

## TOWARDS A SCIENCE OF SPIRIT – A HOLISTIC APPROACH TO BIG QUESTIONS IN MODERN SCIENCE

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### **Abstract**

*Several publications over the past decade show strong interest in the big questions regarding the origin and nature of life and consciousness. Historically, the development of science produced approaches that were sabotaged by an inappropriate emphasis on material and efficient causation, plus other materialistic presumptions that deny the reality of free will. Thankfully there are thoughtful scientists and philosophers at important institutions who recognize the need for a holistic approach, i.e. the necessity of all four aspects of Aristotelean causality, acknowledging the role of teleology in nature and that cognition is present in all living entities from single cells to organisms. The goal of this paper is to contribute to the systems approaches of these cutting-edge scientists and philosophers by complementing the conceptual thinking of Georg W. F Hegel with Vedic wisdom. The necessity for this results from the lack of systems approaches accounting for self-consciousness. During her 1983 Nobel lecture, Barbara McClintock set a goal for 21st century science to learn about the extent of knowledge that a cell has of itself. Questions about “self” are phenomenological questions, i.e. they must be considered from the first-person internal experience of consciousness and not just the third-person external so-called passive observer of nature. It is significant that modern science is inquiring about the self, since ancient Greek and Vedic knowledge concur that self-inquiry marks the beginning of spiritual life, or in this case, a science of spirit.*

**Keywords:** *Aristotle; Hegel; Vedanta; teleology; self; self-consciousness; self-determination; systems approach; phenomenology; conceptual thinking; cognition; life; dialectic; organic whole; spirit*

### **Introduction**

There have been several attempts over the last decade to clearly and publicly articulate the biggest questions that modern science is currently grappling with. In 2013, *The Big Questions in Science: The Quest to Solve the Great Unknowns* considered twenty questions including

“How did life begin?” and “What is consciousness?”<sup>1</sup> Then, in 2017, a science journalist from NBC News reported on what he called “The 7 Biggest Unanswered Questions in Physics,” including “How did life evolve from nonliving matter?”<sup>2</sup> Most recently, and perhaps the most academic presentation thus far, the special report *Innovations In: The Biggest Questions in Science* was published by both *Nature* and *Scientific American* in 2018. It addressed six questions, which again included “What is Consciousness?” and “How Did Life Begin?”<sup>3</sup>

These three presentations of the big questions in science have the following objectives in common: (1) inquiring about the fundamental material that constitutes our experienced reality, (2) discovering how to interact with nature more effectively in a manner that serves our perceived long-term benefit, (3) understanding consciousness – the ability to rationally know reality, (4) understanding the capacity and limits of the human ability to know reality, and (5) understanding the origin and nature of life. Since these aims are also relevant to philosophical and religious inquiry, it is unsurprising that these questions prompted a response from organizations working at the intersection of science and religion, such as the John Templeton Foundation. From 2019 to 2023, about 80% of their funding (approximately \$325 million) was devoted to projects connected with “Science & The Big Questions” which prioritized “Intellectual Humility” and a “Science of Purpose.”<sup>4</sup> Inquiring into the origin and nature of life and consciousness is relevant to contemporary scientific investigation. However, current approaches are hampered by materialistic presumptions, including reductionism which many scientists uncritically embrace.

This article has five aims. In “Part 1: Widening the Scope of Modern Science,” (1) materialistic presumptions hindering scientific progress are acknowledged and the history of science that encouraged them is considered, (2) broadening the scope of contemporary scientific approaches to encompass formative principles and the purposiveness (goal-directed activity) observed in nature. In “Part 2: Considering the Goal-Directed Activity of Living Entities,” (3) recognize that biology includes what yet lies beyond physics and chemistry. In “Part 3: Toward a Self-Conscious Science,” (4) show the “self” is an object of cutting-edge scientific investigation. Finally, in the “Conclusion,” (5) evaluate the necessity of a dialectical metaphysics – as described by Hegel – for inquiring about the self.

### **Part 1: Widening the Scope of Modern Science**

Before considering how the lens through which modern science observes nature and draws rational conclusions might be widened, it is necessary to have some idea of the standard scientific explanations regarding consciousness and life, as well as their respective flaws. This

<sup>1</sup> Hayley Birch, Colin Stuart, and Mun Keat Looi, *The Big Questions in Science: The Quest to Solve the Great Unknowns* (London: Andre Deutsch, 2013); see also their “The 20 Big Questions in Science,” *The Guardian*, August 31, 2013, <https://www.theguardian.com/science/2013/sep/01/20-big-questions-in-science>

<sup>2</sup> Dan Falk, “The 7 Biggest Unanswered Questions in Physics,” *NBC News*, August 28, 2017, <https://www.nbcnews.com/mach/science/7-biggest-unanswered-questions-physics-nena789666>

<sup>3</sup> “The biggest questions in science,” *Nature*, May 10, 2018, <https://www.nature.com/collections/mnwshvsswk>

<sup>4</sup> “John Templeton Foundation to Invest \$325 Million in Strategic Priorities,” John Templeton Foundation, Accessed October 18, 2023, <https://www.templeton.org/news/john-templeton-foundation-to-invest-325-million-in-strategic-priorities>

paper addresses the perspective of modern science identified by *Innovations In: The Biggest Questions in Science*. Therein, neurophysiologist Christof Koch lays out his approach to understanding consciousness:

The majority of scholars accept consciousness as a given and seek to understand its relationship to the objective world described by science. More than a quarter of a century ago Francis Crick and I decided to set aside philosophical discussions on consciousness (which have engaged scholars since at least the time of Aristotle) and instead search for its physical footprints. What is it about a highly excitable piece of brain matter that gives rise to consciousness? Once we can understand that, we hope to get closer to solving the more fundamental problem.<sup>5</sup>

Koch asks, “What is it about ... brain matter that produces consciousness?” However, by presuming that physical matter produces consciousness, he commits the logical fallacy of *petitio principii*, or, begging the question – positing a conclusion within the premise intended to prove it. If instead Koch had asked, “Does brain matter produce consciousness?” then, he would have to consider the work of scientists who recognize that consciousness is ubiquitous in all lifeforms whether or not they have brains.<sup>6</sup> Over 40 years ago biologist Humberto Maturana theorized that “Living systems are cognitive systems and living as a process is a process of cognition. This statement is valid for all organisms with and without a nervous system.”<sup>7</sup> A recent paper by molecular biologist James A. Shapiro concludes that all cells are cognitive agents, thus empirically verifying Maturana’s hypothesis.<sup>8</sup>

The same logical mistake is also found in contemporary empirical approaches to studying the origin of life, which can be observed for instance in an article by the Nobel laureate Jack Szostak:

Today the question of how chemistry on the infant Earth gave rise to RNA and to RNA-based cells is the central question of origin-of-life research. [...] Researchers are just beginning to identify the sources of chemical energy that could enable the RNA to copy itself, but much remains to be done. If these hurdles can also be overcome, we may be able to build replicating, evolving RNA-based cells in the laboratory – recapitulating a possible route to the origin of life. [...] If all goes well, we will eventually learn how robust the transition from chemistry to biology is and therefore whether the universe is full of life-forms or – but for us – sterile.<sup>9</sup>

Here, it is significant that Szostak inquires “what does the transition from chemistry to biology entail?” rather than “are biological entities generated from complex chemical activity?” This is begging the question. The notion that biology is purely a product of chemistry – that life is

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<sup>5</sup> Christof Koch, “What Is Consciousness?” *Innovations In: The Biggest Questions in Science* (2018), <https://www.nature.com/articles/d41586-018-05097-x>

<sup>6</sup> Anthony Trewavas and Frantisek Baluska, “The Ubiquity of Consciousness,” *EMBO Reports*, Vol. 12, no. 12 (2011), pp. 1221-1225.

<sup>7</sup> Humberto Maturana, *Autopoiesis and Cognition: Realization of the Living* (Dordrecht: D. Reidel, 1980), p. 13.

<sup>8</sup> James A. Shapiro, “All living cells are cognitive,” *Biochemical and Biophysical Research Communications*, Vol. 564 (2021), pp. 134-149.

<sup>9</sup> Jack Szostak, “How Did Life Begin?” In *Innovations In: The Biggest Questions in Science* (2018), <https://www.nature.com/articles/d41586-018-05098-w>

produced from nonlife (abiogenesis) – is another materialistic presumption that has *never* been experimentally proven. A living entity has never been produced in a lab by assembling nonliving materials. Synthetic organic chemist James Tour confirms that scientists have never created a single cell *ab initio* (from scratch). He explains that artificial attempts to create a cell have increased the appreciation of its complexity and despite the hype, scientists are “clueless” about the origin of life.<sup>10</sup> According to Tour, in order for scientists to prove otherwise, they would have to synthesize polypeptides (chains of amino acids), polynucleotides (chains of nucleic acids like DNA and RNA), and polysaccharides (chains of sugar).<sup>11</sup> Although tiny brainless (but not mindless) cells regularly manufacture such structures, thus far, this task is too difficult for scientists to replicate.

The reductionist and positivist presumption of Koch and Szostak is that consciousness and life come from matter. Reducing conscious experience to physical mechanisms and living organisms to the sum of material building blocks produces an abstract account of reality where fundamental living experiences such as free will are completely lost, as seen in the work of theoretical physicist Brian Greene. In his view, free choice is an illusion caused by peoples’ inability to directly perceive fundamental physical laws, i.e. “complex processes of shifting particles,” which he views as the source of thoughts and behavior.<sup>12</sup> Biologist Jerry Coyne, neuroscientist V. S. Ramachandran, the late theoretical physicist Stephen Hawking (1942-2018) are other scientists who also believe that free will is an illusion.<sup>13</sup> These free will skeptics presume the validity of determinism – the notion that reality is governed by classical Newtonian physics, and that all present circumstances are the mechanical consequences of preexisting material and efficient causes. This is often likened to a complex scenario of billiard balls colliding with each other and ricocheting in predictable ways, and it implies that the macroscopic experience of making free choices is fictitious and that everything is truly determined by the complex movements of microscopic particles. The epitome of this ideology, known as “Laplace’s Demon,” claims that if all of the physical details of every particle in the universe were known at a given moment, then the entire future could be predicted. Denial of free will ultimately diminishes the value of interpersonal relationships, invalidates intrapersonal development (personal growth), and undermines moral/ethical accountability.<sup>14</sup> These are some of the consequences of unjustifiably presuming that consciousness and life come from matter.

The conclusions of the free will skeptics are totally dependent upon whether or not reality is actually deterministic, and quantum physics has given good reasons to conclude that it is not. In 1927, pioneering quantum physicist Werner Heisenberg proved that the position and momentum of a particle cannot both be precisely measured at the same time. The more

<sup>10</sup> James Tour, “Dr. James Tour vs Professor Dave Farina: Are we clueless about the origin of life?,” YouTube, accessed October 18, 2023, <https://www.youtube.com/live/pxEWXGSIpAI?si=JtqEHKunUsGOdwEh&t=778>

<sup>11</sup> James Tour, “Can Scientists Answer These Questions? RNA, Abiogenesis, Chemical Natural Selection & more,” YouTube, accessed October 18, 2023, <https://youtu.be/MmykRoelTzU?si=rA78cC2eso7TrFNV&t=270>

<sup>12</sup> Brian Greene, *Until the End of Time: Mind, Matter, and our Search for Meaning in an Evolving Universe* (New York: Vintage Books, 2021), p. 137.

<sup>13</sup> Oliver Burkeman, “The clockwork universe: is free will an illusion?,” *The Guardian*, April 27, 2021, <https://www.theguardian.com/news/2021/apr/27/the-clockwork-universe-is-free-will-an-illusion>

<sup>14</sup> *Ibid.*

precise a particle's position is determined, the less precise the momentum is, and vice versa. This Heisenberg Uncertainty Principle offers one of the strongest popularly accepted arguments for why reality is not completely deterministic.<sup>15</sup> Quantum physics also sheds new light on the fundamental role of consciousness in observing physical reality. In *Physics and Philosophy*, Heisenberg suggested that the notion of pure physical objectivity is an ideal of classical physics and that “[q]uantum theory does not allow a completely objective description of nature.”<sup>16</sup> Some scientists portray Heisenberg's view of the observer effect as being one where an observer could be either a human or a measuring device, thus no subjective elements are brought into quantum physics.<sup>17 18</sup> However a closer reading of Heisenberg reveals that he had a more nuanced view that indeed considered as necessary the influence of a conscious observer in determining or actualizing quantum reality.<sup>19</sup> Quantum physicist John Archibald Wheeler puts it nicely by stating that the “universe does not ‘exist, out there,’ independent of all acts of observation. Instead, it is in some strange sense a participatory universe.”<sup>20</sup> This has led scholars to consider physics in light of phenomenology, or the study of the experience of consciousness, an approach that has revealed “some teleological connotations, bringing teleology [purposiveness] into the heart of scientific explicability of the universe.”<sup>21</sup>

Heisenberg recognized the difficulty in seriously considering an indeterministic reality where consciousness plays a fundamental role is rooted in the dominance of René Descartes' philosophy over the zeitgeist of modernity. (Heisenberg also holds the position that consciousness and life are irreducible to physics and chemistry, which will be discussed later.)

<sup>15</sup> Lev Vaidman, “Quantum theory and determinism,” *Quantum Studies: Mathematics and Foundations*, Vol. 1 (2014), <https://link.springer.com/article/10.1007/s40509-014-0008-4>

<sup>16</sup> Werner Heisenberg, *Physics and Philosophy: The Revolution in Modern Science* (New York: Harper & Brothers, 1958), pp. 106-107.

<sup>17</sup> Heisenberg writes, “Of course the introduction of the observer must not be misunderstood to imply that some kind of subjective features are to be brought into the description of nature. The observer has, rather, only the function of registering decisions, i.e., processes in space and time, and it does not matter whether the observer is an apparatus or a human being; but the registration, i.e., the transition from the ‘possible’ to the ‘actual’, is absolutely necessary here and cannot be omitted from the interpretation of quantum theory.” *Ibid.*, p. 137.

<sup>18</sup> Kenneth Baclawski, “The Observer Effect,” *2018 IEEE Conference on Cognitive and Computational Aspects of Situation Management (CogSIMA)* (2018), <https://ieeexplore.ieee.org/document/8423983>

<sup>19</sup> “The measuring device deserves this name only if it is in close contact with the rest of the world, if there is an interaction between the device and the observer. Therefore, the uncertainty with respect to the microscopic behavior of the world will enter into the quantum-theoretical system here just as well as in the first interpretation. If the measuring device would be isolated from the rest of the world, it would be neither a measuring device nor could it be described in the terms of classical physics at all. [...] This again emphasizes a subjective element in the description of atomic events, since the measuring device has been constructed by the observer, and we have to remember that what we observe is not nature in itself but nature exposed to our method of questioning. [...] In this way quantum theory reminds us, as Bohr has put it, of the old wisdom that when searching for harmony in life one must never forget that in the drama of existence we are ourselves both players and spectators.” Werner Heisenberg, *Physics and Philosophy*, pp. 57-58.

<sup>20</sup> John Wheeler, “Observer-Created Reality,” in *The Tests of Time*, ed. Lisa M. Dolling et al. (Princeton: Princeton University Press, 2003), p. 491.

<sup>21</sup> Alexei Nesteruk, “A ‘Participatory Universe’ of J. A. Wheeler as an Intentional Correlate of Embodied Subjects and an Example of Purposiveness in Physics,” Department of Mathematics University of Portsmouth (2013), p. 2, <https://arxiv.org/ftp/arxiv/papers/1304/1304.2277.pdf>

The standard interpretation of Cartesian metaphysics says that consciousness/mind (*res cogitans*) and matter/body (*res extensa*) are separate and independent substances. In this regard, Heisenberg explained,

We cannot disregard the fact that natural science is formed by men. Natural science does not simply describe and explain nature; it is a part of the interplay between nature and ourselves; it describes nature as exposed to our method of questioning. This was a possibility of which Descartes could not have thought, but it makes the sharp separation between the world and the I impossible. If one follows the great difficulty which even eminent scientists like Einstein had in understanding and accepting the Copenhagen interpretation of quantum theory, one can trace the roots of this difficulty to the Cartesian partition. This partition has penetrated deeply into the human mind during the three centuries following Descartes and it will take a long time for it to be replaced by a really different attitude toward the problem of reality.<sup>22</sup>

It is notable that Descartes did not present himself as a dualist. He explained that the “created substances” of matter and consciousness are dependent upon the independent “infinite substance,” God.<sup>23 24</sup> Descartes held that both matter and consciousness were finite substances that necessarily existed in and were thus unified by God, the infinite substance. He also thought that reality had the inherent character of substance (*res*), thus philosophers such as Georg W. F. Hegel understood Descartes to be espousing a monistic metaphysics.<sup>25</sup>

The mechanistic, reductionist, and positivist metaphysics of the modern scientific approach was nurtured by Descartes, Francis Bacon, and Auguste Comte, among others. Descartes and Bacon drew much inspiration from their critical views of the dominant Aristotelian paradigm of their time. “Descartes’ ambition was to provide replacements for all the main parts of Aristotelian physics,” of which his four aspects of cause were an essential component.<sup>26</sup> Descartes emphasized that size, shape, and motion – which became known as primary qualities to which secondary qualities were subordinated<sup>27</sup> – of spatially extended material bodies were the subject matter of mechanistic science. The philosopher of science Thomas Kuhn explained that Descartes’ “nest of commitments proved to be both metaphysical and methodological. As metaphysical, it told scientists what sorts of entities the universe did and did not contain: there was only shaped matter in motion. As methodological, it told them what ultimate laws and fundamental explanations must be like: laws must specify corpuscular motion and interaction, and explanation must reduce any given natural phenomenon to corpuscular action under these laws.”<sup>28</sup> This emphasis relegated consciousness or cognition (*res*

<sup>22</sup> Werner Heisenberg, *Physics and Philosophy*, p. 81.

<sup>23</sup> Noa Shein, “Spinoza’s Theory of Attributes,” *The Stanford Encyclopedia of Philosophy*, June 3, 2023, <https://plato.stanford.edu/entries/spinoza-attributes/#RealDist>

<sup>24</sup> René Descartes, *Principles of Philosophy* (Dordrecht: Springer, 1982), §52.

<sup>25</sup> Georg W. F. Hegel, “Descartes” in *Hegel’s Lectures on The History of Philosophy*, trans. Elizabeth Haldane (London: Routledge & Kegan Paul, 1955), III.2.1.A1.

<sup>26</sup> Gary Hatfield, “René Descartes,” *The Stanford Encyclopedia of Philosophy*, January 16, 2014, <https://plato.stanford.edu/entries/descartes/#NewSci>

<sup>27</sup> Martha Bolton, “Primary and Secondary Qualities in Early Modern Philosophy,” *The Stanford Encyclopedia of Philosophy*, June 1, 2022, <https://plato.stanford.edu/entries/qualities-prim-sec/>

<sup>28</sup> Thomas Kuhn, *The Structure of Scientific Revolutions* (Chicago: The University of Chicago Press, 2012),

*cogitans*) to something outside the scope of modern mechanistic science and facilitated deterministic scientific perspectives, such as Isaac Newton's.

Spiritually oriented scientists like Dr. Bhakti Mādhava Purī, who are well-versed in the philosophy of science and the historical development of ideas, have discussed some of the pivotal historical points that laid the foundation for the materialistic presumptions/conclusions of scientists like Koch, Szostak, and the free will skeptics,<sup>29</sup> and have advocated a return to the foundation that Aristotle established with his four aspects of cause.<sup>30</sup> Aristotle believed that comprehensive knowledge of nature must include four irreducible aspects of explanatory cause (*aition*): (1) material cause, “that out of which a thing comes to be,” what a thing is made of, (2) formal cause, “the statement of the essence” and “the account of what-it-is-to-be,” the blueprint, design, or formative principles of a thing, (3) efficient cause, “the primary source of the change or coming to rest,” the agent that acts on a thing to form it, and (4) final cause (*telos*), “that for the sake of which’ a thing is done,” the end or purpose that a thing ultimately serves.<sup>31</sup> Aristotle said that the job of “the student of nature is to bring the why-question back to them all in the way appropriate to the science of nature.”<sup>32</sup> This teleological approach to comprehending reality inquires about both the origin (formative principles) and final end of things thus elucidating the purpose that they serve.<sup>33</sup> The materialistic presumptions underpinning the approaches of Koch, Szostak, and the free will skeptics are products of the historical development of modern science, which unjustifiably discarded teleology. Bacon held that scientific progress specifically meant rejecting the consideration that there is a purpose guiding physical processes,<sup>34</sup> and effectively removed explanations of formal and final causes from modern scientific inquiry.<sup>35</sup> Comte reinforced a materialistic worldview with his philosophy of positivism, which suggested that theological and metaphysical inquiry were immature stages of human development that culminate in the positive stage, where “the mind stops looking for causes of phenomena, and limits itself strictly to laws governing them; likewise, absolute notions are replaced by relative ones.”<sup>36</sup>

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p. 63.

<sup>29</sup> Bhakti Madhava Puri, *Idols of the Mind vs. True Reality* (Princeton: Bhakti Vedanta Institute, 2020), pp. 69-79.

<sup>30</sup> Bhakti Madhava Puri, “Theory of ‘Organic Whole’,” Sadhu-Sanga Google Group, January 5, 2010, [https://groups.google.com/g/online\\_sadhu\\_sanga/c/xLSN2suGVY0/m/xKKTgQsZ2lkJ](https://groups.google.com/g/online_sadhu_sanga/c/xLSN2suGVY0/m/xKKTgQsZ2lkJ)

<sup>31</sup> Aristotle, *Physics* in *The Complete Works of Aristotle: The Revised Oxford Translation*, Vol. 1, ed. Jonathan Barnes (Princeton: Princeton University Press, 1985), p. 23, Book II, § 3.

<sup>32</sup> Andrea Falcon, “Aristotle on Causality,” *The Stanford Encyclopedia of Philosophy*, March 7, 2023, <https://plato.stanford.edu/entries/aristotle-causality/#FouCauSciNat>

<sup>33</sup> Aristotle, *Physics*, II: 7.

<sup>34</sup> John Losee, “Francis Bacon on the Exclusion of Final Causes” in *Theories of Causality: From Antiquity to the Present* (Oxfordshire: Routledge, 2011), p. 11.

<sup>35</sup> Francis Bacon, *Novum Organum*, edited by Joseph Devey (New York: P.F. Collier, 1902), pp. 108-110.

<sup>36</sup> Auguste Comte, *The Positive Philosophy of Auguste Comte*, translated by Harriet Martineau (Ontario: Batoche Books, 2000), p. 28, <https://socialsciences.mcmaster.ca/econ/ugcm/3ll3/comte/Philosophy1.pdf>

While some have asserted that Aristotle is a materialist/physicalist,<sup>37</sup> this paper rejects that view<sup>38</sup> and maintains the position that the historical reasons for dismissing Aristotle's ideas are largely a result of the societal domination of a materialistic worldview.<sup>39</sup> David Hume – who was born almost a century after Bacon and was thus conditioned by a worldview influenced by the removal of formal and final aspects of causation – rejected Aristotle's four aspects of cause because he understood Aristotle's use of the term "cause" (*aition*) in the modern sense of an event.<sup>40</sup> Hume specifically related his understanding of cause to the collision of billiard balls,<sup>41</sup> the epitome of efficient causality. Restoring the full value of Aristotelean causality to modern science requires carefully considering his nuanced use of the word *aition*, which does not simply refer to causal events, but implies a wider spectrum of explanations.<sup>42</sup>

In order to progress towards an honest and comprehensive account of reality – beyond the current abstract portrayal of a deterministic clockwork universe where consciousness and life come from matter and freedom is fictitious – modern science needs a holistic approach. This can be accomplished by reinstating the formal and final aspects of causation throughout the disciplines and subdisciplines of the natural sciences. As we will see below, scientists and philosophers at leading institutions throughout the United States and the United Kingdom who give due attention to the history of science, recognize the importance of all four of Aristotle's aspects of cause, and advocate the relevance of teleology in 21st-century scientific research, especially within biology.

## Part 2: Considering the Goal-Directed Activity of Living Entities

Hegel was able to systematize and expand upon the profound insights of Aristotle in the modern era, which is why Hegel's philosophy is very useful for re-assessing the utilization of Aristotle's philosophy for the progression of modern science. Here is how Alfredo Ferrarin describes the implications of Aristotelian teleology for Hegel's idea of nature:

For Hegel, Aristotle's nature is what actualizes and maintains itself; it is 'entelechy, that which produces itself'; it is what has in itself the principle of fulfilling its end and which, in its self-identity, while infecting itself with externality, uses the latter to conform to its concept, that is, to its end. [...] For Hegel, the truth of the organic process in contradistinction to mechanical or physical processes is that it can reproduce itself and contribute to the continuation of the species, while this is impossible for all nonorganic processes – that is, in that they are not independent and self-sustaining. And this is only possible because organic beings are not aggregates of parts but overarching totalities whose particular functions are oriented for the sake of the whole. [...] Once

<sup>37</sup> Christopher Green, "The thoroughly modern Aristotle: was he really a functionalist?" *History of Psychology*, Vol. 1, No. 1 (1998) p. 10.

<sup>38</sup> A nice response to those who reject Aristotle's view based upon the charge that he is a materialist has been offered in Bhakti Mādhava Purī, "Why Aristotle May Not Be Considered A Materialist," *Princeton Bhakti Vedanta Institute Report* (2018), <https://mahaprabhu.net/satsanga/2018/04/24/why-aristotle-may-not-be-considered-a-materialist/>

<sup>39</sup> Justin Humphreys, "Aristotle (384 B.C.E.–322 B.C.E.)," *Internet Encyclopedia of Philosophy*, n.d., <https://iep.utm.edu/aristotle/#H5>

<sup>40</sup> John Losee, "David Hume on Causality," in *Theories of Causality*, p. 29.

<sup>41</sup> David Hume, *An Enquiry Concerning Human Understanding* (Chicago: Open Court, 1927), pp. 79-81.

<sup>42</sup> Max Hocutt, "Aristotle's Four Because," *Philosophy*, Vol. 49, no. 190 (1974), p. 385.

again, internal finality is the principle of a holistic view of nature as a totality of self-determining processes, and it is the only category which can account for both life and what is instrumental to it.<sup>43</sup>

We will try to unpack the quotation in what follows. Contemporary physiology defines homeostasis as “a self-regulating process by which an organism can maintain internal stability while adjusting to changing external conditions.”<sup>44</sup> This self-maintenance of an organism’s living integrity depends on internal metabolic processes which rely on feeding behaviors – interaction between the organism and its external environment in the form of consuming nutrients.<sup>45</sup> Bears, for instance, consume blueberries and salmon. These different organisms initially exist separately from each other, where only a common habitat is shared among them. Yet the remarkably dynamic activity of life is such that a bear can consume organisms that are different from it and integrate this difference into the maintenance of its unified self-identity as a bear. Maintenance of its natural self-identity is the teleological end to which the physical processes of the organism are directed. From another perspective, from the way nature consumes itself to maintain itself, we may say “nature is what actualizes and maintains itself.” This is also acknowledged by Vedic wisdom in the Sanskrit aphorism “*jīvo jīvasya jīvanam*,” meaning living beings require other living beings to subsist.<sup>46</sup>

So far, only maintenance of natural self-identity on an individual scale has been demonstrated, but Hegel urges us to consider this on a universal scale. Individual organisms only maintain their natural self-identity for a limited time; they eventually perish for one reason or another. The maintenance of the natural self-identity of the species endures beyond the finite lifetime of the individuals through the process of reproduction. Reproduction preserves the universal species concept, to which all individual members of the species conform, over many generations of organisms. By acknowledging that the individual life of an organism is self-maintained through metabolic and homeostatic processes while the universal life of the species concept is self-preserved through the reproductive process, we necessarily recognize that the concept of life includes both an individual and a universal aspect. We do not intend to say much about universals in this paper, but it is worth noting that although the universal is not immediately accessible through sense perception, the reality of the universal is necessarily deduced through reasoning connected to observed phenomena. This conclusion is an example of how mediated thought delving deeper than the immediacy of appearance produces valid knowledge – i.e. that universals are real and have a direct relationship with observed phenomena.

<sup>43</sup> Alfredo Ferrarin, *Hegel and Aristotle* (Cambridge: Cambridge University Press, 2004), p. 217.

<sup>44</sup> George Billman, “Homeostasis: The Underappreciated and Far Too Often Ignored Central Organizing Principle of Physiology,” *Frontiers in Physiology*, Vol. 11 (2020), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7076167/>

<sup>45</sup> John Imig, “Frontiers in metabolic physiology grand challenges,” *Frontiers in Physiology*, Vol. 13 (2022), <https://www.frontiersin.org/articles/10.3389/fphys.2022.879617/full>

<sup>46</sup> Bhaktivedānta Swāmī Prabhupād, *Śrīmad-Bhāgavatam* (Alachua: The Bhaktivedanta Book Trust, 1972), 1.13.47.

The important point for consideration here is that organic phenomena, conscious living entities, demonstrate this enhanced capacity for stability which is not observed in mechanical or chemical phenomena. Heisenberg was also keenly aware of this:

In order to give a quantitative description of the laws of chemistry one had to formulate a much wider system of concepts for atomic physics. This was finally done in quantum theory, which has its roots just as much in chemistry as in atomic physics. Then it was easy to see that the laws of chemistry could not be reduced to Newtonian mechanics of atomic particles, since the chemical elements displayed in their behavior a degree of stability completely lacking in mechanical systems. But it was not until Bohr's theory of the atom in 1913 that this point had been clearly understood. [...] Just as in the case of chemistry, one learns from simple biological experience that the living organisms display a degree of stability which general complicated structures consisting of many different types of molecules could certainly not have on the basis of the physical and chemical laws alone. Therefore, something has to be added to the laws of physics and chemistry before the biological phenomena can be completely understood.<sup>47</sup>

Hegel's systematic philosophy articulates that the "something" to be added to physical and chemical laws is the final end that those processes are serving. A living entity is not the sum of parts but a totality unto itself – an organic whole – where the identity of each of its parts is dependent upon the maintenance of the integrity of the organic whole. Simultaneously, the purpose of each part is to support and contribute to that maintenance. Due to this dynamic dialectic relationship, the parts of an organic whole are more properly called participants. The participants of an organic whole only develop with the organic whole, i.e. the nucleus, heart, lungs, eyes, etc. are internally produced along with the totality of the cell or organism, and the development is internally motivated to actualize and eventually preserve the self-identity of the whole. In contrast, the relationship between a mechanical whole and its parts is characterized by an external relationship, where the parts exist outside of and independently from the machine, and when these parts are externally unified by an efficient cause the machine is produced. There is no internal influence that unifies and maintains the integrity of mechanical wholes.<sup>48</sup>

The internally motivated goal-directed behavior (inner teleology) of the development of organic wholes was empirically observed in 1891 during Hans Driesch's well-known experiment on sea urchins, where the resilient determination of blastomeres artificially separated went on to form two whole embryos.<sup>49</sup> "What fascinated Driesch was not only that both halves possessed the potential potency to continue normal development, but that there was a rapid establishment of the normal proportions of the original whole."<sup>50</sup> His further experiments observing the regeneration of *Tubularia* confirmed the initial results. This inspired him to conclude that "because the viable whole is given as a clear recognizable end of the totality of all the processes of ontogeny, we judge on the ground of an objective necessity

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<sup>47</sup> Werner Heisenberg, *Physics and Philosophy*, pp. 102-103.

<sup>48</sup> For a more elaborate discussion on this, see Bhakti Madhava Purī, *Idols of the Mind vs. True Reality* (Princeton: Bhakti Vedanta Institute of Spiritual Culture and Science, 2020), pp. 11-25.

<sup>49</sup> Mary E. Sunderland, "Hans Adolf Eduard Driesch (1867-1941)," *Embryo Project Encyclopedia* (2007), <https://embryo.asu.edu/pages/hans-adolf-eduard-driesch-1867-1941>

<sup>50</sup> Frederick Churchill, "From Machine-Theory to Entelechy: Two Studies in Developmental Teleology," *Journal of the History of Biology*, Vol. 2, no. 1 (1969), p. 178.

therefore, these processes to be *as though they were fixed according to quality and order by an intelligence*. With these words we give the really adequate expression to the critical teleological standpoint.”<sup>51 52</sup>

Inner teleology has also been documented in cutting-edge embryonic stem cell research where it has been referred to as “endogenous self-organization.” A recent article in *Stem Cell Reports* begins by stating that the reductionist approach to describing embryological phenomena is inappropriate and repeats this point several times in the conclusion. “Increasing evidence, however, is showing that, in addition to exogenous signals, the development of the embryo involves endogenous self-organization,”<sup>53</sup> where examples of endogenous behavior – internally motivated autonomous activity – “involve feedback regulatory logics” and the creation of “order independently of exogenous instructive signals.”<sup>54</sup> This is contrasted with traditional hierarchical explanations that “ultimately reduces all structures in the embryo to external causes.” The article also states that “these discoveries have prompted a renaissance of the concept of self-organization” concluding that the “fundamental question that remains to be addressed is how self-organization is implemented at the molecular and cellular levels.”<sup>55</sup> The capacity to logically respond to an environment and to create order without external influence are acts of volition and cognition – willing and thinking. Other recent studies also reference the willing and thinking of stem cells, in that they “make the decision to remain naïve or undergo specialization.”<sup>56</sup> This behavior will prove significant in what follows.

In 2015, spiritually oriented scientist Bhakti Niškāma Śhānta explored the modern scientific understanding of “self-organization” in light of the Vedic wisdom. Śhānta gave credit to scientists such as stem cell researcher Neil D. Theise who, based on the observation of self-organization, holds that the machine metaphor does not properly describe living organisms. However, Śhānta clarifies that even the concept of self-organization does not properly describe living phenomena due to it (1) being used to describe as well the organization of physical and chemical systems such as the formation of a tornado or a crystal, and, (2) lacking a developed concept of “self,” especially in reference to the unique behavior of conscious living entities.<sup>57</sup> In this respect, we humbly recommend that self-organization, especially “endogenous self-organization” be understood within the wider context of “self-determination.” Self-determination is a Hegelian term that more appropriately explains the inner teleological behavior observed in organic wholes, thus satisfying Heisenberg’s suggestion that “something has to be added to the laws of physics and chemistry before the biological phenomena can be completely understood.” That “something” includes the final end which mechanical and

<sup>51</sup> Ibid., p. 174.

<sup>52</sup> Hans Driesch, *Analytische Theorie der organischen Entwicklung*, (1894), p. 131.

<sup>53</sup> Jose Serrano Morales, “From Embryos to Embryoids: How External Signals and Self-Organization Drive Embryonic Development,” *Stem Cell Reports*, Vol. 16, no. 5 (2021), p. 1039.

<sup>54</sup> Ibid., p. 1041.

<sup>55</sup> Ibid., p. 1048.

<sup>56</sup> Kacy Gordon et al., “Stem cell niche exit in *C. elegans* via orientation and segregation of daughter cells by a cryptic cell outside the niche,” *eLife*, Vol. 9 (2020), <https://elifesciences.org/articles/56383>

<sup>57</sup> Bhakti Niskama Shanta, “Life and consciousness - The Vedāntic view,” *Communicative & Integrative Biology* 8, no. 5 (2015), p. 5.

chemical processes within the organism serve, as well as the formative agency from which the body and its processes generate – the self.

Before discussing “self-determination” further, we will briefly consider the concept of “self.” The self can be understood as an individual moment of autonomous goal-directed dialectic activity expressed through various degrees of endogenous agency such as the modes of volition (willing), cognition (thinking), and emotion (feeling). That which appears as the opposing content to the self is negated as its own being-for-self to become a dynamic unity – a dynamic organic whole. This was described in the example of organisms consuming food and assimilating nutrients.

The materialistic conception of nature as an environment for the exploitation of resources by conscious living entities can be transcended by inquiring about the reasons for the various degrees of volition, cognition, and emotion. While scientists today may recognize that cells demonstrate volitional and cognitive behavior, they do not say that cells demonstrate emotion. However, mammals such as elephants, chimpanzees, dogs, and, of course, people seem to do so. From a spiritual perspective, nature may be understood as the plane of reality where these organic wholes gradually learn to cooperate and harmonize with gradations of higher purposes which encourage them to act and live for the sake of that which is beyond their own immediate self-centered impulsive desires. This may be understood as progressive degrees or stages of consciousness of living beings, where “there is continuity between humans and other animals in their emotional (and cognitive) lives; that there are transitional stages among species, not large gaps; and that the differences among many animals are differences in degree rather than in kind.”<sup>58</sup>

Spirit may be understood to be an evolution from a state of unconsciousness to full consciousness, where each living being represents an individual moment of this dynamic activity. Within the milieu of such activity, the point at which unconscious spirit becomes conscious of itself (self-consciousness) – as observed with humans – seems to be the point at which a second nature manifests as culture, art, politics, science, philosophy, and religion. At this stage, deeper thought that seeks and contemplates explanations of ultimate causes, reasons, and purposes of reality is exhibited.

The concept of “self-determination” is described at length in Hegel’s *Phenomenology of Spirit*, of which Purī offers the following summary:

Self-determination or free autonomy seems contradictory. How can the self, determine itself? First of all, self means being that is related to/identified with itself. Generally, as I have been trying to offer on this forum [Sadhu-Sanga Google Group], identity is never abstractly separated from difference except in the mind, i.e., as an unreality or not actual. Therefore, self-determinate being must be divided into the difference of a subjective determining self and an objective determined self, which are yet identical since both sides are the same self but negatively related. The subjective is never a direct or immediate identity with the objective, it is always mediated or negatively related through determination or thinking.

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<sup>58</sup> Marc Bekoff, “Animal Emotions: Exploring Passionate Natures: Current interdisciplinary research provides compelling evidence that many animals experience such emotions as joy, fear, love, despair, and grief—we are not alone,” *Bioscience*, Vol. 50, no. 10 (2000), p. 864.

In free will, the term ‘will’ implies act and act implies change or movement. That is one side of will – the expression of will. The other side of will is the impulse that gives rise to will, the lack or desire that manifests as the will to act or fill/fulfill the lack and thereby satisfy itself. Now the lack and desire to fulfill itself arises from a discrepancy between the subjective self and its objective reality thus producing the will or act to abate that discrepancy. This may seem complex, but it is actually the process that gives rise to consciousness or the relation between the self as ego or I and its object.<sup>59</sup>

As a self-maintained unity, all differentiated biological processes within an organic whole are ultimately intended to serve the final end of the totality. On the organismic level, goal-directedness within the whole drives internal events, such as metabolic and homeostatic processes, as well as external events, such as consuming nutrients and mating, which fulfills the end or need for survival from an individual and universal perspective. On the cellular level, goal-directedness within the whole drives internal events, such as DNA proofreading/writing, and external events, such as cellular adhesion, fulfilling the need of their own survival by maintaining homeostasis of the greater organism. It is significant that,

[S]elf-determination is intrinsically connected to a sense of lack, which turns into need. The need is precisely the feeling of lack and at the same time the drive to take it away, to deny it, to find in the environment what can suppress the sense of incompleteness produced by that lack. For Hegel, the activity of life is always an activity that arises from lack [*die Tätigkeit des Mangels*].<sup>60</sup>

When a living entity consciously acts in the external world, it is a response to some particular internal deficiency or lacking. The satisfaction or fulfillment of that initial lack is the teleological purpose of the action, i.e. the inner fulfillment of a living entity is the goal that directs its external activity in the natural environment. So, teleological accounts of living phenomena should consider this negative subjective aspect of behavior that underlies positive objective activity. The subjective and objective are not opposed to each other, as is usually supposed in modern science, but they are a dynamic dialectical unity, an identity-in-difference.

Returning to our earlier example, a bear feels hungry (experiences lack) and is inspired to satisfy the hunger (fulfill the resultant need that was triggered by the lack) by consuming salmon and blueberries. When it perceives a threat from another animal – encountering a dangerous organism other than itself triggers a recognition of its own individual vulnerability or mortality – the bear will overcome this deficiency by defending itself in the immediate situation. This may be the same lack that motivates the need to reproduce; while the individual aspect of the animal drives it to hunt or defend itself, its universal aspect drives it to maintain the security of the species through sexual reproduction. The needs discussed above are products of sensuous thought derived from the immediacy of empirical observation of nature. By engaging in deeper mediated thought – by inquiring about the “self” and its intrinsic nature –

<sup>59</sup> Bhakti Mādhava Purī, “Rudolph Tanzi, RE: C.s. Morrison, RE: [Sadhu Sanga] Physics and qualia,” *Sadhu-Sanga Google Group*, August 3, 2017,

[https://groups.google.com/g/online\\_sadhu\\_sanga/c/jjmFtftjhGQ/m/kOgonXtyAgAJ](https://groups.google.com/g/online_sadhu_sanga/c/jjmFtftjhGQ/m/kOgonXtyAgAJ)

<sup>60</sup> Andrea Gambarotto et al., “Hegel's Philosophy of Biology? A Programmatic Overview,” *Hegel Bulletin*, Vol. 41, No. 3 (2020),

[https://www.researchgate.net/publication/344790498\\_Hegel's\\_Philosophy\\_of\\_Biology\\_A\\_Programmatic\\_Overview](https://www.researchgate.net/publication/344790498_Hegel's_Philosophy_of_Biology_A_Programmatic_Overview).

we may gain insight into more substantial and fulfilling purposes that are served by the goal-directed activity of living entities, not only in immediate nature, but also in the second nature that seems to emerge with the human lifeform, and discussed further in Hegel's anthropology.

In his treatment of Being, Hegel shows that Being contains its own negation, i.e. Nonbeing.<sup>61</sup> This is because pure being lacks all determination – it is indeterminate or empty. Nonbeing, or nothing, is also empty, thus the two are identical in their emptiness. The continuous logical movement from being to nonbeing (ceasing-to-be) and from nonbeing to being (coming-to-be) is what gives rise to Becoming. In this way, Being (thesis) passes into Nonbeing (antithesis), which gives rise to Becoming (synthesis). Hegel describes this activity as occurring within the sphere of Logic, which culminates in the Absolute Idea. The sphere of Nature necessarily emerges from Logic as the Absolute Idea in its externality, or outside itself. Thus, since all being (everything that is) contains its own negation within itself, this lack or deficiency within all living entities that serves as the impetus for their interactions with the external environment (relationships with that which is other than themselves) may be the manifestation of this dialectical dynamic between Being, Nonbeing, and Becoming. The capacity of a self to experience lack and to satisfy it is the process of self-determination, where the self continually determines or establishes its experience through conscious decision making.

Philosophers of science are beginning to recognize the importance of the concept of self-determination, as demonstrated by the systems approach known as Organizational Account (OA), which “puts more emphasis on the internal dimension of living systems ... than on external influences,”<sup>62</sup> and distinguishes between living entities and other self-maintaining systems in nature by recognizing that properties of life are “inherently related to self-determination.”<sup>63</sup> Further, proponents of OA suggest that self-determination “remains the conceptual core of autonomy.”<sup>64</sup> Critically considering what Hegel has written about self-determination will offer great service to these efforts.<sup>65</sup>

Ultimately, self-determination is freedom, which Hegel describes as “being with oneself in the other” (*Bei sich selbst sein im Anderen*).<sup>66</sup> He also reaches the conclusion that “Freedom is the sole truth of Spirit.”<sup>67</sup> It may seem presumptuous sharing these snippets of Hegel's systematic philosophy without including the reasoning behind these conclusions, but they raise a number of important points. Most living entities in nature cannot truly be “with oneself in the

<sup>61</sup> Georg W. F. Hegel, *Hegel's Logic*, translated by William Wallace (Oxford: Clarendon Press, 1975), §89.

<sup>62</sup> Matteo Mossio and Leonardo Bich, “What makes biological organisation teleological?,” *Synthese*, Vol. 194, No. 4 (2017), p. 10.

<sup>63</sup> Alvaro Moreno and Matteo Mossio, *Biological Autonomy: A Philosophical and Theoretical Enquiry* (Dordrecht: Springer, 2015), p. 1.

<sup>64</sup> *Ibid.*, p. xxix.

<sup>65</sup> Luca Corti, “The ‘Is’ and the ‘Ought’ of the Animal Organism: Hegel's Account of Biological Normativity,” *History and Philosophy of the Life Sciences* p 44, no. 17 (2022): <https://doi.org/10.1007/s40656-022-00498-8>

<sup>66</sup> Georg W. F. Hegel, *Elements of the Philosophy of Right* (Cambridge: Cambridge University Press, 1991), p. 42, §7.

<sup>67</sup> Georg W. F. Hegel, *Reason in History: A General Introduction to the Philosophy of History*, trans. Robert S. Hartman, (Indianapolis: The Bobbs-Merrill Company, 1953), Part III, Section 1, p. 22.

other,” since they usually negate what is other from them by consuming it to maintain themselves. This indicates that freedom may not be fully expressed in these lifeforms. As Hegel points out, freedom is truly expressed in Spirit, which is the truth of Nature,<sup>68</sup> or, of which, Nature is the immediate being.<sup>69</sup> It is only in the human lifeform that deeper questions about life and the self can be pondered and a transcendental spiritual vision be awakened. The recognition of an essential spiritual nature among the variegated kinds of living entities is also found in the *Bhagavad-gītā*:

*vidyā-vinaya-sampanne, brāhmaṇe gavi hastini  
śuni caiva śva-pāke ca, paṇḍitāḥ sama-darśinaḥ*

The enlightened souls see transcendence within all living beings, whether the humble and learned *brāhmaṇa*, the cow, the elephant, the dog, or the dog-eater. Therefore, they are to be known as *paṇḍita* – men of true wisdom.<sup>70</sup>

The degree to which freedom is expressed and higher thought can be achieved among lifeforms indicates an evolution of consciousness where there is a “continuity between humans and other animals in their emotional (and cognitive) lives [and] the differences among many animals are differences in degree rather than in kind.”<sup>71</sup>

### Part 3: Towards a Self-Conscious Science

Physiologist Denis Noble illuminates the indeterministic aspect of organic phenomena by acknowledging that,

[c]hoice in the behavior of organisms involves novelty, which may be unpredictable. Yet in retrospect, we can usually provide a rationale for the choice. A deterministic view of life cannot explain this. [...] What therefore is unpredictable in prospect can become comprehensible in retrospect.<sup>72</sup>

He suggests that when faced with an unfamiliar environmental challenge, organisms harness stochasticity in order to generate novel responses. Such responses seem logical upon reflection despite the fact that the respondent had no prior experience. This suggests that at the macroscopic level there are organismic behaviors that are not pre-determined, which take place in addition to the indeterminism at the quantum level as suggested by the Heisenberg Uncertainty Principle. Noble acknowledges the continued relevance of Aristotle’s four aspects of causation to 21st-century science and emphasizes the final cause, namely, teleology:

<sup>68</sup> Georg W. F. Hegel, *Hegel's Philosophy of Nature*, translated by A.V. Miller (Oxford: Clarendon Press, 2004), p. 24, §251.

<sup>69</sup> *Ibid.*, p. 444, §376Z.

<sup>70</sup> Bhakti Rakṣak Śrīdhara Mahārāj, *Śrīmad Bhagavad-gītā* (Nabadwip: Sri Chaitanya Saraswat Math, 2006), p. 94, 5.18.

<sup>71</sup> Marc Bekoff, “Animal Emotions,” p. 864.

<sup>72</sup> Denis Noble and Raymond Noble, “Harnessing stochasticity: How do organisms make choices?” *Chaos*, Vol. 28, No. 10 (2018), p. 2.

Goal-directedness is therefore also a relative property. Goals are always relative to some particular context, internal or external to the organism. Goal-directedness is traditionally called teleology, but many scientists have avoided using the term since Francis Bacon's great work *Novum Organum* in 1620 outlining the inductive method, which formed the basis of the reductive approach in science. That has been interpreted to mean that scientists should avoid teleology [...] I see no reason to avoid the word teleology. [...] Teleology as purpose in the context of a particular organism-environment interaction makes perfectly good scientific sense; it is verifiable. [...] Some 'why' questions can therefore be most certainly answered by scientific investigation.<sup>73</sup>

While it is historically necessary to recognise the insights of Aristotle since his classification of the forms of causation is still very relevant today, it is also important to note that developments in modern science have introduced variations on his theme that he could not have anticipated.<sup>74</sup>

Noble is credited as a "pioneer of Systems Biology,"<sup>75</sup> and his book *The Music of Life* (2006) is considered the "first popular book on systems biology."<sup>76</sup> Given his recognition of the continued relevance of all four aspects of Aristotelean causality, systems biology represents a more holistic approach than reductionist biology. Noble proposes the theory of Biological Relativity, which suggests that scientists "answer questions at the level to which they are most appropriate and then use that insight to probe down and up towards the other levels."<sup>77</sup> He explains that "the level at which they constrain the interactions of the system at lower levels ... is also what canalizes those interactions to serve the natural purposiveness of organisms."<sup>78</sup> His ideas may be connected to the work of philosopher Alicia Juarrero, who has been an advocate of all four aspects Aristotelean causality for over 25 years.<sup>79</sup> A proponent of Dynamical Systems Theory, she calls for the formal and final aspects of causation to be "reimagined in terms of interactional, extended, and *context-dependent interdependencies*."<sup>80</sup> Juarrero suggests that formal and final causes are the constraints of dynamical systems. The work of Noble and Juarrero are two examples of more holistic approaches heeding Aristotle's advice that "the why-question [is] appropriate to the science of nature."

In the first section of this article, we brought attention to the materialistic presumptions and conclusions espoused by today's materially oriented scientists and free will skeptics, which all depend upon the validity of a deterministic reality. As we have seen, however, there are significant challenges to determinism. The historical development of modern mechanistic science through Descartes, Bacon, and others in the 16th and 17th centuries, overemphasized

<sup>73</sup> Denis Noble, *Dance to the Tune of Life: Biological Relativity* (Cambridge: Cambridge University Press, 2018), p. 45.

<sup>74</sup> *Ibid.*, p. 179.

<sup>75</sup> James Shapiro, Raju Pookottil, and Denis Noble, "Denis Noble," *The Third Way of Evolution*, accessed October 21, 2023, <https://www.thethirdwayofevolution.com/people/view/denis-noble>

<sup>76</sup> Rod Cookson, "Denis Noble," The Royal Society, accessed October 21, 2023, <https://royalsociety.org/people/denis-noble-12007/>

<sup>77</sup> Denis Noble, *Dance to the Tune of Life: Biological Relativity* (Cambridge: Cambridge University Press, 2017), p. 47.

<sup>78</sup> *Ibid.*, p. 250.

<sup>79</sup> Since her book Alicia Juarrero, *Dynamics in Action: Intentional Behavior as a Complex System* (Cambridge: The MIT Press, 1999).

<sup>80</sup> Alicia Juarrero, *Context Changes Everything* (Boston: The MIT Press, 2023), p. 20.

the explanatory power of material and efficient aspects of cause at the expense of the formal and final aspects espoused by Aristotle. The concept of a clockwork universe reduced consciousness and life to matter in motion and denied the reality of freedom (in decision-making). But things are changing. Following in the footsteps of trailblazing 20th-century scientists like Nobel laureate Barbara McClintock, biologists Noble and Shapiro have affirmed the importance of teleology for understanding organic phenomena in the 21st-century. As Shapiro writes,

the August 2010 issue of the journal *Nature Immunology* was dedicated to ‘decision-making in the immune system.’ Thus, it appears that the idea of cellular cognition and decision-making with well-defined functional objectives has gone mainstream [...] cells are now reasonably seen to operate teleologically: their goals are survival, growth, and reproduction. In multicellular organisms, cells have elaborate control regimes to ensure that they fit into the overall morphology and physiology.<sup>81</sup>

Shapiro concluded that “[a]ll living cells are cognitive,”<sup>82</sup> thus recognizing the “ubiquity of consciousness”<sup>83</sup> in all lifeforms. This frustrates materialistic approaches to describing consciousness in terms of neuronal correlates – “the minimum neuronal mechanisms jointly sufficient for any one specific conscious experience”<sup>84</sup> – because (1) a single neuron, which is a single eukaryotic cell, already demonstrates cognitive behavior, and because (2) correlation does not imply causation. Comprehending the cause of cognition/consciousness demands we start with Aristotle’s foundation. The final cause of cognition/consciousness, that for the sake of which they exist, is the self – the identity-in-difference of individual cognitive, volitional, and emotive experience on both the individual and universal scale.

McClintock’s groundbreaking discovery of “jumping genes,” or transposons – genes that moved within the genome as opposed to being fixed in their position relative to each other (as was the scientific thinking of the 1950s and 1960s) – inspired honest and sober scientific conclusions regarding the volitional and cognitive capacity of cells.<sup>85</sup> The necessity for a scientific understanding of the “self” was made evident in McClintock’s 1983 Nobel lecture, which is appreciated by neuroscientist Dennis Bray<sup>86</sup>:

There must be numerous homeostatic adjustments required of cells. The sensing devices and the signals that initiate these adjustments are beyond our present ability to fathom. A goal for the future would be to determine the extent of knowledge the cell has of itself, and how it utilizes this knowledge in a ‘thoughtful’ manner when challenged. [...] In the future attention undoubtedly will be centered on the genome, and with greater appreciation of its significance as a highly sensitive organ of the cell, monitoring genomic activities and correcting common errors, sensing the unusual and unexpected events, and responding to them, often by restructuring the genome. We know about

<sup>81</sup> James Shapiro, *Evolution: A View from the 21st Century* (Upper Saddle River: FT Press Science, 2011), p. 137.

<sup>82</sup> James A. Shapiro, “All living cells are cognitive,” pp. 134-149.

<sup>83</sup> Anthony Trewavas et al., “The Ubiquity of Consciousness,” pp. 1221-1225.

<sup>84</sup> Christof Koch et al., “Neural correlates of consciousness: progress and problems,” *Nature Reviews Neuroscience*, Vol. 17 (2016), p. 307.

<sup>85</sup> Brian Ford, “Cellular intelligence: Microphenomenology and the realities of being,” *Progress in Biophysics and Molecular Biology*, Vol. 131 (2017), p. 6.

<sup>86</sup> Dennis Bray, *Wetware: A Computer in Every Living Cell* (New Haven: Yale University Press, 2009), p. vi.

the components of genomes that could be made available for such restructuring. We know nothing, however, about how the cell senses danger and instigates responses to it that often are truly remarkable.<sup>87</sup>

Determining “the extent of knowledge the cell has of itself, and how it utilizes this knowledge in a ‘thoughtful’ manner when challenged,” requires concepts of the self and self-consciousness. But why stop at knowing what cells know of themselves, why not also inquire about the self-awareness of a blade of grass, a fly, fish, bird, dog, or cow in order to comprehend the degree to which the “continuity between humans and other animals in their emotional (and cognitive) lives”<sup>88</sup> extends to cellular life. Since McClintock’s Nobel-prize-acceptance lecture, self-/non-self discrimination has been an object of scientific study. There seems to be two aspects of instinctual awareness in cellular activity: (1) the universal/collective aspect of bacteria behaving in a manner that demonstrates discrimination between those who belong to their particular colony and those who do not, and (2) the capacity of individual bacterial cells distinguishing between what is and what is not their own genetic material.<sup>89</sup> Self-/non-self identification is also relevant in cancer research; cancer may possibly be the result of individual cells in a multicellular organism becoming confused and adopting a “unicellular lifestyle.”<sup>90</sup> These examples demonstrate that cells are conscious of various aspects of their existence, but in order to be self-conscious, they would have to be conscious of their conscious existence.

As there are scientists who recognize the significance of considering how living entities distinguish between self and non-self, we should clarify what the self is. Developmental and synthetic biologist Michael Levin proposes basing the definition of the individual self on information-processing and goal-seeking capacities, where “most biological systems consist of multiple, nested selves”<sup>91</sup> like the cells inside organisms. He says that the demarcation between self and external environment is dynamic and depends on the degree of sophistication of the goal being pursued. Single cells are selves that can pursue goals for their own individual benefit, but when they have to pursue a goal that is beyond their unicellular reach then they must join with other individuals in multicellularity to form tissues or organs. Here, each individual’s sense of self shifts to identifying with the collective such that they dedicate their entire life towards the maintenance of the healthy function of an organ like the heart. Many cell generations are required to attain this goal, yet due to their commitment to the group identity this is not an issue. Similarly, when a human being pursues a goal beyond their individual reach, they form a team of like-minded individuals. The new sense of self that emerges is based upon the requirements of the components of that self, where the components are “smaller” selves, and where the “bigger” self coordinates the necessary activities required by its components. The components

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<sup>87</sup> Barbara McClintock, “The Significance of Responses of the Genome to Challenge,” in Tore Frängsmyr and Jan Lindsten (eds.), *Nobel Lectures in Physiology or Medicine 1981-1990* (Singapore, New Jersey, London, Hong Kong: World Scientific Publishing Company, 1993), p. 193.

<sup>88</sup> Marc Bekoff, “Animal Emotions,” p. 864.

<sup>89</sup> James Shapiro, “All living cells are cognitive,” pp. 3-7.

<sup>90</sup> Perry Marshall, “Biology transcends the limits of computation,” *Progress in Biophysics and Molecular Biology*, Vol. 165 (2021), p. 92.

<sup>91</sup> Michael Levin, “The Computational Boundary of a “Self”: Developmental Bioelectricity Drives Multicellularity and Scale-Free Cognition,” *Frontiers in Psychology*, Vol. 10 (2019), p. 6.

also maintain their own sense of selfhood to the extent that they must individually execute a specific task and communicate that information to other components working on different tasks, all contributing to and subsumed within the activity of the whole itself.<sup>92</sup> This conception is non-reductionistic in the sense that the whole is greater than the sum of its parts because the goal being pursued by the whole is beyond the reach of each individual part or component alone. Thus, Levin argues that the “computational boundary” of a self is the limit of its capacity to influence or achieve certain goals.

The self, as Levin defines it, concerns “functional, third-person, objective capacities, computations, and behaviors.” He intentionally avoids consciousness, which he distinguishes from cognition by defining as “first person experience or a sense of self as qualia.”<sup>93</sup> While it is significant that Levin recognizes the importance of contemplating what the self is in a holistic manner to account for the essential and dynamic role of cognition, his approach must necessarily remain in the realm of externality, since it avoids first-person (internal) experience, i.e. the only concrete example any of us actually has of being a self. Genuine progress in comprehending the self cannot ignore the role of the self in inquiring about itself. This is also the proper way to address Purī’s concern that “science has lost its self-consciousness.”<sup>94</sup> The human lifeform has the privilege of cultivating self-consciousness. Not only are humans conscious selves, but we are conscious that we are conscious selves and can inquire about our own intrinsic nature, purpose, identity and origin. This depth of thought is not possible for other forms of life.

It may be helpful to conceive of the self as an individual moment of autonomous goal-directed living activity with the capacity for various degrees of endogenous agency expressed through volition (willing), cognition (thinking), and emotion (feeling), that necessarily has a dynamic mutually dependent relationship with what is other from itself. The self unifies the differentiated content of local conscious experience – externally in its perception of objects (Kant’s unity of apperception) and internally by recognizing itself despite the physical changes of bodies. Despite the fact that our body is constantly changing – so much so that all cells that constitute a body,<sup>95</sup> including neurons,<sup>96</sup> are replaced several times throughout a single lifetime of a person – we remain the same person. The self is that unchanging aspect which persists despite the constant change of the physical body. This has been known for thousands of years as seen in the *Bhagavad-gītā*.<sup>97</sup> Kant’s “unity of apperception” refers to the function of the “I”

<sup>92</sup> This aligns with Rossen Roussev’s claim that problem-solving tasks and activities are necessarily mediated by ‘self-knowledge’ (as utilized in critical thinking). See Rossen Roussev, “Philosophy and the Transition from Theory to Practice: A Response to Recent Concerns for Critical Thinking,” *Telos*, No. 148 (Fall 2009), especially pp. 88-90, 108-110.

<sup>93</sup> Michael Levin, “The Computational Boundary of a “Self”: Developmental Bioelectricity Drives Multicellularity and Scale-Free Cognition,” *Frontiers in Psychology*, Vol. 10 (2019), <https://www.frontiersin.org/articles/10.3389/fpsyg.2019.02688/full>

<sup>94</sup> Bhakti Madhava Puri, *Idols of the Mind*, p. 79.

<sup>95</sup> Adam Cole, “How do we know the lifespan of different tissue/cell types?,” NPR: Skunk Bear (2016), accessed October 22, 2023, <https://skunkbear.tumblr.com/post/146593746334/c14>

<sup>96</sup> Donavyn Coffey, “Does the human body replace itself every 7 years?,” Live Science (2022), accessed October 22, 2023, <https://www.livescience.com/33179-does-human-body-replace-cells-seven-years.html>

<sup>97</sup> Bhakti Rakṣak Śrīdhara Mahārāj, *Bhagavad-gītā*, p. 24, 2.13.

or self in unifying the manifold of sense experience as a singular object, such as sweetness, whiteness, cubeness, and graininess equating to a sugar cube.<sup>98</sup>

Hegel recognizes the brilliance of Kant's insight about the unity of apperception even as he acknowledges its insufficiency.

It is one of the profoundest and truest insights to be found in the *Critique of Pure Reason* that the unity which constitutes the nature of the [Concept] is recognised as the *original synthetic* unity of *apperception*, as unity of the *I think*, or of self-consciousness.<sup>99</sup> [...] This original synthesis of apperception is one of the most profound principles for speculative development; it contains the beginning of a true apprehension of the nature of the [Concept] and is completely opposed to that empty identity or abstract universality which is not within itself a synthesis. The further development, however, does not fulfil the promise of the beginning. The very expression synthesis easily recalls the conception of an external unity and a mere combination of entities that are intrinsically separate.<sup>100</sup>

The I (self-consciousness) remains abstract as long as it is considered isolated from its context – the world (or what is other than the self). Similarly, a notion of the world isolated from the I (as conscious agent) is also abstract. The world and consciousness of the world must both be considered together as they are intrinsically and irreducibly interconnected. Hegel's conception of the existence of self-consciousness accomplishes this by accounting for the role that recognition from another plays in our becoming self-conscious. When another person acknowledges us as a conscious agent we become conscious of our own conscious agency. In this way, when the I is properly conceived, it serves as a reminder of the mutual dependence between the self and what is other from it.<sup>101</sup> The I is free when it can both be with itself in the other and sees the other in itself.<sup>102</sup> As much as, or perhaps more than the self is in the world, the world is in the self. Thus, modern scientists who believe that they can occupy a passive third-party perspective of nature without interfering with what they observe are misled by their own presumptions. After all, "it is in some strange sense a participatory universe."<sup>103</sup> We experience the world as we are; this is what the Sanskrit aphorism *ātmavan manyate jagat* refers to (one's perception of the world is colored by the peculiarities of their own mind). A self-conscious science must recognize the significant influence that a scientist's consciousness of the world has on their knowledge of it.

### Conclusion

McClintock's Nobel lecture suggests an important goal for 21st-century science: to inquire about (1) the extent of self-knowledge that different living entities have of themselves, and, (2)

<sup>98</sup> Andrew Brook and Julian Wuerth, "Kant's View of the Mind and Consciousness of Self," *Stanford Encyclopedia of Philosophy*, accessed October 22, 2023, <https://plato.stanford.edu/entries/kant-mind/#3.2.3>

<sup>99</sup> Georg W. F. Hegel, *Hegel's Logic*, § 1293.

<sup>100</sup> *Ibid.*, § 1304.

<sup>101</sup> Georg W. F. Hegel, *Philosophy of Right* (London: George Bell and Sons, 1896), §158Z.

<sup>102</sup> Georg W. F. Hegel, *Hegel's Philosophy of Mind*, translated by William Wallace (Oxford: Clarendon Press, 1971), § 431Z.

<sup>103</sup> John Wheeler, "Observer-Created Reality," p. 491.

how they utilize this knowledge in a “thoughtful” manner when challenged. This is relevant for mainstream scientists interested in the origin and nature of life and consciousness. Cutting-edge biologists such as Shapiro have been working towards this goal by studying self-/non-self discrimination in cellular life, which has implications for cancer research. Progress in this direction necessitates a holistic scientific approach that embraces all four of Aristotle’s aspects of causation (material, efficient, formal, and final), as seen in the work of Noble and Juarrero. Influenced by the systems approaches of the Noble and Juarrero, Levin is another scientist who recognizes the pitfalls of reductionism, embraces a holistic approach, acknowledges the ubiquity of cognition in living entities, and understands the need in science for the “self.” It is inspiring to know how many scientists are looking beyond reductionist mechanistic science and scientific determinism. Having attracted the attention of humanities scholars at Princeton University at least as far back as 2017,<sup>104</sup> Hegel’s logical category of life and its implications have been used to comprehend organic life and artificial intelligence.<sup>105</sup> Hegel’s philosophy facilitates systems approaches by incorporating conceptual thinking. Conceptual thinking acknowledges the tripartite aspects of every concept (Universal-Particular-Individual) enunciated by Hegel and embraces the negative side of life (not merely positivism) through recognizing the dynamic dialectic identity-in-difference of the subjective and objective. There is a spectrum of thought intrinsic to our inner contemplative experience and outer sensuous experience. The logical, natural, and spiritual categories deduced through conceptual thinking are not products of ego-centric speculation or certainty, but of the inner necessity of the Absolute Idea or Truth itself, the movement of thought which proceeds forward, encounters opposition, and reconciles the opposition in a new, more comprehensive and accommodating thesis. This is the idea that “concepts indeed do give way necessarily to other succeeding concepts without which they would remain incomplete and to which they necessarily refer.”<sup>106</sup> A complete comprehension of the world and our consciousness of it should consider these necessary determinations of thought that underpin all experience.

Accepting the certainty of immediate sensuous experience as all in all is insufficient; we must cultivate deeper interest in higher purpose and Truth. What is the Absolute foundation that supports this transient phenomenal world and our limited conscious experience of it? What is that infinite context that encompasses all finitude? A genuine consideration of questions like these requires an evolution of consciousness. Hegel’s *Phenomenology of Spirit* encapsulates the development of successive forms of consciousness from sense-certainty, perception, and understanding, beyond consciousness to self-consciousness, reason, and Spirit. We will not

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<sup>104</sup>Recent Princeton University events about Hegel include, “Hegel and the Humanities: A Symposium,” September 29, 2017, Princeton University Humanities Council, accessed October 24, 2023, <https://humanities.princeton.edu/event/hegel-and-the-humanities/>; “Gauss Seminar Discusses the Importance of Hegel’s Legacy,” October 5, 2017, Princeton University Humanities Council, accessed October 24, 2023, <https://humanities.princeton.edu/2017/10/05/gauss-seminar-discusses-the-importance-of-hegels-legacy/>; “God & Infinity: Perspectives from Hegel and Kierkegaard,” April 1-2, 2022, Princeton University Center for Human Values, accessed October 24, 2023, <https://uchv.princeton.edu/events/god-infinity-perspectives-hegel-and-kierkegaard>

<sup>105</sup> Alexander T. Englert, “Life, Logic, and the Pursuit of Purity,” *Hegel-Studien*, Vol. 50 (2016), pp. 63-96.

<sup>106</sup> *Ibid.*, p. 75.

discuss the misconception that Edmund Husserl inaugurated phenomenology,<sup>107</sup> since it has already been thoroughly addressed elsewhere.<sup>108</sup> If phenomenology is “the science of the *experience of consciousness*,”<sup>109</sup> as Hegel describes it, it is reasonable to consider self-inquiry a phenomenological pursuit. Neglecting the first-person perspective when inquiring about the self is simply misdirected. The inability of systems approaches to deal with first-person perspectives of selfhood and conscious experience can be overcome by embracing Hegelian philosophy.

Ancient Greek and Vedic wisdom begin from the point of self-inquiry. The aphorism “*gnothi seauton*,” meaning “know thyself,” was inscribed above the Temple of Apollo at Delphi.<sup>110</sup> Vedic wisdom begins at the same point. In 16<sup>th</sup> century West Bengal, India, Śrī Kṛṣṇa Caitanya Mahāprabhu was asked by the learned scholar Śrī Sanātana Gosvāmī, “*ke āmi*.” “who am I?”<sup>111</sup> This mode of inquiry followed the example established by the first aphorism of the *Vedānta-sūtra*, which advises “*athāto brahma jijñāsā*” – “now, therefore, inquire about Brahman [Spirit].”<sup>112</sup> The departure of modern science from self-inquiry and consideration of the self’s role in observing nature can be traced back to the conclusion of Francis Bacon’s Preface to *The Great Instauration* in 1620. There, his contemporaries as well as future generations of scientists were advised: “Of ourselves we say nothing” (*de nobis ipsis silemus*).<sup>113</sup> However, the study of science in the present day reveals the necessity of self-inquiry via a comprehensive explanation of nature and reality.

Sanātana Gosvāmī’s full question to Caitanya Mahāprabhu was “Who am I? Why do the threefold miseries always give me trouble? If I do not know this, how can I be benefited?” Mahāprabhu answered:

*jīvera ‘svarūpa’ haya – kṛṣṇera ‘nitya-dāsa’  
kṛṣṇera ‘tatasthā-śakti’ ‘bhedābheda-prakāśa’*

It is the living entity’s constitutional position to be an eternal servant of Kṛṣṇa [Supreme Spirit] because he is the marginal energy of Kṛṣṇa and a manifestation simultaneously one with and different from the Lord.<sup>114</sup>

<sup>107</sup> Evan Thompson, *Mind in Life: Biology, Phenomenology, and the Science of Mind* (Cambridge: Harvard University Press, 2007), p. 14.

<sup>108</sup> Alfredo Ferrarin et al., *Hegel and Phenomenology* (Cham: Springer Nature Switzerland AG, 2019).

<sup>109</sup> Georg W. F. Hegel, *Phenomenology of Spirit*, translated by A.V. Miller (Oxford: Oxford University Press, 1977), p. 56, §88.

<sup>110</sup> Charlie Huenemann, “More than ‘know thyself’: on all the other Delphic maxims,” *Aeon Magazine*, September 7, 2018, <https://aeon.co/ideas/more-than-know-thyself-on-all-the-other-delphic-maxims>

<sup>111</sup> Bhaktivedānta Swāmī Prabhupād, *Śrī Caitanya-caritāmṛta* (Alachua: The Bhaktivedanta Book Trust, 1974), Madhya 20.102.

<sup>112</sup> Ashish Dalela, *Conceiving the Inconceivable: A Scientific Commentary on the Vedānta Sūtra* (Bangalore: Shabda Press, 2020), p. 55.

<sup>113</sup> Francis Bacon, *The Great Instauration*, in *The Works of Francis Bacon*, Vol. 3, edited and translated by Basil Montague (Philadelphia: Parry & MacMillan, 1842), p. 337.

<sup>114</sup> Bhaktivedānta Swāmī Prabhupād, *Caitanya-caritāmṛta*, Madhya 20.108-109.

The nonsectarian transcendental wisdom being offered here has significant implications. First is the sober recognition that the material conception of reality has not reduced the on-going suffering that people experience. As the popular saying goes, “the first step in solving any problem is recognizing there is one.” Material suffering is influenced by the threefold miseries which include (1) afflictions of the body and mind, (2) afflictions resulting from interactions with other living entities, and, (3) afflictions caused by the external natural environment. To transcend this suffering an individual has to give up their false-ego, and relinquish their prideful attachment to thinking that they are independent entities who are meant to serve their own transient self-centered will. Self-realization implies recognizing that we are inherently imperfect and finite organic wholes whose maintenance necessarily depends upon the activity of the infinite Organic Whole, which is conceived as the Absolute Truth, Supreme Spirit, and the Supreme Personality of Godhead. As fundamentally dependent finite organic wholes, our inherent purpose is to serve the higher purposes of the infinite Organic Whole – somewhat like the inherent purpose of every cell is to serve the greater organism.

In other words, material suffering is a byproduct of our misconceived independence. Naturally, we yearn for freedom from suffering; this has fueled the agricultural, environmental, medical, and technological advances that modern science has achieved. This end of both the sciences and the humanities was acknowledged by Albert Einstein:

All religions, arts, and sciences are branches of the same tree. All these aspirations are directed toward ennobling man’s life, lifting it from the sphere of mere physical existence and leading the individual towards freedom.<sup>115</sup>

The misconception, however, which prevents us from completely fulfilling this yearning for freedom is the understanding of freedom as being in full control of our lives. This can be likened to the chaos created by the free radicals inside a living organism, where a free radical is a molecule “capable of independent existence” that prove to be “unstable and highly reactive” thus leading to “cell damage and homeostatic disruption.”<sup>116</sup> Fulfillment of our potential to realize true freedom – which, as will be seen, is related to love in that both freedom and love depend on seeing oneself in the other – lies in embracing our constitutional position as part and parcel of the Organic Whole, Supreme Spirit, thus allowing us to truly know and love each other for the first time. As discussed in the last couple paragraphs of Part 2, Hegel explained that self-determination is freedom, which is “being with oneself in the other,”<sup>117</sup> such that one comprehends an identity, as well as a difference, between themselves and the totality of reality – the Organic Whole or Absolute Truth – as opposed to being confronted by it as a foreign element. That is, one feels truly at home when situated in their constitutional position as part and parcel of the Absolute.

Perceiving beyond the immediate bodily designations of gender, ethnicity, nationality, political and religious affiliations, etc., those deep thinkers who see transcendence within all

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<sup>115</sup> Albert Einstein, *The Einstein Reader* (New York: Citadel Press, 2006), p. 7.

<sup>116</sup> Vijaya Lobo et al., “Free radicals, antioxidants and functional foods: Impact on human health,” *Pharmacognosy Reviews*, Vol. 4, No. 8 (2010), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3249911/>

<sup>117</sup> Georg W. F. Hegel, *Elements of the Philosophy of Right*, p. 42, §7.

living entities are to be known as truly learned – *paṇḍitāḥ sama-darśinaḥ* (see the end of Part 2).<sup>118</sup> This is self-realization. The development of self-consciousness results in love as the highest attainment for those who are self-realized. As Hegel writes,

Love means in general terms the consciousness of my unity with another, so that I am not in selfish isolation but win my self-consciousness only as the renunciation of my independence and through knowing myself as the unity of myself with another and of the other with me.<sup>119</sup>

The congruency between Hegel’s description of freedom and love is apparent – the individual becomes cognizant of the identity-in-difference between itself and what is other than itself, ultimately the universal, and experiences a greater degree of fulfillment (love and/or freedom) as a result. Consider the relationship between love and freedom as derived from conventional experience. If one’s gesture of affection is compelled by social convention, it is generally not considered an act of love. When one is free to act as they like, however, the gesture of affection will be seen as a sign of love. It is important here to distinguish between love and lust. Lust may be seen as more of a self-centered desire for sensual/sexual enjoyment. While love may contain lust in certain circumstances, it also refers to degrees of relationships centered on a mutual exchange of affection that surpasses fleeting sexual desires. Since love seems to require free will, there is a concern among the general populace that widespread free will skepticism would “fatally corrode” all human relationships, since romance, friendship, and general civility all depend on the capacity of choice: “any loving or respectful gesture has to be voluntary for it to count.”<sup>120</sup> The idea that love necessitates freedom of choice is not limited to relationships between finite entities, but extends to and finds its highest fulfillment in the relationship between finite and infinite, the soul (finite spirit) and God (infinite Spirit), as corroborated by Hegelian<sup>121</sup> and Vedāntic<sup>122</sup> philosophy.

No matter what our intellectual or cultural backgrounds are, we all have this shared human experience in common. It is too commonplace for the vast differences that exist among people in will, thought, and feelings to be used as an excuse for not discussing things reasonably. This does not promote progress in science, philosophy, religion, or society. It only reinforces stagnant intellectual biases which tend to condition a state of ignorance, rather than a progressive understanding of the dynamic reality that we are all participating in. Isaiah 1:18 KJV suggests “Come now, and let us reason together.” This seems like the only way to proceed towards a positive future of comprehensive knowledge which aims at a fulfilling life experience for all who endeavor to dive deep into reality. In such a state of affairs, advancement of knowledge is not measured by technological prowess or material advancement at the expense of everything else, but by how loving individuals become.<sup>123</sup>

<sup>118</sup> Bhakti Rakṣak Śrīdhar Mahārāj, *Bhagavad-gītā*, p. 94, 5.18.

<sup>119</sup> Georg W. F. Hegel, *Philosophy of Right*, §158Z.

<sup>120</sup> Oliver Burkeman, “The clockwork universe.”

<sup>121</sup> Georg W. F. Hegel, *Phenomenology of Spirit*, pp. 10-11, §18-19.

<sup>122</sup> Bhaktivedānta Swāmī Prabhupād, *Caitanya-caritāmṛta*, Madhya, 2.1-95.

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