinas says,

> *Substance is not rightly defined as a self-subsistent being*: for being cannot be the genus of a thing . . . because nothing can be added to being that has not a share of being, and a difference should not be a part of the genus. If, however, substance can be defined notwithstanding that it is the most universal of genera, *its definition will be a thing whose quiddity is competent to have being not in a subject* [or not in another].[20]

Therefore, color is a dependent essence, for the way in which its existence is possessed is through the modification of a substance, while the essence that is modified by the color is not itself modifying a more basic essence. Such accidental essences are not essences in and of themselves, rather they are essences as layers of or modifications of a more basic essence, because they have their being through their dependence upon the basic essence. The existence of an accidental essence is imparted upon it through its relationship to an actually existing substance.

---

[19] "He says that the term being is used in many senses (as has been stated in Book V (885) where he distinguished the different senses in which terms of this kind are used); for (1) in one sense being signifies (a) the whatness of a thing and (b) this particular thing, i.e., substance, inasmuch as by "the whatness of a thing" is meant the essence of a substance, and by "this particular thing," an individual substance; and the different senses of substance are reduced to these two, as has been stated in Book V (440:C 898). And in another sense (2) it signifies quality or quantity or any one of the other categories." Aquinas, *Commentary on the Metaphysics* trans. John P. Rowan (1961), VII.1.1247.

[20] Aquinas, *QPD*, 7.3 ad 4. Emphasis added.

Substances are those beings which are modified by accidental essences and that do not, themselves, modify any more basic essence. Because these essences are not modifications of another essence, they are considered independent, as the way they exist is not dependent upon another essence. This is really interesting in relation to AGI, for it helps clarify a difference between natural beings and artificial beings, which we will see through a discussion of substantial and accidental unity.

What is the difference between substantial and accidental unity?

Aquinas' definition of substance goes further than merely parsing substances from accidents. Kent views the above passages as evidence that Aquinas holds to a *strict* view of substances, which Kent defines in the following way,

> A thing whose properties are not all reducible to the properties of its parts must be a "thing" in a different and higher sense of the term. Such a thing will have a kind of existence that *is not reducible to the being of its parts - in other words, it will possess a kind of existence that belongs to it "in itself." Its existence will not be entirely reducible to the existence of its parts.*[21]

This is really interesting as it has implications for the AGI conversation. The abilities of AGI, both hardware and software, are reducible to the sum of its parts making it an accidental unity according to Kent's definition. Let us explore more fully this idea of a being that is irreducible to its parts.

The example of a being that is not reducible to its parts, that Kent uses, is a horse. A horse has its being "in itself," not "in its parts." Kent believes we can know this because, "The *source* of some of the *manifestations* of the horse's being (like going toward the hay) [is] *the whole horse*, not merely the interaction of the horse's parts."[22]

---

[21] Kent, "Prime Matter," 100. Emphasis added.

[22] Ibid. Emphasis added.

Put another way, bone and muscle (and any other material components of a horse) are not enough to explain all the actions of a horse. If the material components are not enough to explain all the actions of the unity, then that implies a certain kind of unity, namely, a substantial, rather than accidental unity.

The wider definition of substance (i.e., accidental unity[23]) can be exemplified in either a pile of leaves or a car. Kent uses both of these examples to demonstrate the difference between substantial and accidental unity. A pile of leaves is not really a single thing, because the term pile is used to denote a collection that is identified purely on the basis of an accident. Discussing this he says, "the only reason we have for calling the pile a 'thing' (rather than 'things') is a *unity forged at the accidental level*, such as *locational unity*, or perhaps a certain unity of movement when the wind blows, if in fact the pile consists of lightweight items like leaves."[24]

Similarly, in discussing the unity of a car, Kent says,

> The word "car" represents nothing more than a collection of smaller things (pieces of iron, pieces of rubber, pieces of plastic, etc.) that have been carefully placed next to each other in order to ensure that they will knock into (or not knock into) each other according to a certain pattern when each of them "does its job." True, the parts of the car work together in a unified way to achieve certain goals, like being accelerated and steered down the road, or providing comfort to human occupants. Therefore, we usually speak of a car as if it were one "thing," since it often appears to work as if it were one thing. *But, ultimately, we can explain everything about the car - its entire being - by just talking about the properties of its intricately arranged parts. That is, we can fully and adequately explain a car's activities and its unity as a "thing" by talking about nothing more than a unity of coordination among the accidents of multiple "things," without having to proceed to posit any sort of principle that is numerically the same within each of the thing's parts*.[25]

---

[23] An accidental unity is also sometimes referred to as an artifact.

[24] Kent, "Prime Matter," 97. Emphasis added.

[25] Ibid., 98. Emphasis added.

This is very different from a horse, wherein the pursuit of the hay is not explainable in terms of the qualities of the parts. It is explainable in terms of the need of the animal for fuel. The horse does not seek fuel merely because its stomach "part" is empty, any more than a car with an empty gas tank is capable of seeking fuel. The car's "behaviors" (if we can call them that) are all reducible and explicable in terms of the accidental relations of the parts to one another, but the same cannot be said of all of the horse's behaviors. The locomotive behavior can be explained in terms of the muscles and bones, but the instigation of the locomotion cannot. Both the horse and the car may be in need of fuel, but only one of them is able to make a decision to seek out the fuel it needs.

The difference between substantial and accidental unity is really interesting because of its implications for the AGI conversation. Substantial unity is the kind of unity that a human has. We know this because there is more to human behavior than can be explained by the physical interactions of bone, muscle, etc. The source of the manifestation of human behavior is the human form, not bone + artery + muscle + blood, etc. forms knocking into each other.

However, accidental unity is the kind of unity that AI has. AI is more like the car than the horse in these examples. The source of all of the "behaviors" of AI are explicable in terms of the parts. By understanding the nature of the parts (the configuration of the hardware or the logic of the software), one can understand the behavior of the whole, even though AI is even more complex than a car in some cases.

There is one potential objection to the claim that the behavior of AGI is reducible to the sum of the parts, if one is looking at AGI from the software perspective. Because of software, AI has the appearance of being able to do more than merely knock together

physical parts that result in action in a way similar to pullies and levers. To many, software appears to manifest a behavior that is not accidentally related but it more like the irreducible behavior of the horse. But to a software developer it is clear that software is a series of cause-and-effect actions that are just as accidentally related as the physical cause-and-effect actions of hardware. For all the variability, code is still linear. While algorithms have been created wherein the developer of the algorithm may not be able to trace the line that caused the end result, that does not negate that there is a line. The lack of transparency exposes a logging issue, not a truly non-causal way of processing data. If the logging issue were to be resolved, then the chain of cause and effect would be easily visible.

If a person is a complete substance, then AI could never be a person because AI is an accidental unity. But why should we consider AI an accidental unity instead of a substantial unity? Are we arbitrarily claiming that a human is a substance while AI is an artifact? The best way to determine this is by looking at the act of existence or by understanding what it means for something to subsist of itself. Let us explore Aquinas' essence-existence distinction to understand this a more.

What does it mean to "subsist of itself?"

Recall earlier in the chapter we saw that Aquinas defines a person in the following way: "The 'individual substance,' which is included in the definition of a person, implies *a complete substance subsisting of itself* and separate from all else."[26] We just discovered in the last section that a substance is a being that does not inhere in another being, it is a

[26] Aquinas, *ST* IIIa.16.12 *ad* 2. Emphasis added.

basic, rather than an accidental, essence and we also learned that its parts form a substantial unity, rather than an accidental one. This idea of substantial vs. accidental unity will be helpful in us understanding what it means for something to subsist of itself, rather than to inhere in another. This has significant value in the AGI conversation because it clarifies why a human is considered a substance while no human creation is.

Recall from earlier that Aquinas says that a substances is "an essence that has the property . . . of *existing of itself*; *this existence, however, is not its essence*."[27] Notice here that there is a distinction between a substance's essence and its existence. They are not the same thing, therefore, not only are humans composites of form and matter, they are also composites in the sense of their essence and existence. Like all corporeal beings, a human is a composite. Corporeal beings are composites of prime matter, form, and act of existence.[28]

The act of existence of a substance comes through the form. Recall from the last chapter, Aquinas says, "The cause of anything as its 'essence', i.e. form, is the same as the cause of its being, for *everything has actual existence through its form*."[29] It is the act

---

[27] Ibid., Ia.3.5 *ad* 1. Emphasis added.

[28] In much of what follows I will be discussing form, matter, and act of existence individually with an emphasis on trying to understand what each is and what each brings to the composite. As a result of the desire to parse them in clear and distinct ways, it sometimes may sound as though I am thinking of them as things that can exist independent of each other. I wish to preempt such an understanding by clarifying that hylomorphism does not view form, matter, and existence as pre-existing things that are smashed together by God in creation. Rather hylomorphism views form and matter as coming into existence in temporal concurrence and as matter never existing completely independent of any form. Nevertheless, in Thomistic hylomorphism there is a real distinction between form, matter, and existence such that combinations of them really do form a non-simple being. It is this distinction that allows for there to be real composition in things, as opposed to form and matter merely being useful conceptual terms. It is this distinction that I wish to draw out in the discussion that follows, as the compositional nature of substances is an essential component in engaging materialism.

[29] Aquinas, *InDA* II.319. Emphasis added. Aquinas draws a distinction between essence (form) and existence. This quote is not to say that there is not distinction between these. As we will see in the next chapter the act of existence of any being is distinct from its form, but it is *through* the form that the act of existence comes.

of existence and the form that makes a substantial unity. The act of existence comes through the form and that composition results in being. This kind of composition is what is meant by subsistence. In discussing this Aquinas says,

> The soul [form] communicates that existence in which it subsists to the corporeal matter, out of which and the intellectual soul there results unity of existence; so that the existence of the whole composite is also the existence of the soul. This is not the case with other non-subsistent forms.[30]

Notice here Aquinas draws out that there is a difference between subsistent and non-subsistent beings in this respect. The unity of existence that substances have is not the case of non-subsistent beings. Non-subsistent forms are those which have their act of existence through the being in which they inhere. Therefore, there is a real difference between a substance and an accident in terms of which one possesses a unique act of existence and which one borrows its act of existence from some more basic essence. This is the root of the AI conversation as it relates to it being an artifact.

The root of the difference between substances and artifacts rests in where the act of existence lies. A substance is a being that has its own act of existence. An accident is a being that has its act of existence through a substance. An artifact is a being that has its act of existence through a collection of substances. How do we know that an artifact has its being through a collection of substances? We know this because an artifact is created by utilizing already existent things. The wood that is crafted into a table is a substance that pre-exists the table. The table owes its existence to the wood but does not have its own unique act of existence. The door owes its existence to the wood and metal from which it is created. Similarly, AI owes its existence to the silicon and other base elements

[30] Aquinas, *ST* Ia.76.1 *ad* 5.

from which its hardware is manufactured. It does not have a unique act of existence, rather it borrows the act of existence of the various base elements from which it is crafted. This means that AI is not subsistent of itself. It inheres in another and therefore exposed another way in which it is not able to be a human or a person.

Another interesting thing that we learn about AI from this exploration of the act of existence has to do with unity. It is through the act of existence and the singular form through which that act comes that is the point of unity. Whichever form is the vehicle of the act of existence is the form that has to do with identity and unity. In discussing this Aquinas says, "Nothing is absolutely one except by one form, by which a thing has existence: because a thing has from the same source both existence and unity."[31] In other words there are a multitude of forms that make up a piece of hardware upon which an AI would run. Just because they are physically put together into a collection that adheres well enough together to move as one being does not make it a real unity. Unity and identity come at the level of the form that is the vehicle for existence, rather than the accidental form imposed upon the already existent.

A helpful way of identifying the form through which the act of existence comes is by analyzing at which point the being and its parts cease to be. For example, all the parts of a computer will continue to exist and function properly if the computer is dismantled. Not all of the parts will be in a usable state while they are decoupled from other parts, but if you reuse them in another configuration they will resume working as before they were remove. There is no time limit (generally speaking) for their being in a decoupled state. For example, a computer battery can be removed and put on a shelf for an indefinite

[31] Aquinas, *ST* Ia.76.3 *respondeo*.

amount of time and later be put into a different computer and it will resume its function. This is very different from human organ transplant. Though organs can be transplanted into other humans, there is a finite time before they die and are no longer usable. This shows that organs owe their existence to the substance in which they inhere in a way that computer batteries do not. Therefore, though there are many interchangeable parts within a human, the existential act is at a higher level then at the part level. On the other hand, the existential act in a computer battery is actually at a lower level then the battery itself. Just as you can swap the battery from computer to computer, you can also swap the parts within the battery from one battery to another. This is why batteries are recyclable, because their constituent parts have their own existential acts. The act of existence is not at the level of the battery, it is at the level of the foundational elements from which the battery is made. Therefore, the classification of AI as an accidental unity is not an arbitrary classifications, because there is a real difference between the parts that are interchangeable in humans verses those that are interchangeable in computers. The difference is in where the act of existence of each of those parts lies. For the parts of a substance, the act of existence lies in the form of the substance itself (i.e., the whole of which it is a part) and the parts can only live for a short period outside a substance of that kind, before they themselves stop existing as that kind of thing (i.e., a heart can only be outside of a body for a period of time before it dies). For the parts of an artifact, the act of existence lies in the form of the substances of which the artifact is made (i.e., the silicon or metal from which the thing is constructed) and they can continue in existence for as long as the circumstances which allow those substances to exist remain favorable.

This means that there is a real difference between substances and artifacts. It also means that there is a real difference between a human and an AGI in that a human is a substance while any AI is an artifact. The difference between substance and artifact lies in the kind of unity each has, in that the parts of a substances are a substantial unity with a single act of existence that comes at the level of the substance's form. On the other hand, the kind of unity the parts of an artifact have is an accidental unity where the artifact shares in multiple acts of existence that come at the level of the elements from which the artifact's parts are made. These distinctions have a lot to tell us about the existence of God.

What does accidental unity tell us about the existence of God?

While we have seen good reasons to see a real difference between substances and artifacts, as well as a real difference between humans and AI, there are some that might not be convinced. There are some that might argue that humans are accidental unities as well and that the reason that we see a difference is rooted in the fact that we do not yet exhaustively know how the brain works. They might say that the reason we see behaviors that are irreducible to the sum of the parts is because we do not have enough information yet, and that like so many other things that once were attributed to magic and mystery, the idea of an irreducible aspect will be made obsolete once we exhaustively understand the functions of the brain. Because these are precisely the people to which this project is aimed it is worth exploring the implications of accidental unity on the existence of God. If it were to turn out to be the case that the only kind of unity that actually existed was accidental unity, what would the implications be on the existence of God? In other words,

does an AGI (aside from whether it really is intelligent or human) point towards or away from the existence of God?

This is a really interesting question because accidental unities directly expose existential dependence. If you recall from our earlier discussion, accidents inhere in some more basic essence. They draw their existence from a substance and cannot exist apart from a substance. We also saw that an accidental unity is one wherein the act of existence lies in some more basic elements and not at the level of the accidental unity. In other words, accidents and accidental unities both are entirely dependent upon something else for their existence. They are not subsistent in any way. This means that if it were to turn out that humans are accidental unities then that would be even more evidence for theism, because it would mean that humans are less independent in their existence then previously thought. Let us pull together what we have already seen and parse this out to understand this a bit more.

Accidents are essences which owe their existence to some more basic essence (i.e., a substance). Substances are not independent in the sense that they do not need their accidental essences, rather they are independent in the sense that they do not draw their being from their accidental essences. This is not to say that basic essences are independent in their being in the sense of their efficient causality, for finite being requires the infinite as the efficient cause of its existence; rather, it means that substances in the order of essences do not owe their existence as the modification of something more basic. Independent or basic essences are called substances and accidents are essences that modify substances.

Substances are composites of form, matter, and existence. Form is that which makes a thing *what* it is; matter is potency and that which takes on the form in an actual

existent. Matter does not have any form of itself. It is able to take on or lose any form and then take on another. Matter is what accounts for substantial change for it is what allows for growth or reduction in a substance. Form accounts for the actual *whatness* that is being changed. It accounts for the sameness that remains as change occurs.

If matter is what individuates form, then matter is said to be the material cause of a substance, leaving form as the formal cause. If form is the formal cause of substance, then form is what provides the boundaries or limitations of existence of a substance. This means that a substance has its being through its form. It cannot have its being through its matter, because matter is indifferent to its form and can lose its form to take on another.

In relation to substance, the existential act is that which actuates a substance, it is not *what* exists, rather it comes before the actually existent substance in order of causality. It is not an accident, as an accident is a modification of an already existent substance. Since a substance is the composition of form and matter, the existential act lasts only as long as that composition remains. The composition is limited by the form, since matter is indifferent to its form; therefore, the existential act is limited by the form. This limitation of the existential act makes the essence perishable and a perishable being is called a contingent being, for it is able to change. The matter accounts for the change while the substance remains existent, and also accounts for the ability of the substance to cease being existent, upon death, when the matter then takes on another form.

If matter is what accounts for the contingency of a substance, then form is what accounts for a substance's being. Therefore, form is what orients a substance towards being, but since substance is a composition of form and matter, substance is contingent because of matter. Since form orients towards being, it has no potency towards destruction. As a result, if a finite essence was not a composition of form and matter, it would have no potency to

non-being, nor would it change or die. It would continue in its orientation towards being. However, this is not to say that essence is self-existent of itself, for because these essences are finite there is an infinite gap between existence and non-existence that can only be traversed by an infinite being. Therefore, the efficient causality of finite essences is an infinite being and should that being withdraw its causality, the finite essences would be annihilated. Apart from such a cataclysmic event, finite forms are continually oriented towards being, meaning they cannot not be so long as the efficient cause is not withdrawn. This orientation towards being makes them necessary, however, because they have an efficient cause they are necessary beings that have a cause of their necessity, while that being which is their efficient cause is the only necessary being without a cause.

The composition of form and matter into an actual existent substance is subsistence. This means that actual existent beings are the only beings which subsist. Contrasted with cognitional beings, which owe their existence to the mind that conceives them, subsistent beings are those that owe their being only to the efficient cause of finite essence.

From this we have seen that there are a couple of ways in which accidents expose theism: (1) formal causality, (2) efficient causality, and (3) composition. Accidental unities are forms which draw their existence from the substances from which they are made, and substances are composites of form and matter. Therefore, even if humans are accidental unities, they would still be forms that must draw their existence from more basic substances which themselves are composites of form and matter. Therefore, whether substantial or accidental unities, there is always formal causality that must be taken into account.

Formal causality requires God because it is instructive. The form makes the matter be what it is. It is information that directs something towards an end. In intelligent beings, forms are what guide us when we build things. For example, when we have an idea about something we want to construct, that idea is the form that then is the model for our physical

realization of the idea. Similarly, in non-intelligent beings form is what guides them such that without intelligence they are able to consistently realize a specific path. In discussing this Aquinas says,

> We see that things which lack intelligence, such as natural bodies, *act for an end*, and this is *evident from their acting always, or nearly always, in the same way, so as to obtain the best result*. Hence it is plain that not fortuitously, but *designedly, do they achieve their end.* Now *whatever lacks intelligence cannot move towards an end, unless it be directed by some being endowed with knowledge* and intelligence; as the arrow is shot to its mark by the archer.[32]

Form is that through which the design is communicated to non-intelligent beings. It is through its form that the acorn receives the instructions it needs in order to become an oak tree instead of a maple. However, forms are not intelligent either. They are more like instructions manuals or DNA. They are responsible for transmitting the information, not for causing there to be information in the first place. They themselves require an intelligent cause of their existence and this cause is what we call God.[33]

Second, actually existing things also have an existential act as part of their composition. This existential act is what differentiates actual things from cognitional things. We know that it is not inherent to substances because they go in and out of existence. This means that though substances are more independent than accidents for their existence, they too require an efficient cause of their existence. Therefore, whether substantial or accidental unities, there is always efficient causality that must be taken into account.

Efficient causality requires God because nothing can be the cause of itself. Part of the composition of a substance is an existential act. This is evidenced by the fact that substances come into and go out of existence, which means that their essence is distinct from their

---

[32] Aquinas, *ST* Ia.2.3 *respondeo*. Emphasis added.

[33] In discussing this Aquinas says, "Therefore some intelligent being exists by whom all natural things are directed to their end; and this being we call God." Ibid., Ia.2.3 *respondeo*.

existence. If their essence is distinct from their existence, then there must be something that is the cause of their existence other than themselves. In discussing this Aquinas says, "There is no case known (neither is it, indeed, possible) in which a thing is found to be the efficient cause of itself; for so it would be prior to itself, which is impossible."[34] Following from this, if the only beings that existed were those in which there were an essence-existence distinction then there would be nothing at all, but that is obviously not the case. Therefore, there must be some being whose essence is not distinct from his existence such that he could be the first efficient cause of all beings in which there is a distinction. In discussing this Aquinas says,

> If there be no first cause among efficient causes, there will be no ultimate, nor any intermediate cause. But if in efficient causes it is possible to go on to infinity, there will be no first efficient cause, neither will there be an ultimate effect, nor any intermediate efficient causes; all of which is plainly false. Therefore it is necessary to admit a first efficient cause.[35]

This first efficient cause is what we call God, which shows us that because of efficient causality AGI could never be evidence of atheism.

Third, substances are composites. If substances are not simple, then they require a cause of their composition for Aquinas says that "whatever is in potentiality can be reduced into actuality *only by some being in actuality*."[36] Thus, pure potentiality can only be reduced into act, by virtue of its form, by some being that is already in act. This means that because substances are composites (i.e., form, matter, and existential act), in order for any substances to exist, there must be something that is in act in order to cause matter, form, and existential act to be coupled together. Put another way, for there to be even one composite, there must be

---

[34] Aquinas, *ST* Ia.2.3 *respondeo.*

[35] Ibid., Ia.2.3 *respondeo*.

[36] Ibid., Ia.3.1 *respondeo*. Emphasis added.

a being capable of compounding the composite. In other words, every composite requires a composer distinct from itself, but, as Aquinas is famous for saying in his Five Ways, "This cannot go on to infinity, because then there would be no first . . . and, consequently, no other."[37] Therefore, for any composed beings to exist there must exist a simple being to be the cause of any composition and as Aquinas would say, "this everyone understands to be God."[38]

Conclusion

In this chapter we have discovered what it means to be an individual as well as a person. This took us on an exploration of what it means for something to be a complete substances as well as for it to subsist in itself. Through this we discovered the difference between substances and artifacts, as well as the difference between substantial and accidental unity. This helped us see a real distinction between humans and AGI, such that we could understand why computer part replacement is not the same as organ transplant . We learned about the role that the existential act plays in being able to clarify which beings are artifacts and which are substances. Finally, we took a look at the implications of accidental unity on the existence of God to fully address the question of whether an AGI could in fact be evidence of atheism. In doing so we discovered that an AGI actually is evidence for theism as a result of its exposing formal and efficient causality as well as composition. All of these are evidence for the existence of God and therefore undermine the claim that AGI could be evidence of atheism.

---

[37] Aquinas, *ST* Ia.2.3 *respondeo*.

[38] Ibid.

Chapter 7

Conclusion

What have we learned? In chapter two we learned what is meant by AI. We discovered that there are variety of aspects to AI research as well as three main philosophies: narrow, general, and super. We also learned that many human capacities have been replicated in software and hardware and that the rapid advancement in technology as a result of a decrease in expense related to computing and memory power has led many to believe the creation of an AGI is just a matter of time. They believe that the ability to create an AI that could be good enough to convince people it is intelligent, even if it does not manifest that intelligence in the same way, is just a matter of figuring out the right compute and memory requirements to compute with enough speed and agility to be convincing to someone interacting with it. We learned that they define intelligence in the ability to do all the things a human can do, not in terms of consciousness. We saw general and super AI views carry with them more than a merely technological explanation, but also a religious overtone that helps explain why someone might link AI with philosophy of religion.

In chapter three through a look at Aquinas' hierarchy of being we learned that there are a variety of differences between humans and AI. These included a fundamental difference between living and non-living beings which included a discussion of what is meant by the soul. We also saw that the appetite of AI is more like the natural appetites of inanimate objects than the sensitive appetites of animals making AI's interaction with its environment different from that of an animals. We also saw that there is a distinct difference between understanding and category attribution such that it is difficult to

conclude that what AI and humans are doing in their respective cognitive acts can be considered functionally equivalent. Finally, we discovered that what makes human action distinct is that it is voluntary and some of the details surrounding what that means. By looking at a variety of ways in which AI is distinct from humans we were able to come to the conclusion that even if an AGI is created in the future, it could never be considered evidence of the prerequisites of human origins because it is not the same kind of thing as a human. Therefore, if it is the case that the prerequisites of human origins point to theism then AI cannot override that.

In chapter four we learned that consciousness is the result of the duality of conscious thought; the ability to see both self and other at the same time. We learned that the duality of conscious thought is the result of the immateriality of the intellect because materiality gets in the way of true self-reflexivity. We learned that some reduce consciousness to merely the ability to do all that humans can do. We also learned that there are some discoveries in psychology and neuroscience that remain a stumbling block for some to be convinced that the intellect is immaterial. By looking at these things we are able to come to the conclusion that consciousness could not be reverse engineered. Meaning that AI could never be considered a representative of human consciousness and therefore could not speak to the pre-requisites of human origins, which undermines AI's ability to be evidence of atheism.

In chapter five we learned through a study of perception that material reality is composed of form and matter. We learned that the matter of substances is suitable to their task; it is not random (i.e., like the scarecrow of Oz's brain). We also learned that the form of substances is irreducible. We explored what it means to take on form without

matter and we learned why that is important to understand some of the differences between artificial and human intelligence. And through all of this we learned the metaphysical foundation of Aquinas' view is a hylomorphic view of material reality.

In chapter six we explored Thomistic personhood. This involved looking at what it means to be a substance and what it means for something to subsist in itself. This allowed us to see the difference between substances and artifacts through the different kinds of unities that they each have. This allowed us to see that there is a real difference between humans and AGI at the unity level. It also exposed why organ transplant is not the same as computer part replacement due to where the existential act lies for these different kinds of unities. Finally, we took a look at the implications of accidental unity on the existence of God to fully address the question of whether an AGI could in fact be evidence of atheism. In doing so we discovered that an AGI actually is evidence for theism as a result of its exposing formal and efficient causality as well as composition. All of these are evidence for the existence of God and therefore undermine the idea that AGI could be evidence of atheism.

Interestingly enough, what this all means is that regardless of what computer scientists are able to build, regardless of whether an AGI is ever created that is convincing enough to pass for a human, it would never be evidence of atheism, because the creative ability of the AGI architects themselves are evidence of the existence of God.

Final Thoughts

AGI and ASI proponents are searching for "a perfect man, stripped of hatred, pride, greed, envy or fear. A perfect man in a perfect world."[1] They seek a man who will end all suffering and who will cause "the military, [to] have to look for new jobs."[2] They are hoping to build this man in silicon and usher in a new age in which death loses its grip on mankind. But they need not wait nor need they wish. Such a man has already come. He has already broken the grip of death and has gone to prepare the place where suffering is no more. His name is Emmanuel, God with us, and he came to do what the ASI proponents hope the silicon man will do. He came on a rescue mission to save all those that would put their trust in him as Lord and Savior. His name is Jesus, and he is more than a man or a machine; he is God with us.

[1] Bojor, "The Operational Environment," 267-268.

[2] Ibid., 268.

Bibliography

Adler, Mortimer J. *The Difference of Man and the Difference it Makes*. New York: Fordham University Press, 1993.

Ainsworth, Thomas, "Form vs. Matter.' *The Stanford Encyclopedia of Philosophy* (Summer 2020 Edition).

Anakwue, Nicholas. "Elaborating Aquinas' Epistemology: From Being to Knowledge." *Philosophy Pathways* no. 216 (October 2017): 1-12.

Anderson, Michael and Susan Leigh Anderson. "Machine Ethics: Creating an Ethical Intelligent Agent." *AI Magazine* 28 no. 4 (2007): 15-26.

Aquinas, Thomas. *De Unitate Intellectus Contra Averroistas*. Translated by Beatrice Zedler. Milwaukee: Marquette, 1968.

———. *Expositio libri Posteriorum Analyticorum*. Translated by Fabian Larcher. Milwaukee: Marquette, 1949.

———. *On Being and Essence*. 2nd ed. Translated by Armand Maurer. Toronto: The Pontifical Institute of Mediaeval Studies, 1949.

———. *Questiones Disputatae de Anima*. Translated by John Patrick Rowan. St. Louis: B. Herder Book Co., 1949.

———. *Quaestio Disputata de Spiritualibus Creaturis*. Translated by Mary Fitzpatrick and John Wellmuth. Milwaukee: Marquette, 1949.

———. *Questiones Disputatae de Veritate*. Translated by James V. McGlynn. Chicago: Henry Regnery Company, 1953.

———. *Questiones Disputatae de Virtutibus*. Translated by Ralph McInerny. South Bend: St. Augustine's Press, 1999.

———. *Questions on the Soul*. Translated by James H. Robb. Milwaukee: Marquette University, 1984.

———. *Scriptum Super Sententiis*. Translated by Beth Mortensen. Steubenville: Aquinas Institute, 2018.

———. *Sentencia libri De anima.* Translated by Kenelm Foster and Sylvester Humphries, New Haven: Yale University Press, 1951.

———. *Sentencia libri De sensu et sensate*. Translated by Kevin White. Washington, D.C.: The Catholic University of America Press, 2005.

———. *Summa Contral Gentiles.* Translated by Anton C. Pegis, F.R.S.C. London: University of Notre Dame Press, 2014.

———. *Summa Theologiae*. Translated by Fr. Laurence Shapcote, O.P. Edited by John Mortenson and Enrique Alarcón. Lander: The Aquinas Institute for the Study of Sacred Doctrine, 2012.

———. *Super Boethium De Trinitate*. Translated by Armand Mauer. Toronto: The Pontifical Institute of Mediaeval Studies, 1953.

Aristotle. *De anima*. Translated by Christopher Shields. Oxford: Oxford University Press, 2016.

———. "On the Soul." *The Complete Works of Aristotle: The Revised Oxford Translation.* Edited by Jonathan Barnes. Princeton: Princeton University Press, 1984.

Arkoudas, Konstantine and Selmer Bringsjord. "Philosophical Foundations." *The Cambridge Handbook of Artificial Intelligence*. Cambridge: Cambridge University Press, 2018: 34-63.

Armstrong, Stuart. "Chaining God: A Qualitative Approach to AI, Trust and Moral Systems." Unpublished manuscript, October 20, 2007. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.395.540&rep=rep1&type=pdf.

Asimov, Isaac. *Runaround*. Manhattan: Street and Smith Publications, Inc., 1942.

Augustine. "On the Literal Interpretation of Gensis: An Unfinished Book." In *The Fathers of the Church: St. Augustine on Genesis*. Translated by Roland J. Teske, S.J. Washington, D.C.: The Catholic University of America Press, 1991.

Baars, Bernard. "Consciousness is a Real Working Theatre." *Conversations on Consciousness: What the Best Minds Think About the Brain, Free Will, and What it Means to be Human*. Edited by Susan Blackmore. Oxford: Oxford University Press, 2005: 11-23.

Baker, Thomas. "An Introductory Taxonomy of Aquinas' Powers of the Soul Part 1." *Christian Apologetics Journal* 13, no 1 (Spring 2015): 107-134.

———. "An Introductory Taxonomy of Aquinas' Powers of the Soul Part 2." *Christian Apologetics Journal* 13, no 2 (Fall 2015): 71-95.

———. "Thomistic Teleology in the Philosophy of Nature with its Theological and Moral Implications." PhD diss., Southern Evangelical Seminary, Matthews, 2018. ProQuest Dissertations & Thesis Global.

Bailey, Andrew and Shane Maxwell Wilkins. "Contemporary Hylomorphism." *Oxford Bibliographies*, February 22, 2018, https://andrewmbailey.com/ContemporaryHylomorphism.pdf.

Barna, George. "American Worldview Inventory 2021: Release #6: What Does It Mean When People Say They Are 'Christian'?" *Cultural Research Center* (August 31,

2021). https://www.arizonachristian.edu/wpcontent/uploads/2021/08/CRC_AWVI2021_Release06_Digital_01_20210831.pdf

———. "Perceptions about Biblical Worldview and Its Application: A National Survey from the Center for Biblical Worldview." *Center for Biblical Worldview (*May 2021). https://downloads.frc.org/EF/EF21E41.pdf

Barnes, Gordon P. "The Paradox of Hylomorphism." *The Review of Metaphysics* 56, no. 3 (March 2003): 501-523.

Barnes, Jonathan. "Aristotle's Concept of Mind." *Proceedings of the Aristotelian Society* 72 (1971-1972): 101-114.

Banik, Rounak. "Can Machines Think?" *Medium*, July 2, 2019. https://medium.com/swlh/can-machines-think-9fc81e61ac6.

Bauman, Whitney. "Incarnating the Unknown: Planetary Technologies for a Planetary Community." *Religions* 8 no. 4 (2017): 32-41.

Behdadi, Dorna and Christian Munthe. "A Normative Approach to Artificial Moral Agency." *Minds and Machines* (December 2019) https://doi.org/10.1007/s11023-020-09525-8.

Blackmore, Susan. *Consciousness: A Very Short Introduction*. 2nd ed. Oxford: Oxford University Press, 2017.

———. *Conversations on Consciousness*. Oxford: Oxford University Press, 2005.

Blackmore, Susan and Emily Troscianko. *Consciousness: An Introduction*. 3rd ed. Abingdon: Routledge, 2018.

Block, Ned. "I'm Trying to Refute Functionalism." *Conversations on Consciousness: What the Best Minds Think About the Brain, Free Will, and What it Means to be Human*. Edited by Susan Blackmore. Oxford: Oxford University Press, 2005: 14-35.

Bojor, Laviniu. "The Operational Environment." *Land Forces Academy Review* XXIV, no. 4 (2019): 265-270.

Bostrom, Nick. "The Future of Human Evolution." *Death and Anti-Death: Two Hundred Years After Kant, Fifty Years After Turing.* Edited by Charles Tandy, 339-371. Roa University Press: Palo Alto.

———. "The Future of Humanity." *Geopolitics, History, and International Relations.* 1, no. 2 (2009): 41-78.

Bower, Jeffrey. "A Sketch of the Complete Ontology." *Aquinas's Ontology of the Material World: Change, Hylomorphism, and Material Objects*. Oxford: Oxford University Press, 2014: 3-27.

———. “From Change to Hylomorphism.” *Aquinas’s Ontology of the Material World: Change, Hylomorphism, and Material Objects*. Oxford: Oxford University Press, 2014: 103-129.

———. “Hylomorphism as a Type of Substratum Theory.” *Aquinas’s Ontology of the Material World: Change, Hylomorphism, and Material Objects*. Oxford: Oxford University Press, 2014: 130-151.

———. “In Defense of Hylomorphism.” *Aquinas’s Ontology of the Material World: Change, Hylomorphism, and Material Objects*. Oxford: Oxford University Press, 2014: 152-186.

———. “Mind-Body Dualism.” Aquinas’s Ontology of the Material World: Change, Hylomorphism, and Material Objects. Oxford: Oxford University Press, 2014: 259-278.

———. “Types of Material Compounds.” *Aquinas’s Ontology of the Material World: Change, Hylomorphism, and Material Objects*. Oxford: Oxford University Press, 2014: 200-216.

Braine, David. “The Active and Potential Intellects: Aquinas as a Philosopher in His Own Right.” *Mind, Metaphysics, and Value in the Thomistic and Analytical Traditions* edited by John Halden. Notre Dame: University of Notre Dame Press, 2002: 18-35.

Brandon, John. “An AI God will Emerge by 2042 and write its own Bible. Will you worship it?” *VentureBeat*, October 2, 2017. https://venturebeat.com/2017/10/02/an-ai-god-will-emerge-by-2042-and-write-its-own-bible-will-you-worship-it/.

Brennan, Robert Edward. Thomistic Psychology: A Philosophic Analysis of the Nature of Man. New York: The MacMillan Company, 1952.

Bringsjord, Selmer and Naveen Sundar Govindarajulu. “Artificial Intelligence.” *The Stanford Encyclopedia of Philosophy* (Summer 2020). https://plato.stanford.edu/archives/sum2020/entries/artificial-intelligence.

Brooks, Rodney A., Cynthia Breazeal, Matthew Marjanović, Brian Scassellati, and Matthew M. Williamson. “The Cog Project: Building a Humanoid Robot.” In *Computation for Metaphors, Analogy and Agents*. Edited by Chrystopher L. Nehaniv, 52-87, New York: Springer-Verlag, 1998.

Brown, Sam. “Law of Accelerating Returns.” *Electronic Engineering Times*. (May 29, 2000): 72.

Brüntrup, Godehard. “Soul Body and Survival: The Renaissance of Christian Materialism.” *Revista Portuguesa de Filosofia* 65 (2009): 1137-1155.

Bryant, Levi. “Hylomorphism: The Myth of Formlessness.” *Larval Subjects* (blog) April 13, 2012, https://larvalsubjects.wordpress.com/2012/04/13/hylomorphism-the-myth-of-formlessness.

Buchanan, Mark. “The law of accelerating returns.” *Nature Physics* 4 (July 2008): 507.

Burnyeat, M.F. “Is an Aristotelian Philosophy of Mind Still Credible?” *Essays on Aristotle’s De Anima*. Oxford: Oxford University Press, 2003: 18-29.

Butera, Giuseppe. “Thomistic Thoughts on Changing Representations of Self and Other.” *Philosophy, Psychiatry, & Psychology* 24, no 3 (September 2017): 261-264

“C++ OOP.” *W3Schools*. https://www.w3schools.com/cpp/cpp_oop.asp.

Cadariu, Sasha. “The Law of Accelerating Returns, Superintelligence and The Technological Singularity.” *AI Times Journal* (October 6, 2022). https://www.aitimejournal.com/the-law-of-accelerating-returns-superintelligence-and-the-technological-singularity.

Caponigri, A. Robert. A History of Western Philosophy: Philosophy from the Age of Positivism to the Age of Analysis. Notre Dame: University of Notre Dame Press, 1971.

Carreño, Juan Eduardo. “The Possibility of an Artificial Living Being in the Light of the Philosophy of Thomas Aquinas.” *Angelicum* 94, no. 4 (2017): 635-672. https://www.jstor.org/stable/10.2307/26506544.

Carter, Christopher. “The *Imago Dei* as the Mind of Jesus Christ.” *Zygon* 49, no. 3 (September 2014): 752-760.

Cave, Stephen and Kanta Dihal. “Ancient Dreams of Intelligence Machines: 300 years of Robots.” *Nature*, July 25, 2018. https://www.nature.com/articles/d41586-018-05773-y.

Cellan-Jones, Rory. “Stephen Hawking warns artificial intelligence could end mankind.” *BBC News.* December 2, 2014. https://www.bbc.com/news/technology-30290540.

Chaisson, Eric. *Epic of Evolution: Seven Ages of the Cosmos*. New York: Columbia University Press, 2005.

Chalmers, David. “Is Consciousness Logically Supervenient on the Physical?” *The Conscious Mind in Search of a Fundamental Theory*. Oxford: Oxford University Press, 1996: 93-105.

———. “The Hard Problem of Consciousness.” *The Blackwell Companion to Consciousness*. 2nd ed. Edited by Susan Schneider and Max Velmans. Oxford: Wiley Blackwell, 2017: 32-42.

———. “I’m Conscious: He’s just a Zombie.” *Conversations on Consciousness: What the Best Minds Think About the Brain, Free Will, and What it Means to be*

Human. Edited by Susan Blackmore. Oxford: Oxford University Press, 2005: 36-49.

Charlton, William. "Prime Matter: A Rejoinder." *Phronesis* 28, no. 2 (1983): 197-211.

Chase, Eric. "Spurious Soul: A Modern Critique of the Thomistic Soul." *Episteme* 22, no. 3 (2011): 8-20.

Chirag, Shah. "Sentient AI? Convincing you it's Human is just Part of LaMDA's Job." *Health Care IT News* (July 05, 202). https://www.healthcareitnews.com/blog/sentient-ai-convincing-you-it-s-human-just-part-lamda-s-job.

Choi, Michael Jin. "Consciousness and Intentionality in AI and the *imago Dei*." *Canon & Culture* 10, no. 2 (2016): 69-90.

Churchland, Paul M. "The Continuity of Philosophy and the Sciences." *Mind & Language* 1, no. 1 (Spring 1986): 5-14.

Churchland, Paul and Patricia Churchland. "The visual Sensation of Redness is a Particular Pattern of Activations & The Brain is a Causal Machine." *Conversations on Consciousness: What the Best Minds Think About the Brain, Free Will, and What it Means to be Human*. Edited by Susan Blackmore. Oxford: Oxford University Press, 2005: 50-67.

Clarke, W. Norris. *Person and Being*. Milwaukee: Marquett University Press, 1993.

Clifford, Catherine. "Elon Musk: 'Mark my words - A.I. is far more dangerous than nukes.'" *CNBC* (March 13, 2018). https://www.cnbc.com/2018/03/13/elon-musk-at-sxsw-a-i-is-more-dangerous-than-nuclear-weapons.html.

Coeckelbergh, Mark. "Virtual Moral Agency, Virtual Moral Responsibility: On the Moral Significance of the Appearance, Perception, and Performance of Artificial Agents." *AI & Society* 24 (2009): 181-189.

Cohen, S. Marc. "Hylomorphism and Functionalism." *Essays on Aristotle's De Anima*. Oxford: Oxford University Press, 2003: 61-75.

Cordeiro, Josè Luis. "From Biological to Technological Evolution." *World Affairs: The Journal of International Issues* 95, no. 1 (Spring 2011): 86-99. https://www.jstor.org/stable/10.2307/48504845.

Corduan, Winfried. In the Beginning God: A Fresh Look at the Case for Original Monotheism. Nashville: B&H Academic, 2013.

Cory, Therese Scarpelli. *Aquinas on Human Self-Knowledge*. Cambridge: Cambridge University Press, 2014.

Coulter, Jeff. "Materialist Conceptions of Mind: A Reappraisal." *Social Research* 60, no. 1 (Spring 1993): 117-142. https://www.jstor.org/stable/40970730.

Craig, William Lane. *On Guard.* Ontario: David C. Cook, 2010.

———. *Reasonable Faith.* 3rd ed. Wheaton: Crossway, 2008.

———. *The Kalam Cosmological Argument.* Eugene: Wipf and Stock Publishers, 1979.

Crick, Francis. "You're just a pack of Neurons." *Conversations on Consciousness: What the Best Minds Think About the Brain, Free Will, and What it Means to be Human*. Edited by Susan Blackmore. Oxford: Oxford University Press, 2005: 68-78.

Crevier, Daniel. AI: The Tumultuous History of the Search for Artificial Intelligence. New York: Basic Books, 1993.

Cross, Richard. "Is Aquinas's Proof for the Indestructibility of the Soul Successful?" *British Journal of Philosophy* 5 (1997): 1–20.

Cuypers, Stefaan. "Thomistic Agent-Causalism." *Mind, Metaphysics, and Value in the Thomistic and Analytical Traditions* edited by John Halden. Notre Dame: University of Notre Dame Press, 2002: 90-108.

Cytowic, Richard. "Synesthesia in the Twentieth Century: Synesthesia's Renaissance." *The Oxford Handbook of Synesthesia*. Oxford: Oxford University Press, 2013: 399-408.

———. "Synesthesia: Phenomenology and Neuropsychology – A Review of Current Knowledge." *Psyche* 2 no. 10 (July 1995) https://www.researchgate.net/profile/Richard-Cytowic/publication/247692592_Synesthesia_Phenomenology_And_Neuropsychology_A_Review_of_Current_Knowledge/links/5b79b2b692851c1e12212d83/Synesthesia-Phenomenology-And-Neuropsychology-A-Review-of-Current-Knowledge.pdf.

Darrach, Brad. "Meet Shaky, the first electronic person." *LIFE* 69, no. 21 (November 20, 1970): 56-68.

Davies, Brain. *An Introduction to the Philosophy of Religion.* 3rd ed. New York: Oxford University Press, 2004.

———. *Philosophy of Religion: A Guide and Anthology.* New York: Oxford University Press, 2000.

Dawkins, Richard. *The God Delusion.* New York: First Mariner Books, 2008.

De Cosmo, Leonardo. "Google Engineer Claims AI Chatbot Is Sentient: Why That Matters." *Scientific American* (July 12, 2022), https://www.scientificamerican.com/article/google-engineer-claims-ai-chatbot-is-sentient-why-that-matters.

De Haan, Edward, Paul Corballis, Steven Hillyard, Carlo Marzi, Anil Seth, Victor Lamme, Lukas Volz, Mara Fabri, Elizabeth Schechter, Tim Bayne, Michael

Borballis, and Yair Pinto. “Split-Brain: What We Know Now and Why This is Important for Understanding Consciousness.” *Neuropsychology Review* 20 (2020): 224-233.

Dennett, Daniel C. Breaking the Spell: Religion as a Natural Phenomenon. London: Viking, 2006.

———. *Consciousness Explained*. New York: Back Bay Books, 1991.

———. “Consciousness in Human and Robot Minds.” *Cognition, Computation, and Consciousness* edited by Masao Ito, Yasushi Miyashita, and Edmund T. Rolls. Oxford: Oxford University Press, 1997: 17-30.

———. Darwin’s Dangerous Ideas: Evolution and the Meanings of Life. New York: Simon and Schuster, 1995.

———. “Intentional Systems.” *Journal of Philosophy* 68, no. 4 (February 1971): 87-106.

———. “Intentional Systems Theory.” *The Oxford Handbook of Philosophy of Mind*. Oxford: Oxford University Press, 2009: 339-350.

———. “The Unimagined Preposterousness of Zombies: Commentary on Moody, Flanagan, and Polger.” *Brainchildren: Essays on Designing Minds*. Cambridge: MIT Press, 1998: 171-180.

———. “When Philosophers Encounter Artificial Intelligence.” *Daedalus* 117, no 1 (Winter 1988): 283-295. https://www.jstor.org/stable/20025148.

———. “Why You Can’t Make a Computer That Feels Pain.” *Synthese* 38, no 3. (July 1978): 415-456.

———. “You have to give up your intuitions about consciousness.” *Conversations on Consciousness: What the Best Minds Think About the Brain, Free Will, and What it Means to be Human*. Edited by Susan Blackmore. Oxford: Oxford University Press, 2005: 79-91.

Descartes, René, “Discourse on the Method of Rightly Conducting the Reason, and Seeking Truth in the Sciences.” In *The Philosophical Writings of Descartes, Volume I* translated by John Cottingham, Robert Stoothoff, and Dugald Murdoch. Cambridge: Cambridge University Press, 1985.

———. “Meditation VI.” In *The Philosophical Writings of Descartes, Volume I* translated by John Cottingham, Robert Stoothoff, and Dugald Murdoch. Cambridge: Cambridge University Press, 1985.

———. “Treatise on Man.” In *The Philosophical Writings of Descartes, Volume I* translated by John Cottingham, Robert Stoothoff, and Dugald Murdoch. Cambridge: Cambridge University Press, 1985.

DeYoung, Rebecca, Colleen McCluskey, and Christina Van Dyke. *Aquinas's Ethics: Metaphysical Foundations, Moral Theory, and Theological Context*. Notre Dame: University of Notre Dame Press, 2009.

Dhaouadi, Mahmoud. "An Exploration of the Nature of Human Artificial Intelligence and the Qur'anic Perspective." In *Epistemological Bias in the Physical and Social Sciences*, edited by Abdelwahab M. Elmessiri, 158-173. London: The International Institute of Islamic Thought, 2006. https://www.jstor.org/stable/j.ctvkc66t1.11.

Dickson, Ben. "All the Important Games Artificial Intelligence Has Conquered." *TechTalks*, July 2, 2018. https://bdtechtalks.com/2018/07/02/ai-plays-chess-go-poker-video-games/.

"Dissociative Identity Disorder." *American Psychological Association*, https://dictionary.apa.org/dissociative-identity-disorder.

Doolan, Gregory. *Aquinas on the Divine Ideas as Exemplar Causes*. Washington, D.C.: The Catholic University of America Press, 2008.

Duns Scotus, John. *God and Creatures: The Quodlibetal Questions*. Translated by Felix Alluntis and Allan Wolter. Princeton: Princeton University Press, 1975.

Egnor, Michael and Arjuna Das. "How the Split Brain Emphasizes the Reality of the Mind." *Mind Matters* (August 11, 2021). https://mindmatters.ai/2021/08/how-the-split-brain-emphasizes-the-reality-of-the-mind.

Evans, C. Stephen. *Philosophy of Religion.* Downers Grove: InterVarsity Press, 1982.

Feldman, Gilad. "Free Will is about Choosing: The link between choice and the belief in free will." *Journal of Experimental Social Psychology*. 55 (2014): 239-245. http://dx.doi.org/10.1016/j.jesp.2014.07.012.

Feser, Edward. "Aquinas on the Human Soul." *The Blackwell Companion to Substance Dualism*. Hoboken: Wiley Blackwell, 2018: 88-101.

———. *Five Proofs of the Existence of God.* San Francisco: Ignatius, 2017.

———. *Philosophy of Mind*. London: Oneworld Book, 2020.

Finnis, John. "Object and Intention in Moral Judgments According to Aquinas." *The Thomist: A Speculative Quarterly Review*. 55 no. 1 (1991): 1-27

Flanagan, Owen and Thomas Polger. "Zombies and the Function of Consciousness." *Journal of Consciousness Studies* 2 no. 4 (1995): 313-321.

Fodor, Jerry and Zenon Pylyshyn. "Connectionism and Cognitive Architecture: A Critical Analysis." *Mind Design II: Philosophy, Psychology, Artificial Intelligence*. Cambridge: MIT Press, 1997: 309-350.

Fonda, A. Granville. “A Remark on Biological Consciousness and Free Will.” *Procedia Computer Science* 71 (2015): 99-105.

Forstmann, Matthias and Pascal Burgmer. “A Free Will Needs a Free Mind: Belief in Substance Dualism and Reductive Physicalism Differentially Predict Belief in Free Will and Determinism.” *Consciousness and Cognition* 63 (2018): 280-293. https://doi.org/10.1016/j.concog.2018.07.003.

Future of Humanity Institute – University of Oxford. “Research Areas.” Accessed July 18, 2021. https://www.fhi.ox.ac.uk/research/research-areas.

Gallagher, David Michael. “Thomas Aquinas on the Causes of Human Choice.” PhD diss., The Catholic University of America, Washington DC, 1989. ProQuest Dissertations & Thesis Global.

Gallagher, Kelly. “Can Libertarianism or Compatibilism Capture Aquinas’ View on the Will?” (MA thesis, University of Arkansas, Fayetteville, 2014), ScholarWorks@UARK. http://scholarworks.uark.edu/etd/2229.

Garrigou-Lagrang, Reginald. “Beatitude.” *Collection*. Aeterna: Aeterna Press, 2016.

Gassar, Georg. “Is Hylomorphism a Neglected Option in Philosophy of Mind?” *New Dualism*, July 2020, https://www.newdualism.org/papers-Jul2020/Gasser_hylomorphism06.06.2009.pdf.

Gazzaniga, Michael. The Nature’s Mind: The Biological Roots of Thinking, Emotions, Sexuality, Language, and Intelligence. New York: BasicBooks, 1992.

———. “The Split-Brain: Rooting Consciousness in Biology.” *PNAS* 111 no. 51 (December 2014): 18093-18094.

Geisler, Norman L. and Douglas E. Potter. *The Doctrine of God*. Indian Trail: NGIM, 2016.

———. *Baker Encyclopedia of Christian Apologetics.* Grand Rapids: Baker Books, 2002).

———. *The Big Book of Christian Apologetics.* Grand Rapids: Baker Books, 2012.

———. *Systematic Theology*. Vols 2 and 3. Minneapolis: Bethany House, 2003.

Geivett, R. Douglas and Brendan Sweetman. *Contemporary Perspectives on Religions Epistemology.* Oxford: Oxford University Press, 1992.

Geraci, Robert M. “Apocalyptic AI: Religion and the Promise of Artificial Intelligence.” *Journal of American Academy of Religion* 76, no. 1 (March 2008): 138-166. https://doi.org/10.1093/jaarel/lfm101.

Gibbs, Philip. “Energy is Conserved in General Relativity.” https://vixra.org/pdf/1305.0034v1.pdf.

Gillis, Alexander "Object-oriented programming (OOP)." *TechTarget*. https://www.techtarget.com/searchapparchitecture/definition/object-oriented-programming-OOP.

Gilson, Etienne. *Being and Some Philosophers*. 2nd ed. Toronto: Pontifical Institute of Mediaeval Studies, 1952.

———. Methodical Realism: A Handbook for Beginning Realists. San Franscisco: Ignatius, 1990.

———. *The Unity of Philosophical Experience*. San Francisco: Ignatius Press, 1964.

Ginni. "What are the examples of Unsupervised Learning?" *Tutorials Point.* https://www.tutorialspoint.com/what-are-the-examples-of-unsupervised-learning#:~:text=Unsupervised%20learning%20is%20when%20it,are%20dimension%20reduction%20and%20clustering.

Goetz, Stewart and Charles Taliaferro. *A Brief History of the Soul*. West Sussex: Wiley-Blackell, 2011.

Goldstein, Rebecca. *36 Arguments for the Existence of God: A Work of Fiction* (New York: Vintage Books, 2010).

———. "36 Arguments for the Existence of God." *Edge* (November 18, 2009). https://www.edge.org/conversation/rebecca_newberger_goldstein-36-arguments-for-the-existence-of-god.

Gould, Stephen. "Nonoverlapping Magisteria." *Natural History* (March 1, 1997). https://search.ebscohost.com/login.aspx?direct=true&db=edsggo&AN=edsgcl.19360542&site=eds-live&scope=site.

Good, Irving John. "Speculations Concerning the First Ultraintelligent Machine." *Advances in Computers* 6 (1966).

Gray, Jeffrey. "Synesthesia: A Window on the Hard Problem of Consciousness." *Synesthesia: Perspectives from Cognitive Neuroscience*. Oxford: Oxford University Press, 2005: 127-146.

Green, Christopher. "The thoroughly modern Aristotle: Was he really a functionalist?" *History of Psychology* 1 (1998): 8-20.

Greenfield, Susan. "I get impatient when the really big questions are sliding past." *Conversations on Consciousness: What the Best Minds Think About the Brain, Free Will, and What it Means to be Human*. Edited by Susan Blackmore. Oxford: Oxford University Press, 2005: 92-103.

Grene, Marjorie. *Knowing and Being: Essays by Michael Polanyi*. Chicago: The University of Chicago Press, 1969.

Hainlein Michael and Andreas Kaplan. “A Brief History of Artificial Intelligence: On the Past, Present, and Future of Artificial Intelligence.” *California Management Review* 61 no. 4 (2019): 5-14.

Harré, Rom and Grant Gillett. *The Discursive Mind*. Thousand Oaks: Sage Publications, 1994.

Hasker, William. “A Critique of Thomistic Dualism.” *The Blackwell Companion to Substance Dualism*. Hoboken: Wiley Blackwell, 2018: 123-131.

Haugeland, John. *Artificial Intelligence: The Very Idea*. Cambridge: MIT Press, 1989.

———. “What is Mind Design?” In *Mind Design II: Philosophy, Psychology, Artificial Intelligence*, edited by John Haugeland, 1-28. Cambridge: Massachusetts Institute of Technology, 1997.

Hause, Jeffrey Peter. “Thomas Aquinas on the Will and Moral Responsibility.” PhD diss., Cornell University, Ithica, 1995. ProQuest Dissertations & Theses Global.

Heisenberg, Werner. “Quantum Theory and the Structure of Matter.” *Physics and Philosophy: A Revolution in Modern Science*. New York: Harner & Brothers Publishers, 1958.

Herzfeld, Noreen. “Creating in our own Image: Artificial Intelligence and the Image of God.” *Zygon* 37, no. 2 (June 2002): 303-316.

Hibbert, Giles. “Christian Materialism.” *New Blackfriars* 50, no. 588 (May 1969): 419-431.

Hindson, Ed and Ergun Caner. *The Popular Encyclopedia of Apologetics.* Eugene: Harvest House Publishers, 2008.

Hobbes, Thomas. “Of Liberty and Necessity.” In *Hobbes and Bramhall on Liberty and Necessity* edited by Vere Chappell. New York: Cambridge University Press, 2003.

Hodges, Andrew. “Alan Turing.” *The Stanford Encyclopedia of Philosophy* (Winter 2019 Edition), https://plato.stanford.edu/archives/win2019/entries/turing.

Hodgson, Richard. “A Case of Double Consciousness.” *Proceedings of the Society for Psychical Research* 7 (1891): 221–258.

Hole, Kjell Jørgen and Subutai Ahmad. “A Thousand Brains: Toward Biologically Constrained AI.” *SN Applied Sciences* 3 no. 743 (2021): 6-20.

Holley, Peter. “Bill Gates on Dangers of Artificial Intelligence: ‘I Don’t Understand Why Some People are Not Concerned.’” *The Washington Post* (Jan 29, 2015). https://www.washingtonpost.com/news/the-switch/wp/2015/01/28/bill-gates-on-dangers-of-artificial-intelligence-dont-understand-why-some-people-are-not-concerned.

Hood, Bruce, Nathalia L. Gjersoe, and Paul Bloom. "Do Children Think that Duplicating the Body also Duplicates the Mind?" *Cognition* 125 (2012): 466-474. http://dx.doi.org/10.1016/j.cognition.2012.07.005.

Hook, Sidney. "What is Materialism?" *The Journal of Philosophy* 31, no. 9 (April 26, 1934): 235-242. https://www.jstor.org/stable/2015963.

Hume, David. *A Treatise of Human Nature*. Volume 1. Edited by David Norton and Mary Norton. Oxford: Clarendon Press, 2007.

———. "Liberty and Necessity." In *An Enquiry Concerning Human Understanding* edited by Stephen Buckle. New York: Cambridge University Press, 2010.

Jacobs, Jonathan. "Habits, Cognition, and Realism." *Mind, Metaphysics, and Value in the Thomistic and Analytical Traditions* edited by John Halden. Notre Dame: University of Notre Dame Press, 2002: 109-124.

James, W. The Varieties of Religious Experience: A Study in Human Nature. New York: Longmans, Green and Co., 1902.

Jaworski, William. "Hylomorphism and Mind-Body Problems." *The Brains Blog*, March 10, 2016, https://philosophyofbrains.com/2016/05/10/hylomorphism-and-mind-body-problems.aspx.

———. *Structure and the Metaphysics of Mind: How Hylomorphism Solves the Mind-Body Problem*. Oxford: Oxford University Press, 2016.

———. "The Hylomorphic Mind (Part 1)." *The Brains Blog*, March 8, 2016, https://philosophyofbrains.com/2016/05/08/the-hylomorphic-mind-part-1.aspx.

———. "The Hylomorphic Mind (Part 2)." *The Brains Blog*, March 9, 2016, https://philosophyofbrains.com/2016/05/09/the-hylomorphic-mind-part-2.aspx.

Johnson, Kistina T. and Rosalind W. Picard. "Advancing Neuroscience through Wearable Devices." *Neuron* 108 (October 14, 2020): 8-12. https://doi.org/10.1016/j.neuron.2020.09.030.

Jnr, Yaw Ansong. "Artificial Intelligence and Healthcare: A Qualitative Review of Recent Advances and Predictions for the Future." *Perspectives in Medical Research* 7, no. 3 (September-December 2019): 3-6.

Kahn, Charles. "Aristotle on Thinking." *Essays on Aristotle's De anima*. Edited by Martha Nussbaum and Amélie Oksenberg Rorty. Oxford: Oxford University Press, 2003: 359-380.

Kenny, Anthony. *Aquinas on Mind*. London: Routledge, 1994.

Kent, Matthew. "Prime Matter According to St. Thomas Aquinas." PhD diss., Fordham University, Bronx, 2005. ProQuest Dissertations & Thesis Global.

Kerr, Fergus. “Aquinas after Wittgenstein.” *Mind, Metaphyics, and Value in the Thomistic and Analytical Traditions*. Notre Dame: University of Notre Dame Press, 2002: 1-17.

Klima, Gyula. “Aquinas on the Materiality of the Human Soul and the Immateriality of the Human Intellect.” *Philosophical Investigations* 32, no. 2 (February 2009): 163-182.

———. “The Medieval Problem of Universals,” *Stanford Encyclopedia of Philosophy*. (Spring 2022 Edition).

Klima , Gyula and Robert Pasnau. *The Immateriality of the Human Mind, the Semantics of Analogy, and the Conceivability of God*. ed. Gyula Klima and Alexander W. Hall, Proceedings of the Society for Medieval Logic and Metaphysics 1 (Newcastle upon Tyne: Cambridge Scholars Publishing, 2011), 25–60.

Koch, Christof. The Quest for Consciousness: A Neurobiological Approach. New York: W. H. Freeman, 2004.

Kretzmann, Norman. “Aquinas’s Philosophy of Mind.” *Philosophical Topics* 20, no. 2 (Fall 1992): 77-101.

———. “Philosophy of Mind.” *The Cambridge Companion to Aquinas* edited by Norman Kretzmann and Eleonore Stump. Cambridge: Cambridge University Press, 1993: 128-159.

Kurzweil, Ray. “The Law of Accelerating Return.” (March 7, 2001) https://www.kurzweilai.net/the-law-of-accelerating-returns.

Lambert, Richard Thomas. Self Knowledge in Thomas Aquinas: The Angelic Doctor on the Soul’s Knowledge of Itself. Bloomington: AuthorHouse, 2007.

Lang, David. “Aquinas’s Impediment Argument for the Spirituality of the Human Intellect.” *Medieval Philosophy and Theology* 11 (2003): 107-124.

Lemoine, Blake “Is LaMDA Sentient? - an Interview,” CajunDiscordian (blog), *Medium* (June 11, 2022). https://cajundiscordian.medium.com/is-lamda-sentient-an-interview-ea64d916d917.

Lennox, John C. 2084: Artificial Intelligence and the Future of Humanity. Chicago: Zondervan, 2020.

Levchuk, Kate. “AI Vs. God: Who Stays and Who Leaves?” *Forbes* (blog). August 5, 2018. https://www.forbes.com/sites/cognitiveworld/2018/08/05/ai-vs-god-who-stays-and-who-leaves/.

Leverhulme Centre for the Future of Intelligence. “About.” Accessed July 15, 2021. http://lcfi.ac.uk/about/.

Lewis, David. “An Argument for the Identity Theory.” *The Journal of Philosophy* 63, no. 1 (January 1966): 17-25.

Lewis, H.D. “Mind and Body: Some Observations on Mr. Strawson’s Views.” *Proceedings of the Aristotelian Society* 63 (1962-1963): 1-22.

Loux, Michael J. *Metaphysics: A Contemporary Introduction*. 3rd ed. New York: Routledge, 2006.

Mackie, J.L. *The Miracle of Theism.* Oxford: Clarendon Press, 1982.

Madden, James D. *Mind, Matter & Nature: A Thomistic Proposal for the Philosophy of Mind.* Washington, D.C.: The Catholic University of America Press, 2013.

Martin, C.F.J. “Voluntary Action and Non-Voluntary Causality.” *Mind, Metaphysics, and Value in the Thomistic and Analytical Traditions* edited by John Halden. Notre Dame: University of Notre Dame Press, 2002: 76-89.

Martin, Michael and Ricki Monnier. *The Impossibility of God.* New York: Prometheus Books, 2003.

McCabe, Herbert. “The Immortality of the Soul.” in *Aquinas,* ed. Anthony Kenny London: Macmillan, 1969: 297–306.

McCarthy, John, Marvin L. Minsky, Nathaniel Rochester, and Claude E. Shannon. “A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence.” *AI Magazine* 27, no. 4 (Winter 2006): 12-14.

McCarthy, John. “The Philosophy of AI and the AI of Philosophy.” (June 25, 2006) http://jmc.stanford.edu/articles/aiphil2.html.

———. “Todd Moody’s Zombies.” *Journal of Consciousness Studies* 1, no. 2 (1994): 169-200. http://jmc.stanford.edu/articles/zombie/zombie.pdf.

———. “What has AI in Common with Philosophy?” (April 25, 2006). http://www-formal.stanford.edu/jmc/aiphil.pdf.

———. “What is artificial intelligence?” (November 12, 2007). http://jmc.stanford.edu/articles/whatisai/whatisai.pdf.

McCormick, Matt. “Why God Cannot Think: Kant, Omnipresence, and Consciousness.” In *The Impossibility of God,* edited by Michael Martin and Ricki Monnier, 258-273. Amherst: Prometheus Books, 2003.

McCulloch, Warren S. and Walter H. Pitts. “A Logical Calculus of the Ideas Immanent in Nervous Activity.” In *Embodiments of Mind.* Edited by Warren S. McCulloch, 19-39 Cambridge: The M.I.T. Press, 1970.

McClintock, Alexander. “A Review of the Work of Putnam, Dennett, Fodor, Pylshyn, and Pollack.” *The Convergence of Machine and Human Nature*. Brookfield: Avebury, 1995: 9-50.

———. “Philosophical Attitudes and Artificial Intelligence.” *The Convergence of Machine and Human Nature*. Brookfield: Avebury, 1995: 3-8.

MacDonald, Scott. “Theory of Knowledge.” *The Cambridge Companion to Aquinas* edited by Norman Kretzmann and Eleonore Stump. Cambridge: Cambridge University Press, 1993: 160-195.

McDowell, Josh and Sean McDowell. *77 FAQs About God and the Bible.* Eugene: Harvest House Publishers, 2012.

McGrath, Alister and Joanna McGrath. *The Dawkins Delusion? Atheist Fundamentalism and the Denial of the Divine*. Downers Grove: InterVarsity Press, 2007.

McInerny, Ralph. *Aquinas on Human Action*. Washington, D.C.: The Catholic University of America Press, 1992.

McLaughlin, William I. “Human Evolution in the Age of the Intelligent Machine.” *Leonardo* 17, no. 4 (1984): 277-287.

McLellan, Hilary. “Computers, Artificial Intelligence and Human Imagination.” *Journal of Thought* 23, no. 3/4 (Fall/Winter 1988): 28-44. https://www.jstor.org/stable/42589270.

Minsky, Marvin. “A Framework for Representing Knowledge.” *MIT-AI Laboratory Memo 306* (June 1974). https://web.media.mit.edu/~minsky/papers/Frames/frames.html.

———. *The Society of Mind*. New York: A Touchstone Book, 1988.

Montague, P. Read. “Free Will.” *Current Biology* 18, no 14: 584-585. https://www.cell.com/current-biology/pdf/S0960-9822(08)00539-3.pdf.

Moravec, Hans. *Mind Children: The Future of Robot and Human Intelligence*. Cambridge: Harvard University Press, 1988.

———. “Rise of the Robots.” *Scientific American* (December 1999): 124-135.

Moreland, J.P. “In Dense of a Thomist-like Dualism.” *The Blackwell Companion to Substance Dualism*. Hoboken: Wiley Blackwell, 2018: 102-122.

Murray, Andrew. Intentional Species and the Identity between Knower and Known According to Thomas Aquinas. Strathfield: Catholic Institute of Sydney, 2013.

———. “*Intentionale* in Thomas Aquinas.” Paper presented at the “Plato and Aristotle, Platonism and Aristotelianism” Conference, *Manly*, (January 29-31, 1993). https://andrewmurraysm.files.wordpress.com/2018/10/murray-intentionaleinaquinas.pdf.

Myers, Frederick. *Human Personality and its Survival of Bodily Death*. London: Longmans, Green, and Co., 1903.

Nath, Rajakishore. “A Cartesian Critique of the Artificial Intelligence.” *Philosophical Papers and Reviews* 2, no. 3 (October 2010): 27-33. https://academicjournals.org/journal/PPR/article-full-text-pdf/05D10CC547.

Ng, Andrew. “What Artificial Intelligence Can and Can’t Do Right Now.” *Harvard Business Review*, November 9, 2016. https://hbr.org/2016/11/what-artificial-intelligence-can-and-cant-do-right-now.

Nilsson, Nils. “Human-Level Artificial Intelligence? Be Serious!” *AI Magazine* 26 no.4 (Winter 2005): 68-75.

Novak, Joseph A. “Aquinas on the Incorruptibility of Soul.” *History of Philosophy Quarterly* 4 (1987): 405–21.

Nussbaum, Martha and Hilary Putnam. “Changing Aristotle’s Mind.” *Essays on Aristotle’s De Anima*. Oxford: Oxford University Press, 2003: 30-60.

———. “Changing Aristotle’s Mind.” *Words and Live: Hilary Putnam*. Cambridge: Harvard University Press, 1994: 22-61.

O’Connor, Timothy and Christopher Franklin. “Free Will.” *The Stanford Encyclopedia of Philosophy*. Edited by Edward N. Zalta. https://plato.stanford.edu/entries/freewill/.

Oderberg, David S. “Hylomorphism and Individuation” *Mind, Metaphyics, and Value in the Thomistic and Analytical Traditions*. Notre Dame: University of Notre Dame Press, 2002: 125-142.

———. “Is Prime Matter Energy?” *Australasian Journal of Philosophy* (Jan 12, 2022) https://doi.org/10.1080/00048402.2021.2010222.

———. *Real Essentialism*. New York: Routledge, 2007.

Organisation Intergouvernementale de la Convention du Mètre. *The International System of Units (SI), Bureau International des Poids et Mesures.* http://large.stanford.edu/courses/2018/ph241/carlton1/docs/si-8-mar06.pdf.

Owens, Joseph. *An Elementary Christian Metaphysics*. Houston: Center for Thomistic Studies, 2008.

———. “Aquinas on the Inseparability of Soul from Existence.” *The New Scholasticism* 61 (1987): 249–70.

Pasnau, Robert. *Thomas Aquinas on Human Nature*. Cambridge: Cambridge University Press, 2004.

Petkowski, Janusz, William Bains, and Sara Seager. “On the Potential of Silicon as a Building Block for Life.” *Life* 10, no. 84 (June 10, 2020), https://doi.org/10.3390/life10060084.

Pilling, Franziska, Joseph Lindley, Haider Ali Akmal, and Paul Coulton. “Design (Non) Fiction: Deconstructing/Reconstructuing the Definitional Dualism of AI.” *International Journal of Film and Media Arts* 6, no. 1 (2021): 6-32.

Pini, Giorgio. “Two Models of Thinking: Thomas Aquinas and John Duns Scotus on Occurrent Thoughts.” *Intentionality, Cognition, and Mental Representations in Medieval Philosophy*. New York City: Fordham University Press, 2015.

Pitts, J. Brian. “Conservation of Energy: Missing Features in Its Nature and Justification and Why They Matter.” *Foundations of Science* 26 (2021): 559-584.

Polanyi, Michael. *Personal Knowledge*. Chicago: The University of Chicago Press, 1974.

———. *The Tacit Dimension*. Chicago: The University of Chicago Press, 2009.

Polansky, Ronald. *Aristotle’s De anima*. Cambridge: Cambridge University Press, 2007.

Prince, Morton. The Dissociation of a Personality: A Biographical Study in Abnormal Psychology. 2nd ed. New York: Longmans, Green, and Co., 1913.

Putnam, Hilary. “Aristotle after Wittgenstein.” *Words and Live: Hilary Putnam*. Cambridge: Harvard University Press, 1994: 62-84.

———. “Functionalism: Cognitive Science or Science Fiction?” *The Future of Cognitive Revolution*. Oxford: Oxford University Press, 1997: 32-44.

———. “How Old is the Mind?” *Words and Live: Hilary Putnam*. Cambridge: Harvard University Press, 1994: 3-21.

———. “Minds and Machines.” *Dimensions of Minds*. New York: New York University Press, 1960: 138-164.

———. “Minds and Machines.” *Mind, Language, and Reality*. Vol 2. Cambridge: Cambridge University Press, 1975: 362-385.

———. “‘Naïve Realism’ and Qualia.” *Naturalism, Realism, and Normativity*. Cambridge: Harvard University Press, 2016: 152-168.

———. “Other Forms of Functionalism.” *Representations and Reality*. Cambridge: The MIT Press, 1988: 91-106.

———. “Perception without Sense Data.” *Naturalism, Realism, and Normativity*. Cambridge: Harvard University Press, 2016: 169-198.

———. “Robots: Machines or Artificially Created Life?” *Mind, Language, and Reality*. Vol 2. Cambridge: Cambridge University Press, 1975: 386-407.

———. “Robots: Machines or Artificially Created Life?” *The Journal of Philosophy* 61, no. 21 (November 12, 1964): 668-691. https://www.jstor.org/stable/2023045.

———. “Why Functionalism Didn’t Work.” *Representations and Reality*. Cambridge: The MIT Press, 1988: 73-90.

Rafia. “Artificial Intelligence (AI) Image Recognition.” *Logicai*. https://logicai.io/blog/using-artificial-intelligence-ai-image-recognition.

Rana, Fazale. “Could Life Be Silicon-Based?” (May 25, 2022), https://www.twr360.org/blog/details/4861/could-life-be-silicon-based.

Rana, Fazale R. and Kenneth R. Samples. Humans 2.0: Scientific, Philosophical, and Theological Perspectives on Transhumanism. Covina: RTB Press, 2019.

Reed, Randall. “A New Patheon: Artificial Intelligence and ‘Her.’” *Journal of Religion & Film*. 22, no. 2 (October 2018). https://digitalcommons.unomaha.edu/jrf/vol22/iss2/5/.

Reynoso, Rebecca. “A Complete History of Artificial Intelligence.” *Learning Hub.* March 1, 2019. https://learn.g2.com/history-of-artificial-intelligence.

Riesenhuber, Klaus. “The Bases and Meaning of Freedom in Thomas Aquinas.” *Proceedings of the American Catholic Philosophical Association* 48 (1974): 99-111.

Robidouz, Dunstan. “Aquinas’s Distinction between Natural Being and Intentional Being.” *Lonergan Institute* (December 11, 2009). http://lonergan.org/2009/12/11/aquinass-distinction-between-natural-being-and-intentional-being.

Rodriguez-Pereyra, Gonzalo. “Nominalism in Metaphysics,” *Stanford Encyclopedia of Philosophy* (Summer 2019 Edition).

Rosencrance, Linda. “Software.” *TechTarget*. https://www.techtarget.com/search apparchitecture/definition/software.

Rubin, Charles T. “Artificial Intelligence and Human Nature.” *The New Atlantis* 1 (Spring 2003): 88-100. https://www.jstor.org/stable/43152855.

Russell, Bertrand. History of Western Philosophy and its Connection with Political and Social Circumstances from the Earliest Times to the Present Day. London: George Allen and Unwin Ltd., 1947.

Russell, Stuart and Peter Norvig. *Artificial Intelligence: A Modern Approach.* 2nd ed. Upper Saddle River: Prentice Hall, 2003.

Sack, Warren. “Artificial Human Nature.” *Design Issues* 13, no. 2 (Summer 1997): 55-64. http://www.jstor.com/stable/1511731.

Schopman, Joop. “Review: The Epistemological Interest of Artificial Intelligence.” *Journal for General Philosophy of Science* 19, no. 1 (1988): 153-156.

Seager, William. “Structure and the Metaphysics of Mind: How Hylomorphism Solves the Mind-Body Problem.” *Notre Dame Philosophical Review*, September 4, 2016, https://ndpr.nd.edu/reviews/structure-and-the-metaphysics-of-mind-how-hylomorphism-solves-the-mind-body-problem/.

Searle, John. “Minds, Brains, and Programs.” *Mind Design II: Philosophy, Psychology, Artificial Intelligence*. Cambridge: MIT Press, 1997: 183-204.

Segall, Matthew. “Formal Causality and Materialism.” *Footnotes 2 Plato* (blog) April 14, 2012. https://footnotes2plato.com/2012/04/14/form-and-matter-eternity-and-time.

Selfridge, Oliver G. and Ulric Neisser. “Pattern Recognition by Machine.” In *Computers and Thought* edited by Edward Feigenbaum and Julian Feldman, 237-250, New York: McGraw-Hill Book Company, 1963.

Shults, LeRon. Reforming Theological Anthropology: After the Philosophical Turn to Relationality. Grand Rapids: Eerdmans, 2003.

Sharples, Mike, David Hogg, Chris Hutchison, Steve Torrance, and David Young. *Computers and Thought: A Practical Introduction to Artificial Intelligence*. Cambridge: Bradford Books, 1989.

Shatzer, Jacob. *Transhumanism and the Image of God.* Downers Grove: InterVarsity Press, 2019.

Signorelli, Camilo Miguel. “Can Computers Become Conscious and Overcome Humans?” *Hypothesis and Theory* 5 no. 121 (October 2018): 1-20.

Singler, Beth. “‘Blessed by the Algorithm:’ Theistic Conceptions of Artificial Intelligence in Online Discourse.” *AI & Society* (April 2020). https://doi.org/10.1007/s00146-020-00968-2.

———. “Roko’s Basilisk or Pascal’s? Thinking of Singularity Thought Experiments as Implicit Religion.” *Implicit Religion* 20, no. 3 (2017): 279-297.

Smart, J. J. C., “The Mind/Brain Identity Theory.” *The Stanford Encyclopedia of Philosophy* (Winter 2022 Edition), Edward N. Zalta & Uri Nodelman (eds.). https://plato.stanford.edu/archives/win2022/entries/mind-identity.

Smith, George. *Atheism: The Case Against God.* New York: Prometheus Books, 1989.

Sorabji, Richard. “Body and Soul in Aristotle.” *Philosophy* 49 no. 187 (January 1974): 63-89.

Sperry, R. W. “Cerebral Organization and Behavior.” *Science* 133 no. 3466 (June 1961): 1749-1757.

———. “Hemisphere Deconnection and Unity in Conscious Awareness.” *American Psychologist* 23 no. 10 (October 1968): 723-733.

Sproul, R.C., John Gerstner, and Arthur Lindsley. *Classical Apologetics.* Grand Rapids: Zondervan, 1984.

Staley, Kevin M. “Aquinas: Compatibilist or Libertarian?” *The Saint Anselm Journal* 2 no. 2 (Spring 2005): 73-79.

Still, Carl Nelson. “Aquinas’s Theory of Human Self-Knowledge.” PhD diss., University of Toronto, Toronto, 1999. ProQuest Dissertations & Thesis Global.

Stump, Eleonore. *Aquinas*. New York: Routledge, 2003.

———. “Aquinas on the Mechanisms of Cognition: Sense and Phantasia.” *Historisk-filosofiske meddelelser. Det Kongelige Danske Videnskabernes Selskab.* 77 (1999): 377-395.

———. “Resurrection and the Separated Soul.” *The Oxford Handbook of Aquinas*. Oxford: Oxford University Press, 2012: 258-266.

Stump, Eleonore and Norman Kretzmann. “Absolute Simplicity.” *Faith and Philosophy: Journal of the Society of Christian Philosophers* 2 no. 4 (October 1985): 353-382.

Sweeney, Peter. “Is Strong AI Inevitable?” *The Explainable Startup* (blog). June 2018. https://www.explainablestartup.com/2018/06/is-strong-ai-inevitable.html.

Swinburne, Richard. *The Coherence of Theism.* 2nd ed. Oxford: Oxford University Press, 2016.

Tiku, Nitasha. “The Google Engineer Who Thinks the Company’s AI has Come to Life.” *Washington Post* (June 11, 2022). https://www.washingtonpost.com/technology/2022/06/11/google-ai-lamda-blake-lemoine.

Timpe, Kevin. “Free Will.” *Internet Encyclopedia of Philosophy*. https://iep.utm.edu/freewill/.

Toner, Patrick. “St. Thomas Aquinas on Death and the Separated Soul.” *Pacific Philosophical Quarterly* 91 (2010): 587-599.

Turek, Frank. *Stealing from God*. Colorado Springs: NavPress, 2014.

Turing, Alan. “Computing Machinery and Intelligence.” *Mind: A Quarterly Review of Psychology and Philosophy* LIX, no 236. (October 1950): 433-160. https://academic.oup.com/mind/article/LIX/236/433/986238.

Tye, Michael. “Philosophical Problems of Consciousness.” *The Blackwell Companion to Consciousness*. 2nd ed. Edited by Susan Schneider and Max Velmans. Oxford: Wiley Blackwell, 2017: 17-31.

Vainio, Olli-Pekka. “*Imago Dei* and Human Rationality.” *Zygon* 49, no. 1 (March 2014): 121-134.

Vallverdu, Jordi and Gavriele Trovato. “Emotional Affordances for Human-Robot Interaction.” *Adaptive Behavior* 24, no. 5 (2016): 1-15.

Van Dyke, Christina. “I See Dead People: Disembodied Souls and Aquinas’s Two-Person Problem.” In *Oxford Studies in Medieval Philosophy, V*o*lume 2*, edited by Robert Pasnau, 25-45.

———. “Metaphysical Amphibians - Aquinas on the Individuation and Identity of Human Beings.” PhD diss., Cornell University, Ithaca, 2000. ProQuest Dissertations & Thesis Global.

Van Gulick, Robert. “Functionalism.” *The Oxford Handbook of Philosophy of Mind*. Oxford: Oxford University Press, 2009: 128-151.

Van Huyssteen, J. Wentzel. *Alone in the World? Human Uniqueness in Science and Theology: The Gifford Lectures*. Grand Rapids: William B Eerdmans Publishing Company: 2006.

Van Inwagen, Peter. “Dualism and Materialism.” *Faith and Philosophy* 12, no. 4. (October 1995): 475-488.

Van Leeuwen, Tessa, Wolf Singer, and Danko Nikolić. “The Merit of Synesthesia for Consciousness Research.” *Frontiers in Psychology* 6 no. 1850 (December 2015): 1-9.

Vodovatova, Elena. “Guide to Unsupervised Machine Learning: 7 Real Life Examples.” (blog), https://theappsolutions.com/blog/development/unsupervised-machine-learning.

Wallace, William A. The Modeling of Nature: Philosophy of Science and Philosophy of Nature in Synthesis. Washington, D.C.: The Catholic University Press, 1996.

Ward, Thomas M. “Transhumanization, Personal Identity, and the Afterlife: Thomistic Reflections on a Dantean Theme.” *New Blackfriars* 96, no. 1065 (September 2015): 564-575.

Warwick, Kevin. March of the Machines: The Breakthrough in Artificial Intelligence. Chicago: University of Illinois Press, 2004.

Weiner, Norbert. Cybernetics: or Control and Communication in the Animal and the Machine 2nd edition. Cambridge: The M.I.T. Press, 1961.

Westermann, Claus. *Genesis 1-11: A Commentary*. Translated by John Scullion. Minneapolis: Augsburg, 1984.

Wilhelmsen, Frederick D. *Man’s Knowledge of Reality: An Introduction to Thomistic Epistemology*. Englewood Cliffs: Prentice-Hall, Inc., 1956.

———. “The ‘I’ and Aquinas.” *Ethical Wisdom East and/or West* 51 (1977): 47-55.

Wilkes, Kathryn. *Physicalism*. Abingdon: Routledge, 1978.

Williams, Bernard. “Hylomorphism.” *Oxford Studies in Ancient Philosophy* 4 (1986): 189–199.

Wilson, Bill. *The Best of Josh McDowell: A Ready Defense.* Nashville: Thomas Nelson Publishers, 1993.

Wingell, Albert Edward. “The Relationship of Intellect and Will in the Human Act According to St. Thomas Aquinas.” PhD diss., University of Toronto, Toronto, 1966. ProQuest Dissertations & Thesis Global.

Wuellner, Bernard J. *Dictionary of Scholastic Philosophy.* Milwaukee, WI: The Bruce Publishing Company, 1956.

Wyatt, John and Peter Robinson. “Human identity in an age of nearly-human machines – the impact of advances in robotics and AI technology on human identity and self-understanding.” *The Faraday Institute for Science and Religion.* Accessed July 15, 2021. https://www.faraday.cam.ac.uk/research/robotics-and-ai/.

Zagzebski, Linda and Timothy D. Miller. *Readings in Philosophy of Religion: Ancient to Contemporary.* West Sussex: Wiley-Blackwell, 2009.

Ziff, Paul. “The Feelings of Robots.” *Analysis* 19, no. 3 (January 1959): 64-68. https://www.jstor.org/stable/3326566.

Zoller, Coleen P. “Aquinas’ Compatibilist Theory of Freedom,” *American Philosophical Association (APA)-Pacific Division* (Susquehanna University, March 2001). https://scholarlycommons.susqu.edu/cgi/viewcontent.cgi?article=1002&context=phil_fac_pubs.