Conscious Matter and Matters of Conscience: An Opinionated Précis of *The Feeling of Life Itself*

A Review Essay

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Christof Koch, *The Feeling of Life Itself: Why Consciousness Is Widespread but Can't Be Computed. Massachusetts; MIT Press, 2019. 280 pages. $19.95*

Abstract: In recent decades consciousness science has become a prominent field of research. This essay analyzes the most recent book by a leading pioneer in the scientific study of consciousness. In the The Feeling of Life Itself *Christof Koch presents the integrated information theory and applies it to multiple pressing topics in consciousness studies. This essay considers the philosophical basis of the theory and Koch's application of it from neurobiology to animal ethics.*

In the sciences the study of consciousness was taboo during most of the previous century.[1] Not only physicists, but also biologists and neuroscientists were looked down upon if they had a personal interest in consciousness, and very few had a professional interest, unless retirement was near.[2]

However, things have changed since the search for neural correlates of consciousness was instigated by the renowned biologist Francis Crick and his longtime collaborator, Christof Koch, a prominent neuroscientist whose training is in physics and philosophy.[3] The search for neural correlates ushered consciousness research into a prominent place in cognitive neuroscience.[4]

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[1] See Bernard J. Baars, "Introduction: treating Consciousness as a Variable: The Fading Taboo," in *Essential Sources in the Scientific Study of Consciousness*, eds. Bernard J. Baars, William P. Banks, and James B. Newman (Cambridge, MA: MIT Press, 2003), 1-10.

[2] For example, see Wilder Penfield, *Mystery of the Mind: A Critical Study of Consciousness and the Human Brain* (Princeton, NJ: Princeton University Press, 1975).

[3] For a seminal article, see Francis Crick and Christof Koch, "Toward a neurobiological theory of consciousness," *Seminars in the Neurosciences*, 2 (1990): 263-275.

[4] Eric R. Kandal and A.J. Hudspeth, "The Brain and Behavior" in *Principles of Neuroscience*, 5th Edition, eds. Eric R. Kandel, James H. Schwartz, Thomas M. Jessell, Steven A. Siegelbaum and A.J. Hudspeth (New York, NY: McGraw-Hill, 2013), 18; Chris D. Frith and Geraint Rees, "A Brief History of the Scientific Approach to the Study of Consciousness," in *The Blackwell Companion to Consciousness*, Second Edition, eds. Susan Schneider and Max Velmans (Oxford, UK: Blackwell, 2017), 161-163; Johan F. Storm, Mélanie Boly, Adenauer G. Casali, Marcello Massimini, Umberto Olcese, Cyriel M.A. Pennartz, and Melanie Wilke, "Consciousness regained:

Today, at *The Science of Consciousness* annual conference or the annual meeting of the *Association for the Scientific Study of Consciousness*, one will find philosophers and physicists sitting amongst neuroscientists and biologists in any given session. Yet, while they all might meet under one roof, they are not always of one accord for sociological and ideological reasons.

A common narrative shared by neuroscientists is that philosophers have been inquiring about consciousness for millennia with no progress to show for it, so why don't they (the neuroscientists, of course) kick the research into high gear and solve some so-called "philosophical" problems. Assuming they can just shine the light of magnetic resonance imaging on consciousness, some neuroscientists just want the philosophers to get their careful (a.k.a. "nitpicky") distinctions out of the way of neuroscientific progress. Meanwhile, philosophers stand ready to serve their neuroscience neighbors by pointing out their first three fallacies entirely *pro bono*. And we wonder how this is not progress—after all, we first point out the obvious equivocation, then the non sequitur, before *progress*ing to the third fallacy. To boot, both philosophers and neuroscientists often simply assume that the nature of consciousness is uniquely disposed to the epistemic tools of their discipline, and only their discipline.

While such incongruity provides good fodder for satire, amiable collaboration is required to tenaciously pursue a comprehensive understanding of consciousness and how it relates to the brain that could propel neurological progress. It must be acknowledged that neuroscience and philosophy inevitably have distinct overall goals, primary questions, standards for answers, epistemic methodology, values, and terminology. Yet some neuroscientists are becoming increasingly aware of how philosophical issues unavoidably impact their research in cognitive neurobiology. And some philosophers are becoming increasingly aware that there are important practical questions with real life medical implications they can help answer, but doing so requires establishing *a posteriori* facts via empirical neuroscience. Collaboration between neuroscientists who are open to the value of philosophy in informing their work and philosophers of mind who want to be empirically responsible, provides an opportunity for mutually illuminating, constructive, critical dialogue as we seek to better understand the natural world. What follows is a précis of Koch's most recent book with some critical analysis sprinkled in that is intended to contribute to such dialogue.

Although he strongly critiques some contemporary philosophy, in *The Feeling of Life Itself: Why Consciousness Is Widespread but Can't Be Computed*, Koch also leans heavily, explicitly, and appreciatively on the work of philosophers. And as will become apparent, his incorporation of philosophy fits well with the theory he is advocating for. While I disagree with Koch on some significant points, I welcome the likelihood that this work will significantly influence if not shape consciousness science going forward.

With *The Feeling of Life Itself*, Koch completes a science of consciousness trilogy. The first work in the series, *The Quest for Consciousness: A Neurobiological Approach*, detailed a research project focused on the search for neural correlates of consciousness. *Consciousness: Confessions of a Romantic Reductionist*, the second piece, mixed autobiography with neuroscience

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disentangling mechanisms, brain systems, and behavioral responses," *Journal of Neuroscience*, 37, no. 45 (2017): 10882-10893, doi: 10.1523/jneurosci.1838-17.2017.

as Koch argued that a large-scale, logically coherent theory of consciousness is needed to better understand neural correlates and their implications. This third work elaborates on that need and tries to show that it's met by the integrated information theory, which Koch explains in an accessible manner and applies to a wide range of hot topics in consciousness research and beyond.

Philosophical Foundations

Explaining how consciousness emerges from its physical substrate in the brain has proven to be a hard problem indeed.[5] Therefore, rather than starting with the brain and asking how consciousness emerges from it, the integrated information theory (for brevity IIT) takes the opposite approach. As a theory that developed in the context of cognitive neuroscience, IIT is unique in that it explicitly starts with consciousness itself as epistemically and metaphysical fundamental. Based on the nature of consciousness corresponding predictions are derived about its physical substrate.[6]

Hence Koch begins with a chapter on the nature of consciousness, starting with what it is "for me," from his first-person perspective (p. 10). He defines consciousness simply as experience before elaborating on its essential properties, beginning with the fact that it exists. His discussion of this first fact, which is surprisingly contentious, includes brief spars with other heavy weight consciousness researchers. Koch takes on the Churchlands' eliminativist view, the "metaphysical counterpart to Cotard's syndrome, a psychiatric condition in which patients deny being alive," and Dennett's "absurd" claim that consciousness is an illusion (pp. 3-4).[7] Such views are evidence that much "twentieth century analytic philosophy has gone to the dogs," according to Koch (p. 4) who quotes Searle in support.[8] However, Searle critiques not only philosophy of mind but also cognitive scientists and the materialism they embrace.[9]

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[5] See David J. Chalmers, "Facing Up to the Problem of Consciousness," *Journal of Consciousness Studies*, 2, no. 3 (1995): 200-219.

[6] Giulio Tononi, Melanie Boly, Marcello Massimini, and Christof Koch, "Integrated information theory: from consciousness to its physical substrate," *Nature Reviews Neuroscience*, 17 (2016): 450-461.

[7] See Patricia Smith Churchland, *Neurophilosophy: Toward a Unified Science of the Mind-Brain* (Cambridge, MA: The MIT Press, 1986); Paul M. Churchland, *Matter and Consciousness: A Contemporary Introduction to the Philosophy of Mind* (Cambridge, MA: The MIT Press, 1984); Daniel C. Dennett, *Consciousness Explained* (Boston, MA: Little, Brown and Company, 1991). Tim Bayne critiques IIT's axiomatic approach in part because some axioms are doubted by philosophers who debate points that are axiomatic according to IIT. Yet, the fact that Koch begins by rebutting those who deny the claim that consciousness is a real undeniable feature of the world is indicative of how his claims that IIT's axioms cannot be doubted ought to be interpreted. By 'undeniable,' Koch does not mean 'nobody denies it.' For Bayne's critiques, see Tim Bayne, "On the axiomatic foundations of the integrated information theory of consciousness," *Neuroscience of Consciousness*, 4, no. 1 (2018): 1-8.

[8] John R. Searle. *The Rediscovery of the Mind* (Cambridge, MA: MIT Press, 1992), 3.

[9] Searle, *The Rediscovery of the Mind*, 3. Since the time of Searle's critique materialism has begun waning, see Robert C. Koons and George Bealer, eds, *The Waning of Materialism* (New York, NY: Oxford University Press, 2010).

Koch relies on Descartes' dictum—I think, therefore I am—to defend his position that consciousness is real and undeniable (p. 2). Yet, he later refers to this starting point of IIT as the "Augustinian-Cartesian assertion" (p. 80) because he perceptively traces the likeness of Descartes' dictum back to Augustine's *City of God*, while also noting similarities in Aquinas's *Disputed Questions on Truth* and Aristotle's *Nicomachean Ethics* (pp. 2, endnote 2 & 3). Despite his attention to detail in historical philosophy, which is especially impressive from a neuroscientist, there's an apparent subtle difference in Koch's reasoning and conclusion.

Augustine and Descartes are often interpreted as arguing for the person's existence based on their thinking. The idea being that if I have arrived at the conclusion that I exist by thinking about whether I exist, the conclusion must be true because I must exist in order to think correctly or incorrectly. It's a constructive dilemma entailing that I exist. Accordingly, they are appealing to thinking (which Koch dissociates from consciousness in Chapter 4) to arrive at the conclusion that there is a thinking *subject*, the person who thinks. Koch doesn't appeal to thinking but rather his "direct acquaintance" with his consciousness (p. 11). And his conclusion is not that he exists but that his consciousness exists. Despite this difference in the Augustinian and Cartesian passages Koch cites, he clearly echoes another statement in Augustine's *De Trinitate*: "The mind knows nothing so well as what is present to it, and nothing is more present to the mind than itself" (1991, p. 375).[10]

The aforementioned difference leads to a question about whether the mental capacity is fundamental or its bearer, the subject who is conscious or who is thinking.[11] If consciousness is not a free-floating capacity but always has a bearer, the subject of experience, then solving the hard problem of consciousness would only get us one step closer to what is most fundamental—the experiencer.[12] While Koch is focused on accounting for consciousness not its bearer, his own language suggests there is not only consciousness but also the subject who is conscious. For he begins with what consciousness is like "for *me*" before asking "how is it for *you*" (p. 10 italics mine).

Whereas the first chapter focused on consciousness from the first-person perspective, the second and third chapters focus on recognizing consciousness in others from the third-person perspective. Consciousness is "private" and "directly accessible" for the conscious mind, but "inaccessible to anybody else" (p. 11). "The challenge of the mind-body problem is thus to bridge

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[10] Augustine, *The Trinity*, trans. Edmund Hill, ed. John E. Rotelle (Hyde Park, NY: New City Press, 1991), 375, see also 412. To Koch's credit, in summer 2017, he asked me about such a passage in *De Trinitate* but I mistakenly told him he wouldn't find it there (and rather pointed him toward *Against the Academicians*).

[11] Cf. Ross D. Inman, *Substances and the Fundamentality of the Familiar: A Neo-Aristotelian Mereology* (New York, NY: Routledge, 2018), Ch. 7.

[12] Cf. Mihretu P. Guta, "The Non-Causal Account of the Spontaneous Emergence of Phenomenal Consciousness," in *Consciousness and the Ontology of Properties*, ed. Mihretu P. Guta (New York, NY: Routledge, 2019), 132-133; Dean Zimmerman, "From Experience to Experiencer," in *The Soul Hypothesis*, eds. Mark C. Baker & Stewart Goetz (New York, NY: Continuum, 2011), 168-196.

the divide between the subjective first-person perspective of the experiencing mind and the objective, third-person perspective of science," writes Koch (p. 11). He argues that through abductive reasoning on the basis of objective data about responses to sensory stimuli we can verify consciousness in others from the third-person perspective. However, there's a difficulty regarding unresponsive subjects that's later addressed once Koch's theoretical framework is in place.

Having introduced the abductive approach to identifying consciousness in other humans, Koch then applies it to animals. He argues that mammals are close evolutionary relatives to humans, have remarkably similar neuroanatomy, and have similar behavioral responses to sensory stimuli, and thus it's probable that they, like us humans, are conscious. One might reply that animals are not language users nor rationally intelligent and therefore cannot be conscious. In response, Koch argues that language is not necessary for consciousness given prelinguistic conscious infants and young children as well as neurological scenarios where those who have lost their capacity for language are nevertheless conscious. And he argues that intelligence is neither necessary nor sufficient for consciousness via appeals to unconscious cognitive processing.

Consciousness Science

After laying a philosophical foundation in the first four chapters, Koch turns to the neurobiology of consciousness, where his expertise is second to none. For those wondering why a theoretical approach to consciousness research is needed, the answer begins in the fifth chapter.[13] Koch clarifies how the empirical research project focused on identifying neural correlates of consciousness (NCC) relates to the mind-body problem:

> Francis Crick and I meant the NCC language to be ontologically neutral (which is why we spoke of "correlates") with regard to the age-old battles of the -isms (dualism versus physicalism and their many variants, see chapter 14), as we felt that at this point in time, science could not take a firm position with respect to resolving the mind-body problem. No matter what you believe about the mind, there is no doubt that it is intimately related to the brain. The NCC is about where and how this intimacy takes place. (pp. 48-49)

While NCC research can be immensely advantageous for treating a host of neurological and psychological ailments, NCC data has limitations. As Koch points out, NCC data cannot solve the mind-body problem, nor tell us what the nature of consciousness is. This might disappoint those wishing to marshal NCC research in support of their favored metaphysics of mind, but it actually safeguards the research from being dependent on one particular view of the mind and consciousness. This is especially important when there are multiple contenders on the table.[14] A further limitation is that the identification of NCC tells us which neuronal mechanisms are the

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[13] See also Christof Koch, *Consciousness: Confessions of a Romantic Reductionist* (Cambridge, MA: The MIT Press, 2012), Ch. 8.

[14] See Robert Van Gulick, "Consciousness" in *Stanford Encyclopedia of Philosophy* (Spring 2018 Edition), ed. Edward N. Zalta, accessed May 11, 2020 https://plato.standford.edu/archives/spr2018/entries/consciousness/. John Haldane, "A Return to Form in the Philosophy of Mind," in *Form and Matter: Themes in Contemporary Metaphysics*, ed. David S. Oderberg (Malden, MA: Blackwell Publishers, 1999), 40-64.

substrate of consciousness and which are not, but this alone cannot tell us *why* some mechanisms but not others are the substrate of consciousness. And a practical limitation is that when subjective reports are absent alternative information is needed to confirm what neural activity corresponds to consciousness.

In light of the limitations of NCC themselves, Koch argues that a theory of consciousness is needed in chapter seven before going on to explicate IIT and apply it to various topics. Koch appeals to the hard problem of consciousness to motivate a theoretical approach. Assuming consciousness is ontologically fundamental vis-à-vis its physical substrate, IIT "does not bang its head" against the hard problem by trying to "squeeze the juice of consciousness out of the brain" (p. 74). Nevertheless, there's a lingering question. Koch points out at the end of chapter seven that he is commonly asked: Why does integrated information feel like anything?

It's not surprising this question arises given IIT's central ontological identity claim explicated in chapter eight. According to IIT's axioms, any conscious experience has intrinsic existence, is structured, is the specific informative way it is, is one integrated whole, definite in content and temporal duration. From this it is inferred that the physical substrate of consciousness (abbreviated PSC) will manifest a maximally irreducible causal structure that exercises causal power intrinsically upon itself. In the human brain, the PSC is the neural correlate of consciousness, which Koch calls the Whole. While consciousness is not reduced to the physical substrate (p. 87), it is identical to the causal structure it exemplifies, according to Koch.

> The central identity claim of IIT, a metaphysical statement, makes a strong ontological claim…IIT asserts that any experience is identical to the irreducible, causal interaction of the interdependent physical mechanism that make up the Whole. It is an identity relationship—every facet of an experience maps completely onto the associated maximally irreducible cause-effect structure with nothing left over on either side. (p. 88)

The idea expressed seems to be that consciousness is ontologically identical to the maximally irreducible causal structure consisting of causal relations, which could be inferred from the third-person perspective. And by observing from the third-person perspective the causal structure you are observing consciousness. This would epistemically "bridge the divide between the subjective first-person perspective of the experiencing mind and the objective, third-person perspective of science" (p. 11).

While such an identity claim might be pragmatically useful to assume, it's doubtfully a true description of the ontology of consciousness. For as Koch acknowledges, a conscious subject has direct epistemic access to one's own consciousness (p. 11).[15] I take this to mean that a conscious subject has knowledge by acquaintance of de re facts about their consciousness (e.g. my conscious experience exists and it's integrated or unified). Given such direct epistemic access to our consciousness and the identity claim that a subject's consciousness is identical to the causal interaction manifested by the neuronal mechanism in her brain, the subject should have direct

[15] See also Giulio Tononi, "The Integrated Information Theory of Consciousness: An Outline," in *The Blackwell Companion to Consciousness*, Second Edition, eds. Susan Schneider and Max Velmans (Oxford, UK: Wiley Blackwell, 2017), 243.

epistemic access to the causal interaction. If this were true, we would not need expensive brain imaging technology to have epistemic access to the causal structure in our brain manifested by the PSC, which would save researchers and funding bodies boatloads of cash. The downside, however, is that most of us know very little about the causal interactions in our brain even though we have expert knowledge about our own conscious experience. This is because something is true of a subject's consciousness that is not true of the causal interactions in their brain—the subject has direct epistemic access to the former but not the latter. This is one primary reason why IIT's epistemic methodology of starting with what we know about our own consciousness via direct acquaintance with our consciousness and then inferring empirically verifiable postulates about the brain is justified. But it is also why the central identity claim, as articulated above, seems clearly false.

What IIT proponents could say instead is that there is not an ontological identity relation between consciousness and the causal structure, but rather a grounding relation between them.[16] Based on conversation with Koch, I'm inclined to think that this is closer to his view, but it should have been made clearer—especially since his words in the above quote can easily be taken to suggest a different view. According to this alternative understanding, the causal structure manifested by the PSC would be the way it is in virtue of the state of consciousness so there's a correspondence between them that can be mapped. Consequently, empirical access to the causal structure would yield indirect epistemic access to consciousness from the third person perspective. Yet some might worry that taking this route moves IIT in a dualist direction. Such a move raises concerns regarding mental causation.[17] However, the grounding relation I'm suggesting would make it possible for IIT to circumnavigate the causal pairing problem pertaining to mental causation.[18]

As the aforesaid suggests, there's certainly metaphysical murkiness that IIT proponents need to clear up, which is understandable given that the theory originated in the context of theoretical neuroscience, not philosophy. This provides an opportunity for interdisciplinary work with philosophers that is laudably starting to take place (in large part due to Koch and Giulio Tononi's initiative).

Nevertheless, as a neuroscientist, Koch is most interested in empirically testable results predicted by IIT. Equipped with the theory and its central identity claim, Koch attempts to demonstrate its applicability in the latter portion of *The Feeling of Life Itself*. There are applications Koch makes that will seem to some readers like sci-fi speculation. For example, in the tenth chapter he discusses the possibility of brain bridging, an über-mind, and pure experience. In the same chapter he argues that IIT predicts that split brains with a severed corpus callosum between the two cortical hemispheres will house two conscious minds, and that there can be even more as long

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[16] Cf. Matteo Grasso, "IIT vs. Russellian Monism: A Metaphysical Showdown on the Content of Experience," *Journal of Consciousness Studies*, 26, no. 1-2 (2019): 52-53.
[17] Cf. Hedda Hassel Mørch, "Is Consciousness Intrinsic? A Problem for the Integrated Information Theory," *Journal of Consciousness Studies*, 26, no. 1-2 (2019): 156.
[18] Matthew Owen, "Circumnavigating the causal pairing problem with hylomorphism and the integrated information theory of consciousness," *Synthese* (2019), doi: https://doi.org/10.1007/s11229-019-02403-6

as their PSCs don't overlap (pp. 107, 112).[19] To many readers this will seem just as "obviously false" as Koch finds the Churchlands' eliminativism and Dennett's illusionism. Yet, as it often seems that one man's modus ponens is another's modus tollens, we might say one person's reductio ad absurdum is another's counterintuitive prediction. Koch's very point is that IIT makes counterintuitive predictions that we would not expect to be true apart from the theory. Thus if they turn out to be true in light of empirical research, that's a point in IIT's favor. With the exception of split-brain procedures, such research is yet to be done (p. 117).

Moving from the counterintuitive to providing common sense clarity, Koch applies IIT to machine consciousness and mind downloading (i.e. "rapture for nerds"). Based on IIT, he argues that contemporary computers do not have the capacity to be conscious and will not be conscious unless their architecture comes to resemble the feedback processing exemplified in the brain. Moreover, independently of IIT, he also points out multiple significant differences between the human brain and computers. And there's a major problem for the idea that the mind is an algorithm that can be downloaded to live the dream of a "brain" in a Silicon Valley vat.

> The dirty secret of computational neuroscience is that we still do not have a complete dynamic model of the nervous system of the worm *C. elegans*, though it only has 302 nerve cells and its wiring diagram, its connectome, is known. So here we are, trying to understand the human brain, when we do not yet understand the worm brain. (p. 138)

The upshot of the sober fact that we're nowhere close to brain emulation is that our beloved machines provide zero hope for life everlasting.

In the here and now, however, IIT provides practical promise regarding the search for NCC as well as detecting and measuring consciousness in unresponsive brain injured patients. Armed with IIT's hypothesis about the PSC researchers trying to locate NCC are not just combing through the eighty-six billion neurons in the human brain hoping to stumble upon a correspondence between consciousness and neural activity. Rather, neuronal architecture can indicate what is and isn't a likely NCC candidate. Assuming that the PSC will manifest an intrinsic causal structure, the neural circuitry will have to be sufficiently wired for reciprocal projections. Based on such reasoning, Koch suggests that a posterior "hot zone" in the thalamocortical system is a prime candidate and rules out other systems with feedforward processing despite a high concentration of neurons and complexity (e.g. the cerebellum). And given that consciousness corresponds to intrinsic causation amongst a coalition of neurons, by assessing whether a brain has the capacity to manifest such causation we can assess its capacity for consciousness. Koch provides a lucid description of the relevant research lead by Marcello Massimini and Giulio Tononi, and clarifies its relevance to the possibility of measuring consciousness in unresponsive patients.[20] To me, and

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[19] For a competing account of split-brain scenarios that explains why these patients with a severed corpus callosum live otherwise normal lives, see Tim Bayne, *Unity of Consciousness* (Oxford, UK: Oxford University Press, 2010).

[20] One might think the objection above regarding IIT's central identity claim undermines this possibility. However, it can be preserved by combining IIT's prediction regarding the NCC of being conscious with the Mind-Body Powers Model of NCC. See Matthew Owen, "Aristotelian

I would imagine many other readers, this is the most exciting material in the book. But to the author, what matters most is discussed in the concluding Coda.

Environmental and Animal Ethics

In the Coda, Koch goes beyond the science and provides ethical exhortations in light of IIT's prediction that all cellular life might be conscious. "Most importantly," Koch claims, "we must abandon the idea that humans are at the center of the ethical universe and that we bestow value on the rest of the natural world only insofar as it suits humanity's ends, a belief that is such a large part of Western culture and tradition" (p. 169). Koch is repudiating the idea that humanity is the moral anchor of the universe, which externally confers value on the rest of nature including soulless beasts to the degree that they serve our purposes. The view he has in mind is a domineering view that has far too often motivated exploitation of nature, as opposed to a responsible stewardship of nature. On this view, humans are thought to have intrinsic moral or ethical value because they have souls while the rest of creation, which is just soulless mechanistic matter, is at best extrinsically valuable if we consider it valuable to us (see also p. 25). Sadly, such a position has been all too common in Western history.

At this point, some readers might be inclined to interpret Koch's exhortation to abandon such a mentality as a call to reject a Judeo-Christian anthropocentric framework. However, such an interpretation would be uninformed since the Judeo-Christian Scriptures do not teach the anthropocentrism Koch repudiates. Scripture suggests that the ethical value of all creation depends on God, and that the nonhuman aspects of creation were good before humanity even existed, and therefore must not depend on humans. Even a casual reader of the first chapter of *Genesis* can notice that humanity is not created until the last day (or epoch) of God's creative activity. Everything else—i.e. animals and plants as well as nonliving entities like oceans and land—are created prior to humanity and are called "good" by God before the creation of Adam. So in the *Genesis* creation account, the rest of creation is clearly good temporally and ontologically prior to its relationship to humanity.[21] And in a Western culture that has never been more unlearned regarding Christian theology, many would be surprised to find out that the Old and New Testaments suggests animals have sentient (i.e. conscious) souls, a view which was common in Christian thought until the time of Descartes.[22] While humanity does have greater ethical value and greater moral responsibility (including to care for creation) than plants and animals as well as nonliving nature, the theocentric picture Scripture paints is significantly different from the anthropocentrism Koch repudiates.

A rejection of the Judeo-Christian framework would also be unfortunate for Koch's thesis because it provides a metaethical context that can actually sustain his ethical exhortations. Koch is pointing out moral consequences that purportedly "flow from" IIT's prediction, speaking of

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Causation and Neural Correlates of Consciousness," *Topoi: An International Review of Philosophy* (2018) doi:https://doi.org/10.1007/s11245-018-9606-9

[21] See also Jonah 4.11; Proverbs 12.10; Psalm 104; Job 38-40.

[22] See J.P. Moreland and Scott B. Rae, *Body & Soul: Human Nature & the Crisis in Ethics* (Downer Groves, Illinois: InterVarsity Press, 2000), 213; Richard Swinburne, *The Evolution of the Soul*, Revised Edition (New York, NY: Oxford University Press, 1986), 183.

ethical value, animal rights, and moral duties. However, all that flows from IIT's prediction alone is that animals and perhaps other forms of life are conscious. Nothing ethical follows from that apart from a metaethical framework that grounds ethical values, rights, and duties, none of which are mentioned in the prior chapters. Because IIT cannot itself ground such. However, the Judeo-Christian theocentric worldview can.[23] And it does so not only for living organisms but even nonliving, nonfeeling objects such as mountains (see Dobel 2008; Pawl 2018; Stoll 2015; Williams 2002).[24] However, Koch's moral ladder based on consciousness admittedly cannot account for non-conscious entities, such as the ecosystem (p. 170 endnote 3). So if the Judeo-Christian framework is to be rejected, there is much work to be done in finding an alternative grounding for ethical value, rights, and duties, the existence of which Koch assumes in his exhortation. Hence this reader appreciates Koch's wise acknowledgment of the importance of other philosophical and religious contributions (p. 209). While not everyone will become vegetarian, as Koch recommends, the righteous will at least heed his challenge to highly regard animal welfare (Proverbs 12.10).

Conclusion

The greatest strength of IIT is its theoretical approach that makes its foundational philosophical commitments explicit. While one might disagree with particular commitments, there is no denying that this approach makes it easier to analyze such commitments and their epistemic role. Philosophers will surely debate the philosophical content in *The Feeling of Life Itself*. Yet, the fact that such content is given such an explicit and prominent role in the integrated information theory's approach to consciousness research ought to be applauded by even the most ardent philosophical opponent. In this work, Koch makes evident the interdisciplinary nature of consciousness studies while addressing a wide scope of timeless and timely issues in an accessible manner. This well researched book by a pioneer in the science of consciousness, is essential reading for students, scholars, and laymen interested in this field of study. Readers will gain an understanding of the ideological landscape in the neurobiology of consciousness and one of the field's leading theories.[25]

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[23] William P. Alston, "What Euthyphro Should Have Said," in *Philosophy of Religion: A Reader and Guide*, ed. William Lane Craig (New Brunswick, NJ: Rutgers University Press, 2002), 283-298.

[24] See Patrick Dobel, "The Judeo-Christian Stewardship Attitude to Nature," in *Environmental Ethics: Readings in Theory and Application*, eds. Louis P. Pojman & Paul Pojman (Belmont, CA: Thmson Wadsworth, 2008), 28-32; Faith Glavey Pawl, "Human Superiority, Divine Providence, and the Animal Good: A Thomistic Defense of Creaturely Hierarchy," in *The Christian Doctrine of Humanity*, eds. Oliver D. Crisp and Fred Sanders (Grand Rapids, MI: Zondervan, 2018), 41-60; Mark R. Stoll, *Inhertit the Holy Mountain: Religion and the Rise of American Environmentalism* (New York, NY: Oxford University Press, 2015); Dennis C. Williams, *God's Wilds: John Muir's Vision of Nature* (College Station, TX: Texas A&M University Press, 2002).

[25] I wish to thank the Tiny Blue Dot Foundation for funding my research as the Elizabeth R. Koch Tiny Blue Dot Research Fellow for Consciousness Studies, as well as my fellowship advisor Christof Koch for countless collegial conversations and enjoyable debate relevant to this work. I have also benefited from very insightful comments from two anonymous referees for *Philosophia Christi*, and careful feedback Betty Talbert and Aryn Owen provided on my writing.