Spring 5-2-2018

"Irresistible Motion": Matter, Causality, and Henry David Thoreau

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ABSTRACT

This thesis positions Thoreau’s texts alongside theories of materialist-determinist and indeterminist causality that developed from the causal debate of Enlightenment and nineteenth-century philosophy and science. These debates frame Thoreau’s progression from an epistemological Baconian-Newtonian inductionism to an ontological New Materialist vitalism in his observations of natural causation. As Thoreau traces relations back to possible causes, his language shifts from empirical observations to imaginative inductions and inferences that attempt to complete insoluble causal equations. For Thoreau, thinking about causality in these terms leads to an equivocation of ontological boundaries between human and nonhuman where Thoreau’s mental and physical actions are inseparable from the motions of nonhuman agents. Examining causal events in Thoreau’s texts provides a new interpretation that views theories of motion and causality as central to his epistemology and ontology.

INDEX WORDS: Henry David Thoreau, Walden, A Week, Journal, Transcendentalism, Romanticism, Enlightenment, Motion, Causality, Causal Debate, History of Science and Philosophy, Ecocriticism, Materialism

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A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of

Master of Arts

in the College of Arts and Sciences

Georgia State University

2018

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May 2018

DEDICATION

For my parents who inspire me to “live deep and suck out all the marrow of life.”

ACKNOWLEDGEMENTS

I would like to express special thanks to my thesis committee for their extensive guidance throughout the many stages of this project. I would especially like to thank Dr. Mark Noble for directing this project and supporting my interest in interdisciplinary topics. As a professor and mentor, he has greatly influenced my growth as a literary scholar and professional. I would also like to thank Dr. Audrey Goodman for encouraging me to develop my ideas on Thoreau early in my graduate career, and Dr. Lindsey Eckert for inspiring me to enter a larger scholarly discussion and offering continued support as I pursued new academic goals. I am grateful for my professors and colleagues in the Georgia State University English Department for their collaboration and support. I would like to recognize the Thoreau Society for giving me the opportunity to share an early version of this project at their Annual Gathering and instilling in me a deeper connection to Thoreau and Walden Pond. Most importantly, I wish to thank my family and friends for their unyielding support throughout my entire academic career.

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INTRODUCTION

During a midnight fishing trip on Walden Pond, Thoreau enumerates the actions of things: a "note of an unknown bird" *creaking*, a thousand small perch with their tails *dimpling* the surface of the pond and *reflecting* moonlight, Thoreau himself *drifting* in the "gentle night breeze," and an unfamiliar force *vibrating* along the pond as if "some life force prowling about its extremity." Meanwhile, Thoreau rows *pulling* "hand over hand" in a series of causal relations that suggest the motions of the nonhuman agents are ontologically inseparable from his own.[1] The slight indentation on the water's surface cannot be separated from the perches' tails, the flash of light, and the moon's orbit; likewise, Thoreau's movements become inextricable from the phenomena of the pond at midnight. In this moment, Thoreau categorizes his actions as if they are, in Ralph Waldo Emerson's words, "part and particle" of the natural world;[2] or what Jane Bennett refers to as Thoreau's "*as if* stance," an instant where Thoreau "acts as if he belongs to the universe; as if the Wilderness in him is a handsel from it."[3] Since the causal event is irreducible to any one entity's singular "thing-ness," all living and nonliving entities act as active agents within the sequence of causal relations.[4]

For Thoreau, thinking about causation means emphasizing the equivocation of onto-theological boundaries, such as human/nonhuman and living/nonliving, by correlating human

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[1] Henry David Thoreau, *Walden Walden, Civil Disobedience, and Other Writings,* ed. William Rossi, 3rd ed. (New York: W.W. Norton, 2008), 120. Here, I am using Timothy Morton's definition of causal events "as a set of relations between objects" in *Realist Magic* (Ann Arbor: Open Humanities P, 2013), 90. While Morton rejects vital materialism as reductionists "*undermining*" objects, I parallel his theory with vital materialists to interrogate the function of causal events in Thoreau's text. See William Rossi, "Thoreau's Multiple Modernities," in T*horeauvian Modernities: Transatlantic Conversations on an American Icon*, eds. Francois Specq, et al. (Athens: U of Georgia P, 2013), 56-68 for further discussion of Morton's reading of Thoreau.

[2] Ralph Waldo Emerson, "Over-Soul," in *Nature and Selected Essays*, ed. Larzer Ziff (New York: Penguin, 2003), 207.

[3] Jane Bennett, *Thoreau's Nature*: *Ethics, Politics, and the Wild* (New York: Sage Publications, 1994), 58.

[4] My focus on active agents in causal events is based on Bennett's material vitalism that classifies matter as "vivid entities [that are] not entirely reducible to the context in which (human) subjects set them" in *Vibrant Matter*: *A Political Ecology of Things* (Durham: Duke UP, 2010), 5.

actions with nonhuman entities.[5] While causal reasoning offers Thoreau an epistemology for understanding the laws of Nature, the causal powers of natural objects and their (and his) inseparability from phenomena are often unexplainable in objective terms: the loon (*Colymbus glacialis)* becomes "unearthly," the perch (*Leuciscus pulchellus*) "mysterious," and even Thoreau himself, at times, feels an unfamiliar wildness in his nature. As Thoreau traces relations back to possible causes, his language shifts from empirical observations to imaginative inductions and inferences that attempt to complete the insoluble causal equation. Like Branka Arsić, I am hesitant to view Thoreau's ideational metaphors and anthropomorphisms as mere representations; instead, I advance a reading of Thoreau that sees his cognitive and imaginative acts as central to his causal epistemology and ontology.[6] A cognitive restructuring of ontological boundaries between human and nonhuman occurs when Thoreau's own motions become entangled within a series of natural relations.[7]

Thoreau writes in his March 15, 1842 journal entry, "All things, indeed, are subjected to a rotary motion, either gradual and partial or rapid and complete, from the planet and system to the symplest shell fish and pebbles on the beach."[8] Thoreau was not alone in his examination and theorization of the laws of motion; models of motion served as the framework for nineteenth-century Transcendentalist metaphysics, epistemologies, and ontologies. In his essays, Ralph Waldo Emerson shapes a world that can only be perceived in parts but consists within an ever-

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[5] This vital materiality, as Bennett warrants, calls forth an ontology of vibrant matter "to dissipate the onto-theological binaries of life/matter, will/determination, and organic/inorganic" in *Vibrant Matter*, x.

[6] See Branka Arsić, *Bird Relics*: *Grief and Vitalism in Thoreau* (Cambridge, Mass.: Harvard UP, 2016), 7-8. Arsić's "literalization" considers Thoreau's words as more than metaphors, but rather as "thing[s], capable of affecting bodies," 8.

[7] For the purpose of this thesis, I will focus my examination of causal events on natural and anthropocentric relations; however, as Arsić notes in "Our Things: Thoreau on Objects, Relics, and Archives," *Qui Parle: Critical Humanities and Social Sciences* 23, no. 1 (2014): 157-181 there is a case to be made for causal relations between Thoreau and artifacts.

[8] Henry David Thoreau, *The Journal of Henry D. Thoreau,* eds. Bradford Torrey and Francis Allen (New York: Dover Publication, 1962), 1:332.

moving universe that is "fluid and volatile."[9] While Emerson proposes that everything in the universe is at a continuous state of movement and change, his contemporaries work through similar theories of motion in the natural world. For instance, Walt Whitman writes, "All is a procession / The universe is a procession with measured and perfect / motion."[10] Nathanial Hawthorne echoes Emerson and Whitman in "Artist of the Beautiful" where a watchmaker tries to discover and create perpetual motion.[11] In *Corresponding Motion,* Catherine Albanese describes the "Kinetic Revolution" in Transcendental thought as a "language of motion."[12] Albanese credits Emerson, Bronson Alcott, and Henry Hedge as the primordial originators of the "language of motion" with no mention to Thoreau. But Thoreau was not absent from the conjectures of motion and causality that served as a framework for nineteenth-century concepts of natural science and a relation with Nature.[13]

The advancement in science and technology in the nineteenth century assumed that the universe could someday be, in Laura Walls's words, "unified under the rule of one law, a law comprehensible to human reason."[14] The process of discovering a unifying law from the realizable facts of the material world remained a pursuit for Romantic and Transcendental thinkers on both sides of the Atlantic. Emerson, influenced by Samuel Taylor Coleridge, maintained that "the universe is formed by an antecedent spirit," "the whole can be known only

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[9] Emerson, "Circles," in *Nature and Selected Essays*, ed. Larzer Ziff (New York: Penguin, 2003), 226.
[10] Walt Whitman, "I Sing the Body Electric," in *Leaves of Grass and Other Writings*, ed. Michael Moon (New York: W.W. Norton, 2002), 88-90.
[11] Nathanial Hawthorne, "Artist of the Beautiful," in *Nathanial Hawthorne's Tales*, ed. James McIntosh (New York: W.W. Norton, 1987), 159-177.
[12] Catherine Albanese, *Corresponding Motion: Transcendental Religion and the New America* (Philadelphia: Temple UP, 1977), 70.
[13] Walls testifies to Thoreau's exposure to scientific and philosophic theories, placing Thoreau within the tradition of nineteenth-century science in *Seeing New Worlds*: *Henry David Thoreau and Nineteenth-Century Natural Science* (Madison: U of Wisconsin P, 1995). See also Robert Thorson, *Walden's Shore Henry David Thoreau and Nineteenth-Century Science* (Cambridge, Mass.: Harvard UP, 2014).
[14] Walls, ed., "Man Most Alive," in *Material Faith: Thoreau on Science* (New York: Houghton Mifflin Company, 1999), x.

through reason's unmediated and intuitive connection with spirit," and "the spirit acts as the organic or organizing principle to assimilate matter to its flow of energy."[15] Under the mentorship of Emerson, Thoreau established his theory with the assumption of a higher law and its organizing principles. Thoreau's scientific underpinnings evolve, as Walls convincingly demonstrates, to incorporate the empirical holist assumption that "the universe is a whole of antecedent parts, open-ended and radically indeterminate, hence knowable only through empirical contact."[16] Emerson's interpretation of nature as a set of "spiritually coherent" hieroglyphs differs little, as Lawrence Buell claims, from Thoreau's view of natural phenomenon as having both spiritual and material importance. It is, however, Thoreau's "empirical and 'scientific' approach to nature" that distinguishes him from the other Transcendentalist thinkers.[17] While writers, like Emerson, pondered concepts of motion in the universe through abstract reasoning, Thoreau went out into nature and examined the laws of motion and matter firsthand to create his own "language of motion."

Throughout Thoreauvian scholarship, there have been two conjectures of Thoreau's representation of nature's materiality in texts. On the one hand, scholars approach materiality with a Marxist and post-structuralist lens, viewing Thoreau's accounts of nature as economic exchanges and utilitarian commodities. Outlining Thoreau's "economy of nature," Richard Grusin argues that Thoreau examines nature as a symbol of economy. Thoreau, according to Grusin, understands nature's economy in terms of the Marxist critique of traditional economics and capitalism.[18] In keeping with Grusin's argument, Lance Newman observes Thoreau's shift

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[15] Walls, *Seeing New Worlds,* 61. For more on Coleridge and Emerson's relationship, see Robert Sattelmeyer's and Richard Hocks's "Thoreau and Coleridge's *Theory of Life*," *Studies in the American Renaissance* (1985): 269-284.
[16] *Seeing New Worlds*, 85.
[17] Lawrence Buell, *The Environmental Imagination* (Cambridge, Mass.: Harvard UP, 1995), 117.
[18] Richard Grusin, "Thoreau, Extravagance, and the Economy of Nature," *American Literary History* 5, no. 1 (1993): 47.

between idealism and materialism, suggesting that Thoreau moves toward a "materialist understanding of nature" as he analyzes the influence of the economic, capitalist, and social relations in Thoreau's empirical and ontological experience.[19] While traditional Materialist discourse acknowledges Thoreau's awareness of meaning and symbolism in matter, they conclude that Thoreau's experiment relies on the economy of nature, discounting the ontological relation between human and nonhuman objects. Scholars also view motion and materialism as a utility in Thoreau's texts: a poetic device for constructing symbolic and metaphoric categorizations. For Charles Anderson, the movements of wildlife serve "metaphorical or humorous purposes" for Thoreau's writings and provides him with "poetic imagery."[20] Nature's motions also emerge as a symbol for vitalism, or according to Stephen Tanner, a "sign that the universe is alive."[21] The "current motions" of water constructs Thoreau's view of nature's "organic unity" but also "reveals [his] profoundly transcendental understanding of life and art."[22] In *Thoreau as Romantic Naturalist,* James McIntosh also identifies Thoreau's observations of nature as "chaotic, various, and ever changing" but still classifiable as "a single organic world."[23] In McIntosh's view of the Thoreau's "shifting stance," the movement and changes of the landscape act as a reflection of Thoreau's attempt to "accommodate his writing to [nature's]

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[19] Lance Newman, "Thoreau's Materialism: From Walden to Wild Fruits," in *More Day to Dawn: Thoreau's Walden for the Twenty-First Century*, ed. Sandra Harbert Petrulionis and Laura Dassow Walls (Boston: U of Massachusetts P, 2007), 111-5. See also Newman, *Our Common Dwelling: Henry Thoreau, Transcendentalism, and the Class Politics of Nature* (New York: Palgrave Macmillan, 2005). Reading Thoreau's economics, Leonard Neufeldt, *The Economist: Henry Thoreau and Enterprise* (Oxford: Oxford U P, 1989); Richard Prud'homme, "Walden's Economy of Living," *Raritan: A Quarterly Review* 20, no. 3 (2001):107-131; Judith Saunders "Economic Metaphor Redefined: The Transcendental Capitalist at *Walden*," *American Transcendental Quarterly: A Journal of New England Writers* 36 (1977): 4-7; and more recently Seth McKelvey, " 'But One Kind' of Life: Thoreau's Subjective Theory of Value in Walden," *Nineteenth-Century Literature* 70, no. 4 (2016): 448-472 also examine Thoreau concerning market exchange and capitalist enterprise.

[20] Charles Anderson, *The Magic Circle of Walden* (New York: Holt, Rinehart and Winston, 1968), 217-18.

[21] Stephen Tanner, "Current Motions in Thoreau's *A Week*," *Studies in Romanticism* 12, no. 4 (1973): 766.

[22] Ibid., 775.

[23] James McIntosh, *Thoreau as a Romantic Naturalist* (Ithaca: Cornell UP, 1974), 17.

shifting appearances."[24] Thoreau's representations of nature's motions serve, in this view, as a means for economic exchange or as a poetic device for metaphorical imagery.

On the other hand, ontological Materialists interpret Thoreau's materiality as less of an economic and symbolic exchange and more as a vital agent to Thoreau's experiences and the framework of his thought processes. Scholars, such as Robert Abrams and Branka Arsić, contest the traditional Materialist thought by showing how Thoreau rejects notions of capitalism and American enterprise with an ontological connection with matter. Detailing Thoreau's resistance to the civilization and stabilization of the American landscape, Abrams testifies to Thoreau's opposition to the rise of cultivated boundaries by exposing the volatile and shifting patterns of nature. Abrams further argues that the seemingly "static" materiality transfigures into "cognitive profiles and perspectives, and topographical features" that are constantly in flux.[25] Similarly, Branka Arsić contends that Thoreau refutes the American view of materiality as a capitalist commodity and, rather, views Thoreau's "things" as active agents in ontological ordering and meaning.[26] The notion of "active matter" that Abrams and Arsić convey relates to recent conversations of New Materialism and "vital matter," coined by Jane Bennett in *Vibrant Matter*. Outlining the New Materialist movement, Diana Coole and Samantha Frost indicate the relations between matter and immaterial "idealist assumptions," such as "language, consciousness, subjectivity, agency, mind, soul…imagination, values, meaning."[27] The New Materialists' ontological approach abandons the belief that matter is an inert substance; instead, they view matter as an active force in an integrated system, which allows New Materialist scholars to return

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[24] Ibid., 19.
[25] Robert Abrams, "Image, Object, and Perception in Thoreau's Landscapes: The Development of Anti-Geography," *Nineteenth-Century Literature* 46, no. 2 (1991): 261.
[26] Arsić, "On Things," 160.
[27] Diana Coole and Samantha Frost, eds., "Introducing," in *New Materialisms: Ontology, Agency, and Politics* (Durham: Duke University Press, 2010), 2.

to the question of agential capacity in the location and structure of matter.[28] In recent studies, Materialist critics position Thoreau's texts alongside the New Materialist approach to matter as an active agential force that influences Thoreau's experiences, sensations, and consciousness. Rochelle Johnson exhibits this New Materialist approach in "'This Enchantment Is No Delusion': Henry David Thoreau, the New Materialisms, and Ineffable Materiality." Examining Thoreau's ontology, Johnson claims that Thoreau experiences a magnetism to the "vital force permeating all matter," exchange of "human and nonhuman matter," and the sensual effect of material causality.[29] Although the New Materialists resist the notion of inert matter, little has been said about how related causal events shape Thoreau's epistemology and ontology.[30]

Like many nineteenth-century thinkers, Thoreau's interests developed from science and natural philosophy. He was immersed in the scientific societies, studying natural philosophy and natural history at Harvard. "Science," Walls writes, "was the talk of parlor and street corner, even men of science were consolidating and elevating their pursuit into a profession."[31] Influenced by philosophers like Francis Bacon, Isaac Newton, Gottfried Leibniz, and Immanuel Kant, Thoreau and his contemporaries were exposed to a number of philosophic and scientific concepts that impacted their own observations of the laws of nature and the universe. My first chapter "Theories of Causality" outlines theories of causation that influenced nineteenth-century thought and sees Thoreau's accounts of causality as a response to a long debate about the nature

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[28] Ibid., 9. See Rochelle Johnson, Jane Bennett, and Branka Arsić.
[29] Rochelle Johnson, " 'This Enchantment Is No Delusion': Henry David Thoreau, the New Materialisms, and Ineffable Materiality," *ISLE* 21, no. 3 (2014): 607-8. In *Passions for Nature Nineteenth-Century America's Aesthetics of Alienation* (Athens: U of Georgia P, 2009), 3 Johnson argues that Thoreau sought a "counteraesthetics, which assumed that the value of nature resided in its physicality, rather than in metaphors for human experience."
[30] Several scholars, such as Laura Dassow Walls and Alfred Tauber, point to motion and natural causation in reference to nineteenth-century science and Thoreau's epistemology while other scholars, such as Bennett and Arsić, observe causality and assemblages or exchanges of matter in terms of Thoreau's ontology. Causal events themselves, however, remain a narrowly-examined facet of Thoreau's works.
[31] Walls, "Man Most Alive," x.

of causality from Aristotle's four causes and Bacon's inductionism to Coleridge's Kantian idealism and Emerson's causal continuum. The causal debate moves from *materialist-determinist causation* where an efficient cause (like God's will) moves an entirely corporeal universe, which can be explained in linear terms from cause to effect/effect to cause to *indeterminist causation* where the efficient cause manifests in matter itself (a self-organizing force) in which the cause-and-effect relations are constantly shifting, exchanging, and changing. A story emerges in this trajectory of causal thought from materialist-determinist to indeterminist causation, a narrative that influences Thoreau's epistemological approach and ontological relation to Nature. Natural causation, for Thoreau, acts a method of rationalizing Nature's laws and a theory to explain the dynamic interaction between events.[32]

My second chapter "The Motions of *Walden*" extends the causal debate and Thoreau's causal reasoning to a close-reading of his observations of natural causation in *Walden*. The aim of this chapter is twofold: to show how language itself can inaugurate a reflection on causal events and to demonstrate how Thoreau applies causal theories to his observations of nature, identifying a shift from a determinist to an indeterminist approach that influences Thoreau's ontological relation to Nature. Following the Baconian-Newtonian tradition, Thoreau forms a causal theory with the assumption that cause and effect act in a linear sequence whereby inference and induction can expose the underlying variable for all the laws of nature. Thoreau's determinist approach shifts upon empirical contact with dynamic natural phenomena. When the actions of human and nonhuman entities become inseparable from an insoluble web of relations,

[32] I use "causation" as Kerns defines it: "Causality, or causation (the terms are used interchangeably), is a metaphysical (or ontological) concept that refers to actual cause-and-effect relations between events or to dynamic interactions and processes in the world," see Stephen Kerns, *A Cultural History of Causality: Science, Murder Novels and Systems of Thought* (Princeton: Princeton UP, 2004), 22-3.

Thoreau's descriptions grow increasingly ideational and imaginative: the sandy overflow's animated clay, Walden Pond's pulsating ecosystem, birds' ethereal flight, the loon's mystical maneuverings. The end of this chapter will suggest that the scope of Thoreau's causal reasoning includes his examinations of Concord's capitalist society and political atmosphere. In returning attention to causal relations in Thoreau's writings, this thesis demonstrates his contribution in, what Albanese terms, the "Kinetic Revolution." Positioning Thoreau alongside the causal debate provides a new interpretation of Thoreau that views theories of motion and causality as central to his epistemology and ontology.

1 THEORIES OF CAUSALITY

In his biographical sketch of Thoreau, Ralph Waldo Emerson writes that "if he wants lyric fineness and technical means, if he have not the poetic temperament, he never lacks the causal thought showing that his genius was better than his talent."[33] This passage, while somewhat acerbic about Thoreau's poetic talent, testifies to Thoreau's causal reasoning: "[t]he depth of his perception found likeness of law throughout Nature" in which Thoreau "swiftly inferred universal law from the single fact."[34] Thoreau's "causal thought" embraced the claims of nineteenth-century science that laws of natural causation revealed a "deeper order in the universe," an order with "an inherent unity with nature."[35] The nineteenth-century philosophies that pervaded Thoreau's intellectual society (Lyellian geology, Newtonian physics, Coleridgean idealism, Emersonian transcendentalism) responded to a long tradition of scientific and philosophic debates on natural causation.

The Early Modern and Enlightenment contributors in the causal debate set the groundwork for nineteenth-century intellectual movements and shaped how thinkers considered their relation to the movement of bodies in the material world. Two major epistemologies of causality surface in the nineteenth-century: *materialist-determinist causation* and *indeterminist causation*. Materialist-determinist causation maintained that the laws of nature were determined by a divine force (Descartes, Leibniz, and Spinoza), the properties of bodies themselves (Hobbes), or nothing at all (Hume). For Cartesians and mechanical philosophers, namely Descartes, Hobbes, Spinoza, and Leibniz, matter moved from an external efficient cause whereby the motions could be perceived in a linear, determined cause and effect apparatus. Because the causal relations

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[33] Ralph Waldo Emerson, "Thoreau," in *Lectures and Biographical Sketches* (New York: Riverside Press, 1911), 475.
[34] Ibid., 474.
[35] Alfred Tauber, *Henry David Thoreau and the Moral Agency of Knowing* (Berkeley: U of California P, 2001), 128.

were determinable, induction and deduction could explain the effects by their causes and vice-versa. Indeterminist causation, on the other hand, resisted the notion that causality entails physical determinism and its metaphors of nature's motions as mechanical clockwork, which threatened to reduce nature to mere scientific facts and did not allow space for the poetic imagination. For nineteenth-century Romantics, the efficient cause, proposed first by Spinoza and Leibniz, co-existed with the material and spiritual stratums: a self-organizing, creative principle whose "external" moving force is within. The regenerative universe called forth indeterminist causation where cause and effect could not be traced linearly but rather encompassed a network of fluctuating and reconfiguring relations. Romanticism's emphasis on the intuition and imagination of causal relations led to an insight of the "deeper order of the universe," an understanding that could incorporate an original relation to the universe and advance scientific discovery. For these thinkers, namely Emerson and Coleridge, materialist-determinist methods of induction and deduction could never uncover the underlying cause of Nature's laws because they failed to see the universe as a self-organizing organism in continuous flux.

Thoreau finds himself in this shifting culture of causal explanations: attracted to the precision and accuracy of inductionism to reveal scientific facts and, at the same time, fascinated with nature's unpredictability and mysticism.[36] And, in turn, Thoreau's causal explanation shifts between thinking about causality in linear, determinist terms where induction and deduction of phenomena are possible and his realization that cause and effect cannot be predicted from the

[36] Thoreau was immersed in theories of science encountered in his education, contemporaries, and personal study. See more in Walls, *A Life* (Chicago: U of Chicago P), 73-75. Walls writes, "By spring 1837, Thoreau was hauling away armfuls of Goethe, Coleridge, Victor Cousin, and, of course, Emerson's Nature." After leaving for a term to teach with Orestes Brownson, Thoreau returned to Harvard and "began working through Brownson's reading list: the latest European literature and philosophy—Goethe and Coleridge, Heine, Cousin, Constant."

continuous, intangible effluence of matter. In general, Early Modern and nineteenth-century philosophers and scientists assumed that causality could be knowable *a priori* and could necessitate a logical connection in the external world, which allowed for the claim that human reason and intuition were divinely or intrinsically interconnected with the natural and spiritual world.[37] Thoreau, too, maintains the philosophical premise that "[a]ll material things are in some sense man's kindred, and subject to the same laws with him."[38] For Thoreau, the universal law (cause) ideally could be deduced by the likeness of the law (fact) in natural phenomena (effects of the universal law). However, causal induction suggests a reductionist position where nature becomes an object, reduced to a series of facts and systematic calculations, which does not account for the irregularity of nature and excludes Thoreau from an unmediated relation with the universe. His causal explanation must then maintain an Emersonian "original relation" to nature, embrace the infinitude of nature's flux, and allow for both the visible, sublunary and invisible, unknown forces of natural phenomena. I argue in chapter two that Thoreau's Baconian-Newtonian inductionism leads him to reflect on relationalities that blur ontological boundaries between human/nonhuman: a causal explanation where Thoreau's mental and physical actions are inseparable from the motions of nonhuman agents. Thinking about causality for Thoreau means thinking about materiality, in New Materialist terms, as "something more than 'mere' matter: an excess, force, vitality, relationality, or difference that renders matter active, self-creating, productive, unpredictable."[39] To frame Thoreau's progression from an epistemological Baconian-Newtonian inductionism to an ontological New Materialist vitalism, we must first

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[37] This premise, what Edward Craig calls the "Insight Ideal" is "the thesis that the human mind can in principle have access to true beliefs in a way that is analogous to the way in which God can," see *The Mind of God and the Works of Man* (Oxford: Clarendon P, 1987), 38 quoted in Helen Beebee, *Hume on Causation* (New York: Routledge, 2006), 2.
[38] Thoreau, *Journal*, 2:345.
[39] Coole and Frost, 9.

understand how Thoreau's "causal thought" fits into the causal debate of Enlightenment and nineteenth-century science.

The causal debate, for both empiricists and rationalists, foregrounded the methods of causal explanation as a way of thinking about our relation to the physical world and the underlying epistemologies and metaphysics of natural causation. Aligning Thoreau with either of these ways of causal thinking, as Laura Walls puts it, "divides Thoreau from himself."[40] Walls indicates that "the texts Thoreau was reading do not stake out simplistic positions in a debate between eighteenth-century 'empirical' or 'inductive' reasoning and the 'idealist,' a priori rationalism of the new philosophy."[41] Equally, the causal debate Thoreau was exposed to did not present a singular epistemology of causal explanations but a conflicted view of natural laws and our capacity to discover them. While the scope of this project does not allow for a comprehensive review of the causal debate and its often complicated and contradictory trajectories, I argue that the two positions of causal explanation (materialist-determinist and indeterminist causation) that surfaced, or resurfaced, in the nineteenth century act as a framework for Thoreau's scientific observation. In this chapter, I contextualize Thoreau's writings in *A Week* and his *Journal* alongside theories of materialist-determinist and indeterminist causality that developed from the causal debate. I then explain how a New Materialist reading of Thoreau's causal reasoning offers a framework for a close-reading of causal events *Walden,* which I turn to in chapter two.

[40] Walls, *Seeing New Worlds,* 4. Nina Bayrm testifies to Thoreau's complex stance on science in "Thoreau's View of Science," *Journal of the History of Ideas* 26, no. 2 (1965): 221-234.
[41] Ibid., 16.

1.1 Survey of the Causal Debate

Scholastic theories of causation set the groundwork for the Early Modern and Enlightenment epistemologies and metaphysics. The Scholastics recovered the Greek philosophic tradition by translating and advancing Aristotelian philosophy.[42] In *Physics* and *Metaphysics*, Aristotle maintained that there were four causes that could be applied to any explanation: the material cause (the properties), the formal cause (the form), the efficient cause (the course of change or rest), and the final cause (the *telos* or end of the process).[43] Francis Bacon's *Novum Organum* (1620) challenges the Scholastic's terminology of causation, proposing a revision to, in Kenneth Clatterbaugh's words, "the syllogism, the concept of substance, matter, and form…the very explanatory qualities...used by scholastic science."[44] Bacon aims to systematize the causal explanations to minimize errors in inferring the cause from the effect. To do this, he attempts to outline the mind's "true supports," the empirical facts.[45] The Baconian method requires observing natural phenomena, classifying a conceptual system, and deducing the true causal law that governs phenomena. To isolate the cause of a phenomenon, the observer would list all the properties and order them in terms of their "effects." By interpreting these empirical observations, the observer could deduce the underlying cause of the phenomenon, forming a hypothesis to be compared to other phenomena.[46] For Bacon, the effect

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[42] See Robert Schnepf, "From Scholasticism to Modern Physics—and Back?," in *Thinking about Causes,* eds. Peter Machamer and Gereon Wolters (Pittsburgh: U of Pittsburgh P, 2007), 77-99.
[43] Hippocrates G. Apostle, trans., *Aristotle's Physics* (Grinnell: The Peripatetic Press, 1969).
[44] Kenneth Clatterbaugh, "The Early Moderns," in *The Oxford Handbook of Causation*, eds. Helen Beebee, Christopher Hitchcock, and Peter Menzies (Oxford: Oxford UP, 2009), 56. See Francis Bacon, *Novum Organum*, eds. Lisa Jardine and Michel Silverthorne (Cambridge: Cambridge UP, 2000), 102. For Bacon, the final cause "distorts nature except in the case of human actions. Discovery of Form is regarded as hopeless. And the Efficient and Material causes…are perfunctory and superficial." While Bacon first engages in revising Scholastic terminology, René Descartes's theory of causation more successfully confronts Scholasticism.
[45] Bacon, 34.
[46] For more on Bacon's methods, see Jonathon Smith, *Fact and Feeling*: *Baconian Science and the Nineteenth-Century Literary Imagination* (Madison: U of Wisconsin P, 1994), 11-44.

(or properties of phenomena) and its cause are interchangeable because when the cause is present the effect will also be present and vice versa: "Bacon was sure that once a list of possible causes had been prepared," as Marie Boas Hall puts it, "the systematic elimination of those causes would eventually yield one certain cause."[47] Bacon's methodology suggests the possibility of a scientific epistemology founded on empirical observations of phenomena and inductive reasoning, a scientific method that would affect later nineteenth-century science and natural theology.

As Bacon developed a method of scientific induction, René Descartes posed a metaphysical approach to causal explanation with the purpose of redefining the Scholastic's efficient cause. Descartes's causal principle holds that "there must be as much [reality] in the efficient and total cause as there is in the in the effect" of that cause.[48] Because the cause must contain the properties that exist in the effect, the "causal principle states a necessary condition for efficient causation."[49] If God's will is the total efficient cause, how does God fit into the scientific explanation? Because God's will is sufficient and necessary for all effects, Descartes maintains that the only explanation of true change is God.[50] Descartes writes in *Meteorology*

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[47] Marie Boas Hall, "Matter in Seventeenth Century Science," in *Concepts of Matter*, ed. Ernan McMullin (Notre Dame: U of Notre Dame P, 1963), 26.

[48] René Descartes, *The Philosophical Writings of Descartes*, trans. John Cottingham, Robert Stoothoff, and Dugald Murdoch, vols. 3 (Cambridge: Cambridge UP, 1984), 2:201.

[49] Kenneth Clatterbaugh, *The Causation Debate* (New York: Routledge, 1999), 21. As a result, an effect must be similar to its cause insofar as it contains the alike properties because "if we admit that there is something in the effect that was not previously in the cause, we shall also have to admit that this something was produced by nothing." The likeness of cause and effect returns to the Scholastic view of "influx model," following Aristotle's notion that form must be pre-existing in its cause, which "explains causation through the transfer of an entity (usually a property) from the cause to effect." Because the properties cannot come to the effect from nothing, there must be a transference: a quality of motion passed from body to body. The cause then "must be like its effect, which simply means that the cause, conceived as matter in motion, must possess at least the quantity of motion found in the effect." This position is argued by Clatterbaugh, "Descartes's Causal Likeness Principle," *The Philosophical Review* 89, no. 3 (1980): 379-402; Daisie Radner, *Malebranche: A Study of a Cartesian System* (Assen: Van Gorcum, 1978); and Richard Watson, *The Downfall of Cartesianism* (The Hague: Martinus Nijhoff, 1966). For more see Clatterbaugh, "The Early Moderns," 57-8.

[50] Clatterbaugh, *The Causation Debate,* 52.

(1641) that "if I here explain the nature of clouds," then "we will easily believe that it is similarly possible to the find the cause of everything that is most admirable." For example, if we "explain [the rainbow's] colors we commonly see in the clouds and in the circles which surround the stars," we can find "the cause of the suns, or moons, several of which sometimes appear together."[51] Descartes implies, like Bacon, that accurately portraying and explaining facts can lead to a hypothesis of a cause based on the facts that "sometimes appear together." Here, he sees understanding a phenomenon as inseparable from thinking about its causes, for "it is causes that 'explain' effects whereas causes are 'proven' from their effects."[52] In other words, this reasoning holds that "from the effect we can (inductively) infer *that* the cause occurred, from the cause we can (deductively) infer *why* the effect occurred."[53] From this determinist explanation, Descartes categorizes two types of scientific inference: analysis and synthesis.

For Descartes, analysis "proceeds from effects to their causes" as a "nondeductive form of inference" whereas synthesis "proceeds from causes to their effects" as a "deductive form of inference." The results of these methods differed; as Clatterbaugh defines it, "analysis is reasoning inductively from effect to cause in order to discover new things" while "synthesis is reasoning deductively from cause to effect in order to explain the effect which is contained in the cause."[54] The induction or deduction must begin by searching for first causes that satisfy two conditions: first, the causes must be clear insofar as their truth can be known and, second, a deduction from the causes and necessary effects must show that things in the chain of relations

[51] Descartes, *Discourse on Method, Optics, Geometry, and Meteorology,* trans. Paul J Olscamp (Indianapolis and New York: Bobbs Merrill), 264 quoted in ibid.
[52] Descartes, 3:106-7.
[53] Clatterbaugh, *Causation Debate*, 53.
[54] Ibid., 52-53.

are manifest.[55] According to Clatterbaugh, Descartes posits that "it is epistemically necessary for human minds to supply the 'suppositions,' or intermediate principles after the first principles, by analysis or reasoning from what is known to the senses (effects) back to their causes."[56] In Thomas Kuhn's view, Descartes's influence and the commitment to the assumption "that the universe was composed of microscopic corpuscles and that all natural phenomena could be explained in terms of corpuscular shape, size, motion, and interaction" provided a metaphysical explanation that the universe contained "only shaped matter in motion" and a methodology where "laws must specify corpuscular motion and interaction, and explanation must reduce any given natural phenomenon to corpuscular action under these laws."[57] After 1630, we see this underlying corpuscular assumption in causation theories of Thomas Hobbes, Benedict Baruch Spinoza, Gottfried Leibniz, Robert Boyle, Samuel Clarke, and Isaac Newton. However, a shift emerges in the causal debate from a solely mechanistic rationalization (Hobbes, Spinoza, Leibniz) to a claim that causes exist in a non-physical stratum (Boyle, Clarke, Newton).

The goal for Hobbes's causal explanation is similar to Descartes's insofar as it attempts to find "*the shortest way of finding out effects by their known causes, or of causes by their known effects*."[58] In the *Leviathan* (1651), Hobbes holds that "for the *universe*, being the aggregate of all bodies, there is no real part thereof that is not also *body*, nor anything properly a body that is not

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[55] Descartes, 1:180. These conditions, as Clatterbaugh argues, show an empiricist side to Descartes's causal explanations because of his reliance on "various observational data which are known by the senses and indubitable," see Descartes, 3:77.

[56] Clatterbaugh, *Causation Debate*, 56. Here, Clatterbaugh points to the ambiguity of Descartes's use of the terms "cause" and "effect" where a cause can be both "cause-as-thing" and "cause-as-preposition or premise in a proper scientific explanation." This ambiguity allows Descartes "to speak of the cause both as a set of premises from which the effect can be deduced and as a substance or shape, position or size." For example, Descartes writes, "For I proved by the first, which are their causes, so the first are proved by the last, which are their effects… For as experience makes most of the effects quite certain, the causes from which I deduce them serve not so much to prove them as to explain them; indeed, quite the contrary, it is the causes which are proved by the effects." See Descartes, 1:150-1.

[57] Thomas Kuhn, *The Structure of Scientific Revolutions*, 3rd ed. (Chicago: U of Chicago P, 1996), 41.

[58] Thomas Hobbes, "Concerning Body," in T*he Metaphysical System of Hobbes in Twelve Chapters from Elements of Philosophy Concerning Body,* ed. Mary Calkins, 2nd ed. (La Salle: Open Court Publishing Co, 1948), 18.

also part of…the *universe*."[59] Since mind and body are corporeal, all causal relations can be reduced to the body itself. His theory of causation maintains that when "one body by putting forwards another body generates motion in it, it is called AGENT [the cause]; and the body in which motion is so generated, is called the PATIENT [the effect]."[60] The *efficient cause,* for Hobbes, is "the aggregate of accidents in the agent" and the patient where an accident is "*that faculty of any body, by which it works in us a conception of itself,*" like if a body is at motion or rest and its phenomenological qualities (color, heat, odor, appearance).[61] Causal inference becomes the most efficient method of gaining knowledge because it is necessary for "those that search after science indefinitely, which consists in the knowledge of the causes of all things" to "know the causes of universal things, or of such accidents as are common to all bodies… before they can know the cause of singular things, that is, of those accidents by which one thing distinguished by another."[62] Here, "the *properties* of the agents" are explanations of a cause and the patient's *properties* of the effects.[63] Walter Ott notes that, for Hobbes, only after observing several instances of an event to find the accidents can we "do our best to determine *which* accidents of the alleged agent and patient are such that if they are present, we cannot imagine the effect not being produced."[64] Clatterbaugh sees Hobbes as reframing the Cartesian synthesis to include "deductive reasoning from universal principles to other principles—from cause to effect" and an analysis to approach the process of "looking at the effect, often empirically known, and arriving at universal or general principles."[65] In this way, Hobbes combines analysis and synthesis, in what Clatterbaugh calls, "a combination of empirical induction—finding the

[59] Thomas Hobbes, *The Leviathan*, ed. Edwin Curley (Indianapolis: Hackett Publishing Company, 1994), 261.
[60] Hobbes, "Concerning Body," 69.
[61] Ibid., 54.
[62] Ibid., 21.
[63] Clatterbaugh, *Causation Debate, 63.*
[64] Walter Ott, *Causation and Laws of Nature in Early Modern Philosophy* (Oxford: Oxford UP, 2009), 221.
[65] Clatterbaugh, *Causation Debate*, 76.

particular causes—and conceptual analysis—finding the general and universal causes."[66] Overall, Hobbes's causal explanation relies on empirical induction to find the necessary connection between particular causal relations and universal causes.

Benedict Spinoza likewise defends the logical necessity between cause and effect where "[f]rom a given determinate cause an effect necessarily follows; and, on the other hand, if no determinate cause be given, it is impossible that an effect can follow."[67] Spinoza's philosophy views everything as causally dependent on God because God and Nature are one and the same, and both are constituted as the efficient cause; and, for Clatterbaugh, Spinoza "believes that the arguments in favor of final causes, especially conceived as God's purposes, are irrational attempts to place all events into an anthropocentric framework."[68] By dismissing explanations of final causation where God's will necessitates all events, Spinoza's explanation views God's nature as a triangle where "everything follows in a logical sense from that nature."[69] Jonathan Bennett argues that "Spinoza did not distinguish what is absolutely or logically necessary from what is merely causally necessary. In his way of thinking, there is a single relation of necessary connection, which links causes with effects in real causal chains and premises with conclusions in valid arguments."[70] A possible explanation lies in the principle of sufficient reason (PSR) that assumes that "the laws and rule of nature according to which all things happen, and change from one form to another, are always and everywhere the same."[71] Here, Clatterbaugh notes that PSR serves two purposes: (1) "it is an assurance that the world is comprehensively causal, that is, there exists a cause for everything," and (2) "it is an assurance that the world is comprehensively

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[66] Ibid., 77.
[67] Benedict Spinoza, *Ethics*, trans. W.H. White (Hertfordshire: Wordsworth Classics, 2001), 4.
[68] Clatterbaugh, *Causation Debate*, 133.
[69] Ibid., 134.
[70] Jonathan Bennett, "Spinoza's Metaphysics," in *The Cambridge Companion to Spinoza,* ed. Don Garrett (Cambridge: Cambridge UP, 1996), 61 quoted in ibid.
[71] Spinoza, 492.

intelligible, that is, there exists an explanation (proof or demonstration) or everything."[72] In *Ethics* (1677), Spinoza aims to revise the Cartesian synthesis through a "deductive sequence of explanations."[73] PSR unifies causation and explanation because the reason of a phenomenon's existence can be answered by the relevant causes. Causation then acts as a conceptual connection whereby in conceiving causes (conceptual relations), mental and physical phenomena are parallel: "The order and connection of ideas is the same as the order and connection of things" because "knowledge of an effect depends on, and involves, the knowledge of its cause."[74] Since there is only one substance for Spinoza (a synthesis of God and Nature), when we explain a sequence of substances or ideas, we must understand that the causal relation of our ideas must be analogous to the way the substances themselves are related.

Like Spinoza, Leibniz supports sufficient reason where "*there is nothing without a reason,* or *there is no effect without a cause.*"[75] Leibniz, however, rejects the model of materialist-determinist motion of Descartes, Hobbes, and Spinoza where extension is external from substance: "I do not think that substance is constituted by extension alone, since the concept of extension is incomplete. Nor do I think that extension can be conceived in itself, but I consider it an analyzable and relative concept."[76] Rather, substances (or monads) embody the complete concept so that the substance itself and the concept of its properties are linked by sufficient reason into a harmonized network—what Leibniz terms "pre-established harmony." While the substances are "separated from one another by their own actions, which continually change their relations," every monad "is a living mirror or a mirror endowed with internal

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[72] Clatterbaugh, *Causation Debate,* 141.
[73] Ibid.
[74] Spinoza, 50.
[75] Gottfried Leibniz, *Philosophical Essays*, eds. and trans. Roger Ariew and Daniel Garber (Indianapolis: Hackett Publishing, 1989), 31.
[76] Leibniz, *Philosophical Papers and Letters: A Selection*, ed. Leroy Loemker, 2nd ed., 2 vols. (Boston: Kluwer Academic Publishers, 1989), 517.

question, which represents the universe from its own point of view and is as ordered as the universe itself."[77] In *Discourse of Metaphysics* (1686), Leibniz explains that the complete concept in monads "is sufficient to contain and to allow us to deduce from it all the predicates of the subject to which this notion is attributed."[78] In other words, the complete concept will allow us to deduce all the "created, active force inherent in things," like extension, inertia, and motion.

In the explanation of monads, Leibniz separates monads into ontological categories where "[s]ouls act according to the laws of final causes, through appetitions, ends, and mean" and "[b]odies act according to the laws of efficient causes or of motion;" it is in the immersion of these "two kingdoms, that of efficient cause and that of final cause" are in harmony.[79] Leibniz contends that mechanistic states are the only method of explaining the causal sequence; however, as Clatterbaugh notes, "the explanation stops at the 'primitive force' that is in each monad and which causally carries out the blueprint or formal cause that is the individual concept."[80] In Clatterbaugh's view, Leibniz's causal explanation holds that "the effect must correspond to its cause; indeed, the effect is best recognized through a knowledge of a cause," and "[m]oreover, it is unreasonable to introduce a supreme intelligence as orderer of things and then, instead of using his wisdom, use only the properties of matter to explain phenomena."[81] Here, Leibniz distinguishes his view from Spinoza's claim that God's will is not necessary to the causal explanation. Leibniz elaborates on God's wisdom as the explanation of phenomena in *On Nature Itself* (1698):

> But if, indeed, the law God laid down left some trace of itself impressed on things, if by his command things were formed in such a way that they were rendered appropriate for fulfilling the will of the command then already we must admit that a certain efficacy has

[77] Leibniz, *Philosophical Essays*, 207.
[78] Ibid., 40.
[79] Ibid., 223
[80] Clatterbaugh, *Causation Debate*, 153.
[81] Ibid., 53.

> been placed in things, a form or a force, something like what we usually call by the name 'nature,' something from which the series of phenomena follow in accordance with the prescript of the first command.[82]

If we use only the physical to explain phenomena, we will not see the true cause—the wisdom of the orderer. Leibnizian metaphysics values the concept, the essence of a body and its causal relations, rather than an empirical observation.[83] Leibniz's materialist-determinism of pre-establish harmony follows a strictly corpuscular system; his efficient cause ("the law God laid down") imprints within the forces and forms of the material world and acts as a series of phenomena that follows God's "first command." Boyle's and Newton's experiments would soon challenge the linear, mechanized causal explanation of Descartes, Hobbes, Spinoza, and Leibniz.

1.2 A Turn Toward Indeterminist Causation

In a letter to Newton, Leibniz accused Newton's theory of gravitation of using "miracles in order to explain natural things" and "reducing a hypothesis *ad absurdum*."[84] Newtonian science proved that inductions could be empirically given: observing physical effects could lead to a discovery of invisible causes. Boyle and Newton proposed what Stephen Gaukroger calls "horizontal causal processes, those where cause and effect were on the same level," arguing that the cause and effect together could be an "independent form of explanation."[85] They contended that the causes are not restricted to the underlying properties of phenomena, and so the causes exist in a different stratum. While "[m]echanism had been premised on the belief that all physical behavior is the result of a single level of common causation, that of mechanically characterizable interactions between micro-corpuscles," Gaukroger observes, scientific experiments like Boyle's

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[82] Ibid., 159.
[83] The assumption of that the "universe is a rational, harmonious unity" will lead to a Leibnizian optimism in nineteenth-century New Philosophy. See Walls, *Seeing New Worlds*, 21.
[84] G.W. Leibniz and Samuel Clarke, *Correspondence* (Indianapolis: Hackett Publishing Company, 2000), 11.
[85] Stephen Gaukroger, "Philosophy and the Physical Science," in *The Routledge Companion to Eighteenth Century Philosophy*, ed. Aaron Garrett (New York: Routledge, 2014), 688.

investigations of "the spring of the air" and Newton's accounts of gravitation and spectral colors questioned a purely mechanistic rationalization.[86] For Hall, Newton's *Principia* (1687) claims that "the whole burden of philosophy seems to consist in [a particulate structure of matter]—from the *phenomena of motions* to investigate the *forces of nature*, and then from these *forces to demonstrate the other phenomenon*."[87] In other words, Newton suggests universal applicability of the phenomena of motion evident in larger bodies: the forces at work with the laws of nature, like gravity. Newton aims to show how we are "to collect the true motions from their causes, effects, and apparent differences; and, *vice versa*, how from motions, either true or apparent, we may come to knowledge of their causes and effects."[88] Newton claims that sensible or manifest causes, where one phenomenon is the cause of another, could only be "determined by experiment and observation;" however, the deeper causes or intelligible causes explain "why the phenomenal laws are as they are."[89] These causes are the real, deeper causes of phenomena and even when they are not observed, their effects are observable and predictable. Newton writes in a letter to Roger Cotes in 1713, that "[t]hese principles [laws of gravity] are deduced from phenomena and made general by induction, which is the highest evidence that a proposition can have in this philosophy."[90] Newton's discovery that principles, or causes, can be deduced by invisible phenomena validated the role of inferring unknown causes from an empirical observation of materialist mechanics. Yet, the causal debate relied on a major assumption that cause and effect acted on the material world and could be known *a priori* or through inductive

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[86] Ibid.
[87] Hall, 363.
[88] Isaac Newton, *Principia*, trans. Andew Motte (New York: Prometheus Books, 1995), 18.
[89] Clatterbaugh, *Causation Debate*, 182.
[90] H.S. Thayer, ed., *Newton's Philosophy of Nature: Selections from his Writings* (New York: Hafner, 1953), 6 quoted in ibid.

and scientific methods. The role of subjectivity, the mind, and experience challenged the validity of causal explanation to reach a higher truth.

John Locke, for example, complicates the concept of an *a priori* knowledge of natural causation by questioning what kinds of things we could know. As a nominalist, Locke maintains that human thought is but a mental construction. In contrast to the Cartesian pre-existing concepts, Locke rejects the notion of innate ideas and posits that knowledge is determined by experience and sense perceptions only. In his *Essay Concerning Human Understanding* (1690), Locke challenges the notion of logical necessity in causation insofar as his conception of causes and effects do not suggest a necessary connection: "The reason whereof is, that the simple idea whereof our complex ideas of substances are made up are, for the most part, such as carry with them, in their own nature, no *visible necessary* connexion or inconsistency with any other simple ideas, whose co-existence with them we would inform ourselves about."[91] For Locke, our minds are "not [innately] able to discover any connexion betwixt these primary qualities of bodies and the sensations that are produced in us by them," and so "we can never be able to establish certain and undoubted rules of the *consequence* or *co-existence* of any secondary qualities."[92] While we could "discover size, figure, or motion of those invisible parts which immediately produce them," we cannot know "*what* figure, size, or motion of parts produce by no means conceive how *any* size, figure, or motion of any particles, can possibly produce in us the idea of any colour, taste, or sound whatsoever: there is no conceivable connexion between the one and the other."[93] Locke's causal explanation questions the Cartesian and Baconian-Newtonian causation, where cause and effect are knowable *a priori*, for if knowledge is derived from sense perception,

[91] Locke, "Essay Concerning Human Understanding," in *The Empiricists* (New York: Anchor Books, 1960), 86.
[92] Ibid.,
[93] Ibid., 87.

we cannot know the intangible cause just by observing the sensory effects. Locke's reflection on the limits of what we can know *a priori* led Hume to reject the logical necessity of causation all-together.

David Hume maintains that causal relations are not logically necessary, and therefore, they cannot be known *a priori*. He writes in an *Enquiry Concerning Human Understanding* (1748) that the "knowledge of this relation [cause and effect] is not, in any instance, attained by reasoning *a priori;* but arises entirely from experience, when we find, that any particular objects are constantly conjoined with each other."[94] Hume argues that inductive reasoning and reliance on the causal structure cannot be rationally warranted: cause and effect becomes a habit of human thought rather than an intrinsic structure of the external world. With this thesis, Hume challenges the notion of the Insight Ideal or what Edward Craig describes as "the thesis that the human mind can in principle have access to true beliefs in a way that is analogous to the way in which God can."[95] Helen Beebee views Hume as responding to two major philosophical beliefs. First, the metaphysical belief that "nature operates in a way that is analogous to *a priori* reasoning" where "the processes we see unfolding around us are *causal* processes, with earlier stages linked to later ones by causal relations." Second, causal relations are "worldly correlates of *a priori* inference" where "causes necessitate their effects, or guarantee that those effects occur."[96] While several scholars read Hume's claims as rejecting causal reasoning and induction, Beebee argues that Hume acknowledges that causes and effects are "mind independently

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[94] David Hume, *An Enquiry Concerning Human Understanding*, ed. Eric Steinberg, 2nd ed. (Indianapolis: Hackett Publishing, 1977), 17. See also David Hume, *A Treatise of Human Nature,* eds. David Norton and Mary Norton (Oxford: Clarendon Press, 2007).
[95] See Craig, 38 quoted in Beebee, 2.
[96] Ibid., 3. In this view, which was held by rationalists and empiricists alike, the effect must be manifest in the cause: for rationalists the knowable *a priori* causal inference derived from the mind and reason while the empiricists used sensations and perceptions.

connected in some way," but the "*nature* of that connection lies beyond our cognitive grip."[97] Our observations of causal relations "can reveal no more than a succession of events which insofar as they are represented by those impressions, are 'entirely loose and separate'."[98] Therefore, causality can be "reduced to subjective effects and merely practical purpose."[99] Because the mind, for Hume, projects the idea of "necessary connection" onto the external world, we cannot hold that our minds are analogous to a divine entity.

Like Hume, Kant accepts that our constitutions think teleologically about the world as a concept for understanding mechanical explanations.[100] However, Kant resists Hume's dismissal of *a priori* causal relations and famously responds with a metaphysics that offers "a complete solution of Humean problem," which

> restores to the pure concepts of the understanding their a priori origin, and to the universal laws of nature their validity as laws of the understanding, but in such a way that it restricts their use to experience only, because their possibility is founded solely in the relation of the understanding to experience: not, however, in such a way that they are derived from experience, but that experience is derived from them, a completely reversed type of connection that never occurred to Hume.[101]

For Hume, the *analytic* (a claim true by definition) and *synthetic* (empirical observations) are the only types of knowable truths. Kant's *synthetic a priori* allows for a third type of knowledge where judgments that are necessarily true can be known to be true independent of experience: the

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[97] Ibid., 10. Humean reductionists view discount mental projections in Hume's causality, see J.A. Robinson, "Hume's Two Definitions of 'Cause'," *The Philosophical Quarterly* 12 (1962): 162-71; A. J. Ayer, *The Central Problems of Philosophy* (Harmondsworth: Penguin, 1973); and Roger Woolhouse, *The Empiricists* (Oxford: Oxford U P, 1988).

[98] Ibid., 5.

[99] Patrick Keane, *Emerson, Romanticism*, *and Intuitive Reason* (Columbia: U of Missouri P, 2005), 54.

[100] Although the mind seeks mechanical explanation, Kant holds in *Critique of Judgment* that living beings cannot solely be rationalized mechanistically. See Robert Richards, *The Romantic Conception of Life* (Chicago: U of Chicago P, 2002), 65. Richards writes, "Kant argues that our understanding of organic structures and activity cannot proceed through a mechanically causal analysis alone." Instead, Kant turns toward more holistic concepts where the "existence and relations of the parts, therefore, depend on the whole; and their operations and existence cannot ultimately be understood without a concept of the whole."

[101] Immanuel Kant, *Prolegomena to Any Future Metaphysics,* ed. and trans. Gary Hatfield, 4 vols. (Cambridge: Cambridge UP, 2004), 4:313 and 64-5.

assertion that every event must have a cause is, Kant argues, a *synthetic a priori.*[102] Kant distinguishes between *phenomena* (things-as-they-appear) and *noumena* (things-themselves); *synthetic a priori* judgments occur in the phenomenal dimension. Causality then is a "conceptual structuring of the world," a pure concept that is independent from empirical and analytical judgments.[103] The fact that causal relations are mind-dependently determined does not differ from Hume; however, unlike Hume, Kant's concept of a cause "so plainly involves the conception of a necessity of connection with an effect, and of a strict universality of the law, that the very notion of a cause would entirely disappear, were we to derive it, like Hume, from a frequent association of what happens with that which precedes."[104] For example, Kant argues that "just by the fact that [our sense] accepts appearances, also admits to the existence of things in themselves."[105] Kant holds phenomena, like cause and effect, as realizable through the "appearance" of "things themselves."

In this regard, Kant also agrees with Hume that, as Keane demonstrates, "human knowledge was limited to things as they appear to us because of our mode of experiencing them; ultimate reality, 'things-in-themselves,' we can never know."[106] For instance, Kant writes in *Critique of Pure Reason* (1781) that "if we remove our own subject or even only the subjective constitution of the senses in general, then all constitution, all relations of objects in space and time, indeed space and time would disappear, and as appearances they cannot exist in themselves, but only in us."[107] In Kant's "two-world vision," the knowable world of *phenomena* is, in Keane's words, "passively received but then actively ordered by forms, such as Space and

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[102] Ibid., 65.
[103] Gaukroger, 694.
[104] Immanuel Kant, *Critique of Pure Reason*, trans. Werner Pluhar (Indianapolis: Hackett Publishing Company, 1996), 47.
[105] Kant, *Prolegomena*, 4:315 and 66.
[106] Keane, 55.
[107] Kant, *Critique of Pure Reason*, 168.

Time, which are 'in the mind,' a priori, that is, independent of sensory experience."[108] Keane explains that Kant's speculative reason "reveals to us the *idea* of the Infinite, the Unlimited."[109] Coleridge and Wordsworth interpret the power of speculative reason as an intuitive and imaginative mode of reaching "the Infinite, the Unlimited," leading to Coleridge's theories of continuity. Romantic Kantian idealism, I argue, evokes indeterminist causation insofar that it connects human reason with an inexhaustible and indeterminable concept of Nature and its laws.

The Romantics, influenced by German Idealism, resisted the Baconian idea, according to Smith, that "the indiscriminate collection of facts [would] lead eventually and inevitably to the formation of theory" because it did not allow room for "the individual human will and imagination, while collecting and classifying ignored the relationship between natural beings, especially human organisms and their environments."[110] Michel Foucault writes, "Descartes, Malebranche, and Spinoza analysed [the imagination], both as the locus of error and as the power of attaining to truth, even mathematical truth; they recognized in it the stigma of finitude, whether the sign of a fall outside the area of intelligibility or as the mark of a limited nature...."[111] After Kant's idealism, transnational Romanticism did not see the imagination as a "stigma of finitude" but as necessary action of scientific methods to reach Nature's infinitude. Victor Cousin, Samuel Coleridge, Thomas Carlyle, Ralph Waldo Emerson, and Johann Wolfgang von Goethe set the stage for a New Philosophy, which drew largely from

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[108] Keane, 55.
[109] Ibid.
[110] Smith, *Fact and Feeling*, 46. Keane notes that Emerson and Coleridge were also influenced by Francis Bacon: Emerson "(and Coleridge's) favorite English writer, Francis Bacon, reveals his awareness that [Emerson] was hardly the first to announce a 'new philosophy' based on the 'relation of man and nature'," 166.
[111] Michael Foucault, *Order of Things* (New York: Vintage Books, 1994), 70. He continues, "It was just in this proliferation of a nature that is multiple, yet obscurely and irrationally re-created, in the enigmatic fact of a nature that prior to all order resembles itself, that Condillac and Hume sought for the link between resemblance and imagination."

Romanticism.[112] The New Philosophy, like Romanticism, considered poetry and science valid approaches for exploring and explaining an organic universe and, as in Wordsworth's "Tintern Abbey," a universe that could be "half-create[d]" by perception and observation.[113] They endorsed Kant's synthetic *a priori* concept of causality insofar as it allowed for a subjective experience of universal laws where the individual could use aesthetics to discover a relation to nature and advance scientific developments. In William Wordsworth's 1802 Preface to *Lyrical Ballads*, he imagines a poet who discovers "the primary laws of our nature."[114] Genius, for Wordsworth and Coleridge, introduced "a new element into the universe," or at least, "the application of powers…to produce effects hitherto unknown."[115] Reason and intuition were necessary for scientific discovery and used to discover the laws of nature. By engaging with anti-Lockean Kantian idealism, Coleridge reflects on natural causation and the role of intuitive Reason.[116]

Coleridge follows Kant in rejecting Hume's argument, claiming in *Biographia Literaria* (1817) that "[t]he process, by which Hume degraded the notion of cause and effect into a blind product of delusion and habit, into the mere sensation of proceeding life (*nisus vitalis*) associated with the images of the memory."[117] Coleridge's causality, on the other hand, views the "necessity of causal relations," which "depend on, or rather inheres in, the idea of the Omnipresent and Absolute: for this it is, in which the Possible is one and the same with the Real

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[112] Walls, *Seeing New Worlds*, 16.
[113] William Wordsworth, "Tintern Abbey," in *Wordsworth: The Major Works*, ed. Stephen Gill (Oxford: Oxford UP, 1984), 134. The Romantics, as Jonathon Smith indicates, "wanted both science and poetry to explore an organic universe rather than a machine, a universe where reality is created—or at least half-created—by the observing mind," *Fact and Feeling,* 46.
[114] Wordsworth, "Preface," in *Lyrical Ballads*, ed. Fiona Stafford (Oxford: Oxford UP, 2013), 97.
[115] Wordsworth, "Essay, Supplementary to the Preface," in *Wordsworth: The Poems*, ed. John O. Hayden, 2 vols. (New Haven: Yale UP, 1981), 2:944-47 quoted in Keane 1.
[116] Keane, 54.
[117] Coleridge, *Biographia Literaria,* eds. James Engell and W. Jackson Bate (Princeton: Princeton UP, 1983), 121.

and Necessary."[118] Coleridge defines Nature as a "Power subject to Law of Continuity," which "human understanding, by a necessity arising out of its own constitution, can *conceive* only under the form of Cause and Effect."[119] The "*form* (or law) of Cause and Effect" exists relative to our thinking but also acts as a "form or mode of *thinking*" because the law is "inherent in the Understanding itself…"[120] Here, Coleridge accounts for causation as a mind-independent law of nature (a continuous flow of relations) whereby our Reason comprehends the laws through an apparatus of cause and effect—because Reason is the "integrated Spirit of the regenerated man, reason substantial and vital."[121] By this logic, a chain of causal relations could be explained by "a chain of *deductions* and *conclusions*;" however, Coleridge identifies two issues with this method: first, "the very faculty would equally demand an explanation," and second, "that there exists in fact no such intermediation by logical notions, such as those of cause and effect." If we try to deduce the chain of causal relations, then we are presented with "the product of syllogism" and not "the object itself."[122] Unlike Kant's reason, the intuitive Reason held by Coleridge, Wordsworth, and Emerson is, as Keane notes, "capable of creative insight into things-in-themselves, ultimate reality: the divine life within us an abroad."[123] Natural causation itself, and not an explanation of causal relations through deductions, reveals the integration of Spirit and Matter, the Absolute and Man.

Coleridge's intuitive Reason appealed to Emerson, and in "Self-Reliance," Emerson writes, "a man should learn to detect and watch that gleam of light which flashes across his

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[118] Coleridge, "Statesman's Manual," in *The Complete Works of Samuel Taylor Coleridge*, ed. W. G. T. Shedd, 7 vols. (New York: Harper & Brothers, 1884), 1:439.
[119] Coleridge, *Aids to Reflection* (New York: Cosimo Classics, 2005), 176fn1.
[120] Ibid.
[121] Keane, 50.
[122] Coleridge, *Biographia Literaria,* 134.
[123] Keane, 58.

mind, more than the lustre of the firmament of bards or sages."[124] According to Keane, Emerson "transcends the Kantian categories of Time and Space to affirm those gleams, the reciprocal 'power' Coleridge says 'streamed' from Wordsworth when he received light: '…an instantaneous in-streaming causing power'."[125] It is in this "instantaneous in-streaming" that Emerson's theory of indeterminist causation emerges. Albanese argues that Emerson and the Transcendentalists resisted theological and scientific notions of causality for higher-order thinking that transcended the limits of cause and effect rationale and "fit into the definition of magic."[126] John Lysaker also refutes the possibility of causation as critical groundwork for Emerson's metaphysics: "In disclosing causality in which the very thought of causality arises, Emerson draws the bottom out from under this would-be ontological linch-pin."[127] Causality, I argue, serves as a framework for Emerson's metaphysics—what Joseph Urbas terms "universal causation." For Emerson, the continuous flowing law of nature ("the universal causation") is the unifying property that makes the world "One." Urbas positions Emerson as both a Realist and Nominalist since "Emerson's metaphysics easily accommodate both, as opposite poles of one great causal and ontological continuum (however difficult the *lived* experience of bi-polarity may often be)."[128] In Urbas's view, Emerson is "a *causationist*—that is, a firm believer in causality as the 'strict connexion between every pulse-beat'—every 'trifle'—'and the principle of being'."[129] Emerson sees reality as a causal continuum "intricate, overlapped, interweaved and endless,"—a "web of relations" where the "relation and connection are not somewhere and sometime, but

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[124] Emerson, "Self-Reliance," in *Selected Essays of Emerson,* ed. Larzer Ziff (New York: Penguin Books, 1982), 176. See Samantha Harvey, *Transatlantic Transcendentalism: Coleridge, Emerson, and Nature* (Edinburgh: Edinburgh UP, 2013) for a comprehensive study on Coleridge's influence on Emerson.
[125] Keane, 62.
[126] Albanese, 7.
[127] John Lysaker. *Emerson and Self-Culture* (Bloomington: Indiana UP, 2008), 86 quoted in Joseph Urbas, "'Bi-Polar' Emerson: 'Nominalist *and* Realist'," *The Pluralist* 8, no. 2 (2013): 93.
[128] Urbas, 85.
[129] Ibid.

everywhere and always."[130] In the last lines of "Self-Reliance," Emerson declares that "Cause and Effect" are the "chancellors of God."[131] Causality is the governing motion—a universal causation where "there is never a beginning, there is never an end, to the inexplicable web of God, but always circular power returning into itself."[132] Perceiving the laws of "Cause and Effect" then leads us to a higher unity; it awakens our intuition so that we can see the whole, "the causes and spirits," rather than simply the particulars.

Thoreau's theory of causality likewise relies on the "assumption that the universe is a whole formed by an antecedent spirit," or a singular fact.[133] Because of this "One" organizing law of Nature, Thoreau maintains that all "nature obeys the same civil laws:" from the cosmos to the "deepest recesses of the forest" in the "little red bug on the stump of a pine," the shifting of wind, and the sun breaking through the clouds.[134] For Thoreau, however, "we discover infinite change in particulars only, not in generals."[135] This discovery starts with an empirical and phenomenological experience with the particulars of nature; for if all nature obeys the same antecedent law as the whole universe, then observing the particulars, like "the little red bug," would reveal insight into the laws of Nature. In this view, the precision of Baconian inductionism and Newtonian scientific explanation offers Thoreau a method for discovering the

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[130] Emerson, "Fate," in *Selected Essays of Emerson,* ed. Larzer Ziff (New York: Penguin Books, 1982), 383, 379.
[131] Emerson, "Self-Reliance," 203
[132] Emerson, "American Scholar," in *Selected Essays of Emerson,* ed. Larzer Ziff (New York: Penguin Books, 1982), 85.
[133] *Seeing New Worlds,* 61. Walls explains that to nineteenth-century science and philosophy "[f]acts are vital" because "[t]ruth is intrinsic contained ready in the fact," 40. For Tauber, Thoreau regards "facts" as materials to "construct a portrait of reality, in the process enunciating a metaphysics of the self," 99. In Donald Worster's *Nature's Economy*, 2nd ed. (Cambridge, Mass.: Cambridge UP, 1994), 78, "Facts must become experiences for the whole man, not mere abstractions in a disembodied mind. The naturalist must allow himself to be engulfed to his every ears in the odors and textures of sensible reality."
[134] *A Week on the Concord and Merrimack Rivers* (New York: Penguin, 1998), 255.
[135] Ibid., 77.

unknown particulars of nature: *a posteriori* facts realizable only through empirical evidence and scientific application. He writes,

> An unwearied and systematic application to nature, causes the unknown to reveal themselves…. How many new relations a foot-ruler alone will reveal, and to how many things still this has not been applied! What wonderful discoveries have been, and may still be, made, with a plumb-line, a level, a surveyor's compass, a thermometer, or a barometer![136]

The mathematical and scientific devices lead to unknown facts that cannot be uncovered *a priori* without a systematic approach of measuring, surveying, and calculating. The Baconian-Newtonian method lets Thoreau work from his empirical observations to reach a hypothesis about a higher, unknown truth.

This empirical and "Baconian" method dominated nineteenth- century science and natural theology, although labeling science as such, Walls claims, does not consider the historical complexities of the Baconian epistemology. The general assumption that "the mere accumulation of facts would produce scientific truth" excluded the need for hypothesis and "became so overwhelming that the system collapsed, clearing the way for a more modern and theoretical approach" where "facts are not facts until hypothesis gives them significance."[137] While some like Coleridge, William Whewell, and John Stuart Mill were skeptical of Baconian induction, they believed that without Bacon science could not have advanced and offered new readings of Bacon's *Novum Organum.*[138] Coleridge argued that, without the active participation of the mind, Bacon's system of gathering facts cannot be considered a method of science. The "true Baconian philosophy" then relies on "a profound meditation on those laws which the pure reason in man

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[136] *A Week*, 292-3.
[137] Walls, *Seeing New Worlds,* 30.
[138] Smith, *Fact and Feeling*, 18. Smith notes, "Where Herschel sees in Lyell a Baconian emphasis on facts and a Newtonian emphasis on 'true causes' infused with the right amount of speculation and imagination, Coleridge and Whewell are critical of a speculation too much grounded in the here and now and off mental initiative prematurely," 100.

reveals to him, with the confident anticipation and faith that to this will be found to correspond certain laws in nature."[139] Walls writes that, for John Herschel, the belief that "Bacon's real teaching was that natural philosophy consists of generalizing from particulars, and reasoning from generals back to particulars" formed his 1830s "feedback loop of deductive and inductive reasoning," which he claimed to be "infinitely more powerful" than deduction or induction alone.[140] Like his contemporaries, Thoreau was skeptical about the Baconian-Newtonian structures of science where induction could reduce nature to a "finite rule," and thereby "no longer dazzles us" or enchants us.[141] "We do not learn by inference and deduction and the application of mathematics," writes Thoreau in "Natural History of Massachusetts," "but by direct intercourse and sympathy…. the Baconian is as false as any other…."[142] Thoreau sees, as Coleridge does, the lack of active and personal participation from the observer in inference and deduction. Thoreau, however, uses the Baconian-Newtonian approach in order to hypothesize on the unknown cause of the visible effects, an act that necessitates an imaginative speculation to complete the inference.

Perhaps, the most influential application of the Baconian-Newtonian induction for Thoreau occurred after reading Charles Lyell's *Principles of Geology* (1830). Lyell's theory uses induction to "trace the long series of events which have gradually led to the actual posture of affairs." By "connecting effect with their causes," Lyell claims that we can "classify and retain

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[139] Coleridge, *The Philosophical Lectures of Samuel Taylor Coleridge,* ed. Kathleen Coburn (New York: Philosophical Library, 1949), 333-34 quoted in Smith, 16.
[140] Walls, *Seeing New Worlds,* 30; John Herschel, *Preliminary Discourse on the Study of Natural Philosophy* (Chicago: U of Chicago P, 1987), 104, 181 quoted in ibid. Likewise, Victor Cousin maintained that an empirical philosopher should "[b]egin with the method of a priori, and give to it by way of counterpoise the method a posteriori."
[141] *Journal* 3:44.
[142] "Natural History of Massachusetts," in *The Essays of Henry David Thoreau*, ed. Lewis Hyde (New York: North Point Press, 2002), 23. He continues, "It is with science as with ethics,—we cannot know truth by contrivance and method; the Baconian is as false as any other, and with all the help of machinery and arts, the most scientific man will still be the healthiest and friendliest man, and possess a more perfect Indian wisdom."

the memory of a multitude of complicated relations."[143] This method would reveal "what combination of causes analogous effects were referable; and they would often be enabled to supply, by inference, information concerning many events unrecorded."[144] Thoreau draws on the Lyellian inductionism in his claim that "[w]e discover the cause of all past change in the present invariable universe."[145] By studying the present natural world, Thoreau could infer the "causes of all past change," a systematic approach that would, in Walls's words, "bring to light 'astonishing and unexpected… connexions with past civilizations'."[146] While, in his strict Baconian method, Lyell discouraged the study of unknown forces since visible, measurable forces were sufficient, Thoreau's "unwearied and systematic application to nature" insists on a study of unknown forces.[147] The fact that "we can reason so accurately, and with such wonderful confirmation of our reason, respecting so-called material objects and events infinitely removed beyond the range of our natural vision" prompts Thoreau to question the validity of our speculation of the unknown in *Walden*: "why may not our speculations penetrate as far into the immaterial starry system, of which the former is but the outward and visible type?"[148] Newton's method proved it possible for Thoreau to reach the intangible laws of Nature through a phenomenal and empirical experience.

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[143] Charles Lyell, *Principles of Geology*, 8th ed. (London: John Murray, 1850), 1.
[144] Ibid., 12. Lyell's theories largely influenced Charles Darwin. See Smith, *Fact and Feeling*, 95. Lyell's geological methods would influence Charles Darwin, who in a letter to Leonard Horner wrote: "I always feel as if my books came half out of Lyell's brain."
[145] *Journal* 1:90-91.
[146] *A Life,* 42.
[147] William Rossi identifies a tension between Lyell's uniform change and the "Newtonian model of the continuous and simultaneous interaction" of change in "Poetry and Progress: Thoreau, Lyell, and the Geological Principles of *A Week,*" *American Literature* 66.2 (1994): 279.
[148] *Walden*, 310.

1.3 Thoreau's New Materialist Ontology

In his Preface to *Principia*, Newton writes, "I wish we could derive the rest of the phenomena of nature by the same kind of reasoning from mechanical principles, for I am induced by many reasons to suspect that they may all depend upon certain forces by which the particles of bodies, by some causes hitherto unknown…"[149] In *Walden,* Thoreau offers a similar ambition for causal reasoning; he writes that "[if] we knew all the laws of Nature, we should only need one fact, or the description of one actual phenomenon, to infer all the particular results at that point."[150] Since there are laws "which we have not detected," we must view the particulars laws to reach through "an infinite number of profiles" to find the "one form."[151] In order to infer "the particular results" from "one actual phenomenon," Thoreau's epistemological approach to observing natural causation emerges in his attempt to find regularity in the undetected laws of nature: the underlying cause of nature's laws and his own being. The fact that Newton's discovery derived from empirical observations warrants the significance of a personal, firsthand experience with Nature, leading Thoreau to question: "How can we *know* what we are *told* merely?...We read that Newton discovered the law of gravitation, but how many who have heard of his famous discovery have recognized the same truth that he did?"[152] Newton's empirical methods recognized a fact (the law of gravitation) and uncovered an unknown truth of Nature's law.[153]

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[149] Newton, *Principia,* 4.
[150] *Walden*, 195.
[151] I will elaborate on this passage in chapter two where I offer a close-reading of Thoreau's causal reasoning in *Walden.*
[152] *A Week,* 293.
[153] In this view, Newton's approach merits a Coleridgean and Emersonian relation to science where self-knowledge and an imaginative interjection into a scientific method can be used to reveal the laws of nature.

Thoreau's empirical approach to finding natural laws can also be traced to Alexander von Humboldt, as compellingly demonstrated by Walls.[154] Humboldt follows the Baconian-Newtonian tradition in *Cosmos* (1845) by tracing "the stream of our knowledge to its primitive source…amid the ever-recurring changes of form, to recognize the invariability of natural laws."[155] Finding a "knowledge of the chain of connections, by which all natural forces are linked together" becomes Humboldt's aim in observing physical phenomena. His empirical study leads to, what Wall's terms, an empirical holism in which "a harmonized whole [] emerged from the interconnected detailed of particular natural facts."[156] Humboldt's description of the relation between the "harmonized whole" and "interconnected details" evokes indeterminism, even though it strives for invariability. For instance, Humboldt writes in his introduction to *Cosmos*, "Nature considered *rationally*, that is to say, submitted to the process of thought, is a unity in diversity of phenomena; a harmony, blending together all created things, however dissimilar in form and attributes; one great whole animated by the breath of life."[157] Here, Humboldt's harmonized whole does not seem to have a linear, determinable structure; instead, his idea of unity entails a "blending together," an "inextricable net-work of organisms by turn developed and destroyed" amidst "the universal fluctuation of phenomena and vital forces."[158] Studying the network of organisms "leads us to the entrance of new labyrinths" and "vague intuition of the mysteries to be unfolded."[159] Here, Humboldt's network of fluctuating organisms and vital forces

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[154] Walls writes in "Believing in Nature," in *Thoreau's Sense of Place,* ed. Richard Schneider (Iowa City: U of Iowa P, 2000), 18, "Alexander von Humboldt took the alternate pathway [from Kant], not to replace [empiricism] but to complete the kind of knowledge being developed by the "rational" sciences, and so developed an "empirical" alternative which strongly appealed to Thoreau. See also Walls, *The Passage to Cosmos* (Chicago: U of Chicago P, 2009).
[155] Alexander von Humboldt, *Cosmos: A Sketch of the Physical Descriptions of the Universe*, trans. E. C. Otté. 2 vols. (Baltimore: John Hopkins UP, 1997), 1:23.
[156] Walls, *Seeing New Worlds,* 4.
[157] Humboldt, 1:23.
[158] Ibid., 41.
[159] Ibid.

aligns with an Emersonian web of relations, which continually create "new labyrinths" for the intuition to explore. Humboldt approaches this inextricable web of fluctuations and forces through "a more intimate knowledge of the connection existing among all phenomena."[160] In this sense, Humboldt's writings shift from an materialist-determinist approach of "intimate knowledge" to an indeterminist perspective of unceasing vital forces and entangled phenomena.

Similar to Humboldt, Thoreau uses a Baconian-Newtonian method to create an apparatus for inferring the materialist-determinist causal relations in Nature but finds that the qualitative relation between cause and effect cannot be so easily determined in the dynamic ecosystem of the Concord Woods and Walden Pond. Instead, Thoreau's determinist causal inference leads to a reflection on indeterminate series of causal relations, where the causal actions of nonhuman and human entities become inseparable from one another.[161] Vital materialist (or New Materialist) theories offer a productive framework for literary analysis in the trajectory of Thoreau's causal thought because, like Thoreau, they find that causality requires a more complex understanding than the materialist-determinist causation model. Diana Coole and Samantha Frost credit the Newtonian model of physics (mechanical physics) for offering a way "to examine the interactive relationship between bodies and the forces that act upon them" and to develop a "science of forces and movements that are less obviously material yet from which matter is inseparable."[162] New Materialists, however, reject the claims of materialists-determinist causality where "material objects move only upon an encounter with an external force or agent, and they do so according to a linear logic of cause and effect" and "predictable forces."[163] Instead, they argue

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[160] Ibid., 50. Walls, "The Value of Mutual Intelligence," in *Thoreau at Two Hundred,* ed. Kristen Case and K. P. Van Anglen (Cambridge: Cambridge UP, 2016,) 191describes Humboldt's observational stance: "Cataracts, sound waves, air currents, the ear that hears, the mind that responds—all are entangled."
[161] See *Journal* 3:326 where Thoreau exclaims, "I wonder that I even get 5 miles on my way the walk is so crowded with events – & phenomena."
[162] Coole and Frost, 11.
[163] Ibid., 7.

for a more complex understanding of causality: "new materialists are rediscovering a materiality that materializes, evincing immanent modes of self-transformation that compel us to think of causation in far more complex terms; to recognize that phenomena are caught in a multitude of interlocking systems and forces and to consider the location and nature of capacities for agency."[164] The laws of nature are viewed as unpredictable because "there is no longer a quantitative relationship between cause and effect," and "[f]or any emergent material configuration, infinitesimally small causes can transform successive conditions for interaction among elements such that they end up having *massive but unanticipated effects.*"[165] In Karen Barad's agential realism, for instance, "[c]ause and effect emerge through intra-actions," or a necessitation of bodies to participate in action ("causal enactments") with one another—to understand things and forces as constantly changing, exchanging, diffracting, and interacting inseparably as "matter-in-the-process-of-becoming is iteratively enfolding into its ongoing differential materialization."[166] Causal relations, however, "cannot be thought of as specific relations between isolated objects; rather causal relations necessarily entail a specification of the material apparatus that enacts an agential cut between determinately bound and propertied entities within a phenomenon."[167] In agential realism, objects and beings are not separable and objectified; there are constant exchanges and changes occurring. Our attempt to understand the phenomena through the phenomenological body becomes an apparatus (a structure to measure an outcome) and makes a cut in the agencies (exchanges and changes) to identify an aspect of the phenomena that can be imagined within the apparatus as an object/being/body and an other; this "agential cut" comes from the "marking or specific materializing 'effect' identifies the agency of

[164] Ibid., 9.
[165] Ibid., 14; emphasis mine.
[166] Karen Barad, *Meeting the Universe Halfway* (Durham: Duke UP, 2007), 176-9.
[167] Ibid., 176.

observation as agentially separable from its 'cause' (the 'object') within the phenomenon."[168] Unlike the Cartesian cut that attempts to "disentangle" the phenomena, the agential cut provides "a contingent resolution of the ontological inseparability within the phenomenon hence the conditions for…description: that is, it enables an…account of marks on bodies, but only within the particular phenomenon."[169] Bodies are then perceived as nodes in space-time: assembling, connecting, congealing, exchanging, reconfiguring.

Intra-activity introduces a "new sense of aliveness" where the "world's effervescence, its exuberant creativeness, can never be contained or suspended."[170] Thoreau, too, seems to see a new sense of aliveness in the movement of bodies. In an 1851 journal entry, he writes, "The earth I tread on is not a dead, inert mass. It is a body, has a spirit, is organic, and fluid to the influence of its spirit, and to whatever particle of that spirit is in me."[171] He resists seeing "events as merely material—wooden—rigid—dead" and acknowledges that "we actually inform with them little life by which they live."[172] When Thoreau applies Baconian-Newtonian methods and attempts to determine forces as predictable, he does not find a qualitative relationship between

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[168] Ibid., 175
[169] Ibid., 348.
[170] Ibid., 177. See Gaukroger, 688-99. Scientific discoveries in electricity, biology, and chemistry supported the self-organizing, organic universe that informed Romantic and Transcendentalist vitalism. With new developments in electricity, like Boscovich (1758), a radical rethinking of material occurred: "a conception of matter as something essentially active." In *Vénus Physique* (1745), Pierre Louis Moreau de Maupertuis "defends a variety of egigensis that is based on a sort of vital materialism" where "fluids [are] intrinsically active matter drive by a sort of attraction to form the parts of the embryo in accordance with natural law." Maupertuis identifies a "vital, internal motive force that explains the motion of biological substances." The French Enlightenment Vital Materialists relied on "immaterial principles," attributing "innate activity to matter" and believed that "matter itself rather than some superadded principle…is capable of self organization." Similarly, in biology, Éntienne Geoffroy Saint-Hilaine proposed "[t]here was a continuity between the organic and inorganic, and the idea that the matter of living things was itself living." Thoreau writes of these concepts in a journal entry: "Read an interesting article on Étienne Geoffroy Saint-Hilaine, the friend & contemporary of Cuvier, though opposed to him in his philosophy. He believed species to be variable. In looking for anatomical resemblances he found that he could not safely be guided by function, for structure, size, color, etc. but only by the relative position and mutual dependence of organs. Hence his *Le Principe des Connexions* & his maxims, 'An organ is sooner destroyed than transposed'…A principle formula of his was 'Unity of Plan, Unity of Composition'," see *Journal* 6:178-9.
[171] *Journal*, 3:165.
[172] Ibid., 1:468.

cause and effect but phenomena "caught in a multitude of interlocking systems and forces," where the motions of human and nonhuman entities become inseparable.[173] Underlying Thoreau's causal epistemology and ontology is the belief that all material in the universe obeys the same law, an antecedent motion in all material: "The hardest material seemed to obey the same law with the most fluid, and so indeed in the long run it does."[174] Like Emerson's "universal causation," Thoreau's theory holds that the continuous flowing laws of nature are the unifying property that makes the world "One." Thoreau writes,

> The first cause of the universe makes the least noise. Its pulse has beat but once—is now beating. The greatest appreciable revolutions are the work of the light-footed air—the stealthy-placed water—and the subterranean fire. The wind makes the desert without a rustle. To every being consequently its own first cause is an insensible and inconceivable agent.[175]

This passage echoes Emerson's metaphors of causality as a "strict connexion between ever pulse-beat" and the "principle of being."[176] Here, Thoreau's first cause continually pulses through natural elements: its pulse is the "work of the light-footed air," "the stealthy-placed water," the "subterranean fire." Every being after the "first cause of the universe" cannot trace its cause back through the pulsations, so its "own first cause is an insensible and inconceivable agent." Because "Nature is continually original – and inventing new patterns," the first cause cannot be conceived as it is derived from an endless series of pulsations—shifting relationalities between objects: the "overhanging pine" *dropping* into the water, the "sun and wind *rubbing* it on the shore" and *wearing* its boughs "white and smooth" to "assume fantastic forms."[177] We can read this passage through Barad's causal intra-actions where "bodies differently materialize

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[173] Ibid., 14; emphasis mine.
[174] *A Week,* 266.
[175] *Journal*, 1:90-91.
[176] Emerson, "Power," in *The Collected Works of Ralph Waldo Emerson*, eds. Joseph Slater, et al. 9 vols. (Cambridge, Mass.: Harvard UP, 1971–2011), 6:28, 29 quoted in Urbas, 85.
[177] *Journal* 1:376.

as particular patterns *of* the world as a result of the specific cuts and reconfigurings that are enacted."[178] For Thoreau, these relationalities cannot be traced through an inductive or deductive method because Nature continually creates new patterns.[179] Thus, Thoreau writes, "Cause and effect are equally evanescent and intangible, and the former must be investigated in the same spirit and with the same reverence with which the latter is perceived."[180] Thoreau claims that the "essence" of the phenomenon comes from this "evanescent and intangible" flow of cause and effect: "the essence which at the same time perceived the effluence."[181] Causality becomes the essence of the phenomenon—or if, as Barad argues, the primary ontological units are "phenomena—dynamic topological reconfigurings/ entanglements/ relationalities/ (re)articulations," we can interpret the effluence of "Cause and Effect" as an ontological unit.[182] Cause and effect are dependent modes of explanation that must be studied with the "same reverence," and so the causal event becomes an epistemological site of causal explanation along with an ontological site where Thoreau must place his actions within the web of causal events. This unpredictability in natural phenomena renders an agency and vitalism to nonhuman entities where the action (a cause or effect) of a single entity is inextricable from its relationalities—from the entire causal event itself.

In the following chapter, I argue that these shifts in Thoreau's causal thinking expose moments of cognitive restructuring of ontological boundaries between observer/observed and human/nonhuman. As the qualitative relation between cause and effect becomes insoluble in

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[178] Barad, *Meeting the Universe,* 176.
[179] Barad writes, "Intra-actions always entail particular exclusions, and exclusions foreclose the possibility of determinism, providing the condition of an open future…Possibilities aren't narrowed in their realization; new possibilities open up as others that might have been possible are now excluded: possibilities are reconfigured and reconfiguring," ibid., 177.
[180] *Journal* 1:23.
[181] *Ibid.,* 1:23-24
[182] Barad, "Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter," *Signs* 28, no. 3 (2003): 817-8.

Baconian-Newtonian methods, Thoreau uses imaginative inferences and poetic ideations to make meaning of the causal event where nonhuman and human entities are inseparable from their series of causal relations. Just as vital materialists linger on "moments during which they find themselves fascinated by objects, taking them as clues to the material vitality that they share with them," I argue that we can locate moments in Thoreau's texts where he is fascinated by nonhuman entities and their actions, textual clues where the "sensory, linguistic, an imaginative attention [turns] toward a material vitality."[183] Because indeterminist causal events cannot be reduced to a single entity's actions, all living and nonliving material entities become active agents—an interplay of agentic forces—within the series of cause and effect.

[183] Bennett, *Vibrant Matter,* 17-18.

2 THE MOTIONS OF *WALDEN*

In an April 18, 1852 journal entry, Thoreau records a series of observations: a flock of birds flying and landing in the water; ducks grazing in the field; a thistle springing up in the grass; geese crackling and flying overhead; the willow catkin expanding; a sucker floating on the meadow. The actions of the phenomena of the lake lead Thoreau to reflect on the series of events:

> Why should just these sights & sounds accompany our life? Why should I hear the chattering of blackbirds—why smell the skunks each year? I would fain explore the mysterious relations between myself & these things. I would at least know what these things unavoidably are – –make a chart of our life—know how its shores trend—that butterflies reappear & when—know why just this circle of creatures completes the world."[184]

To explore the relations "between myself & these things," Thoreau acknowledges the need for a theoretical system that could chart and calculate natural occurrences.[185] In this passage, he speculates that a systematic epistemology of nature's progressions would yield a method of exploring the "mysterious relations" between things and inferring regularity in nature from these relations. In *Walden* (1854), Thoreau would develop this earlier theoretical requirement for exploring the enigmatic, inexplicable relations—relations that he finds unavoidably inseparable from himself. The inseparability of things from a network of causal connections calls into question the ontological difference between "myself & these things." As I demonstrated in chapter one, Baconian-Newtonian inductionism offered Thoreau an accurate and precise method of calculation and prediction to explore the unknown laws of Nature. By observing causal relations as linearly determined, Thoreau could infer an underlying "cause," or a singular fact, from the regularity in empirical "effects" of natural phenomenon. This materialist-determinist

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[184] *Journal*, 10:729.

[185] Walls, *Seeing New Worlds*, 171 suggests that "[u]nder his theory that the universe formed a "complete" and closed circle, Thoreau was determined to observe all possible causes and coincidences…"

approach to causation becomes a framework for Thoreau's imaginative inferences or figurative renderings of the "mysterious relations" that sees human and nonhuman entities as vital agents in an indeterminist series of causal relations.

Thoreau's causal reasoning becomes apparent in his attempts to measure the "deepest part of the pond" in "The Pond in Winter." Following the Baconian-Newtonian scientific tradition, Thoreau gathers empirical evidence by observing the particular facts of Walden Pond. By "sounding through the ice" to determine the shape of the pond's bottom, Thoreau "could calculate the variation for each one hundred feet in any direction."[186] Thoreau explains his progression of thought from his detected calculation to its theoretical applicability:

> Having noticed that the number indicating the greatest depth was apparently in the centre of the map, I laid a rule on the map lengthwise, and then breadthwise, and found, to my surprise, that the line of greatest length intersected the line of greatest breadth *exactly* at the point of greatest depth…. I said to myself, Who knows but this hint would conduct to the deepest part of the ocean as well as of a pond or puddle? Is not his the rule also for the height of mountains, regarded as the opposite valleys?[187]

Thoreau develops a conceptual system in which he deduces a causal law that governs the phenomenon and infers a hypothesis that can be compared to other phenomenon: "Given, then, the length and breadth of the cove, and the character of the surrounding shore, and you have almost elements enough to make out a formula for all cases."[188] Finding regularity and conformity in his calculations of Walden Pond, Thoreau contemplates the possibility of a causal epistemology. If we could access the knowledge of regularity and uniformity in "all the laws of Nature," then, by observing its patterns through the occurrences of the effect following its cause ("one fact, or the description of one actual phenomenon"), we could anticipate the causal relations in nature ("infer all the particular results at that point"). He illustrates this point by

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[186] *Walden*, 195.
[187] Ibid.
[188] Ibid.

applying the same formula to measure the depth of White Pond, and then, to the depths of human character for an anthropometric-like inference drawn from the "one fact," or the "rule of two diameters." Thoreau's systematic effort to find the "deepest part" affords a way "to infer [a person's] depth and concealed bottom" by drawing "lines through the length and breadth of the aggregate of a man's particular daily behaviors and waves of life into his coves and inlets" and, by finding in the line's intersection, uncover "the height or depth of his character."[189] Like his causal theory, Thoreau seeks to find the underlying cause (a person's depth) by observing the effects (series of daily behaviors). For his epistemology to hold true, Thoreau's "one fact" can be inferred for "all the particular results" in both human and nonhuman phenomena.

This universal causal reasoning is but an ideal in Thoreau's empirical observations, for "we know only a few laws, and our result is vitiated, not, of course, by any confusion or irregularity in Nature, but our ignorance of essential elements in the calculation."[190] Our conceptions of "law and harmony" are confined to the few laws constituting our knowledge of the "essential elements in the calculation," but the still-more-wonderful harmony results in "a far greater number of seemingly, conflicting, but really concurring, laws, which we have not detected."[191] Although Thoreau acknowledges the epistemic limitation of nature's laws, he accepts the determinist approach where laws *can* infer "all particular results" if we could only know *all* the laws of nature. In the next line, the determinist epistemology recedes into the endless fluctuation of nature, imperceptible to the bounds of perception: "The particular laws are as our points of view, as, to the traveller, a mountain outline varies with every step, and it has an infinite number of profiles, though absolutely but one form."[192] We cannot perceive the harmonization (the "one

[189] Ibid., 196.
[190] Ibid., 195.
[191] Ibid.
[192] Ibid., 195-6.

form") except through our shifting and fragmented "point of view" of nature, which appears in "an infinite number of profiles." Thoreau's reference to the "infinite number of profiles" evokes an indeterminist view where the laws of Nature cannot be linearly determined due to the shifting relations. This passage exhibits the interdependence of these two frameworks of the causal debate where Thoreau's reflection on the effervescent causal relations first depends on his causal epistemology that attempts to linearly trace cause-and-effect by inferring particular laws from the detected material motions of nonhuman and human entities. Finding these laws becomes a pursuit of Thoreau's observations and epistemological framework to experience knowledge through the particulars of the material world.[193] For Walls, Thoreau tests this theory by "reach[ing] through the particulars to the single law that organized them into a harmonious whole," shifting from a "passive recorder to an active seeker."[194] The particular, as Michael Jonik holds, "is bound up with how we can perceive it within its tangle of relations."[195] Thoreau tests his theory ("all the particular results" can be deduced from "one actual phenomenon") by locating "the particulars" of a phenomenon within "tangled" causal relations of human and nonhuman motions.[196]

Thoreau does not find a "particular result" but rather finds himself in a universe made up of causal connections: a continuous interchange of matter, motion, and contact. The empirical experience of indeterminist causation challenges the assumptions of the Baconian-Newtonian method and, as he views causal relations of the material world, Thoreau realizes that there is no

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[193] Thoreau's attention to the particulars of the material world acts as a primary framework for his epistemology. As Tauber demonstrates, "Truth was to be found in the actual process of *seeing*, it would be discovered in the particular, for the particular's own sake," 99.
[194] *Seeing New Worlds*, 36.
[195] Michael Jonik, " 'The Maze of Phenomena': Perception and Particular Knowledge in Thoreau's Journal," *Thoreauvian Modernities: Transatlantic Conversations on an American Icon*, eds. Francois Specq, et al. (Athens: U of Georgia P, 2013), 205.
[196] *Walden,* 195.

single phenomenon; instead, a single spatiotemporal phenomenon—a moment of interplay between space, time, and matter—contains simultaneous events that are contiguous in space and time.[197] In Karen Barad's definition of "agential realism," for example, she claims that phenomena "do not merely mark the epistemological inseparability of observer and observed, or the results of measurements; rather, *phenomena* are the *ontological* inseparability of agential intra-acting components."[198] If the primary ontological units in Thoreau's texts resemble causal relations between entities rather than entities themselves, how could our views of his ontology change? When Thoreau observes the "enfolding phenomenon" of causal relations, the domains of the interior of his mind and exterior of the material phenomenon "lose their previous designations." Thoreau does not have an "exterior observational point," rather he becomes "part *of* the world" by his entanglements in the causal motions of nature's materiality.[199] Walls testifies to Thoreau's ontological engagement in nature by describing his observations and perceptions of nature's heterogeneous parts: moments "where man and nature were at every level dependent on and expressive of each other, and the 'facts' of nature were energetic co-productions of the human mind operating with and within the field of natural objects."[200] My close-readings of causal events present a cogent case for Thoreau's ontological relation to nature insofar as they accentuate the interdependency of human and nonhuman actions.

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[197] See Paul Giles, "Transnational Thoreau: Time, Space, and Relativity," in *Thoreau at Two Hundred,* eds. Kristen Case and K. P. Van Anglen (Cambridge: Cambridge UP, 2016), 150. He writes, "Hence 'the infinite extent of our relations' also betokens for Thoreau a world of relativity, whose shifting dimensions of time and space render the position of the local observer always refractory."

[198] Barad, *Meeting the Universe*, 33. Barad's term "intra-activity" suggests that "reality is not composed of things-in-themselves or things-behind-phenomena but 'things'-in-phenomena," in "Posthumanist Performativity," 817-8. It refers to how "the marking or specific materializing 'effect' identifies the agencies of observation as agentially separable merges from its 'cause' (the 'object') within the phenomenon. The marks left on the agencies of observation (the effect) are said to constitute a measurement of specific features of the object (the cause)," *Meeting the Universe,* 176. Kristen Case provides a persuasive reading of Karen Barad's "agential realism" and Thoreau's Kalendar in "Knowing as Neighboring: Approaching Thoreau's Kalendar," *J19: The Journal of Nineteenth-Century Americanists* 2, no. 1, (2014): 107-129.

[199] *Meeting the Universe*, 180-81.

[200] Walls, *Seeing New Worlds,* 144.

2.1 Writing Relationalities: Language and Cognitive Acts

To claim that natural causation yields an ontology, we must first ask how language itself inaugurates such reflections on causal relations and the agency of natural objects. How does the connection between words enact the relation between material objects and phenomena? In one sense, we could say that meaning and words offer an "ontological condition" where, as Stanley Cavell argues, "our meaning a word is our return to it and its return to us—our occurring to one another—is expressed by the word's literality."[201] This transfer from our meaning to the word's and back becomes relational to the literal expression of the word. Cavell's literality, according to Branka Arsić, means that "words have to find their way back to things: emerging out of imprints—a novel phenomenon generated by encounters with beings and things—they themselves have to become 'events'."[202] Sharon Cameron holds that figurative language in Thoreau's *Journals* raises "a question of how part of a phenomenon is related to the whole of that phenomenon or to another phenomenon."[203] Thoreau's "series of impression," for Cameron, most clearly "refers to the connection of a phenomena with itself…and to the conjunction of one phenomena with another."[204] In this view, an objective description of things is an effort to "writ[e] nature" in a way that "subordinates human presences" while necessitating a reflection on the connectivity between natural phenomena.[205] *Walden*'s descriptions simultaneously subordinate human presences foregrounding the phenomena itself and involve human presences within causal relations as if to write human actions into nature's phenomena. With these

[201] Stanley Cavell, *The Senses of Walden: An Extended Edition* (Chicago: U of Chicago P, 1992), 27; 63.
[202] Arsić, 7. See *Journal* 12:389-90 where Thoreau writes, "Why the roots of *letters* are *things*."
[203] Cameron, *Writing Nature* (Chicago: U of Chicago P, 1985), 11.
[204] Ibid., 57;60. Cameron writes, "For the 'mystery of relation' between nature and the self inheres not simply in the sense that certain phenomena, themselves incomplete, arbitrarily engage and complete man's attention… rather it inheres in the inexplicable way in which ostensibly the same phenomena exhibit—as each occurrence a different manifestation."
[205] Ibid., 145.

frameworks, Thoreau's language functions in two ways: (1) words themselves, bound by material objects and actual events, become a phenomena derived from and always returning to material objects and occurrences, and (2) a series of observations reveals the relationalities between phenomena and necessitates a reflective response concerning causal relations. In his description of causal events (or series of causal relations), Thoreau's figurative language works both as a way to question nature's relation to itself and as a thing itself (an entity acting within the causal event).[206]

If we define causal events as "set[s] of relations between objects," these relations must also be realizable within Thoreau's accounts of nature.[207] In "Brute Neighbors," Thoreau questions these relations between objects, "Why do precisely these objects which we behold make a world?"[208] How are objects (the antecedent parts) causally connected to the whole (the organic, self-organizing universe)? How do we perceive the objects as causally connected insofar as they logically necessitate an interconnected system? Thoreau's descriptions of causal events attempt to answer these question by fixing objects, and their actions, within a series of causally-connected events. In other words, an object's essence (its singular "thingness") cannot be thought of as separable from the causal event: or, in Thoreau's words, "the essence which at the same time perceived the effluence."[209] Thoreau's enumeration of causally-connected phenomena must show a certain type of relation between objects, an action that connects one occurrence with another occurrence whereby the first causes the second, and the second depends on the first; and, although the causal event cannot always be determined in these linear terms, the event still

[206] Cameron aims to "demonstrate the way in which Thoreau employs metaphors so that, for from establishing relations, they rather call them into question—in this case, call into question the relation of nature to itself," 65.
[207] Morton, 90.
[208] *Walden*, 153.
[209] *Journal* 1:23-24

contains evident causally-connected interactions.[210] Causal events occur in the text when actions foreground the description, rather than the objects themselves. Take for example the passage from Thoreau's midnight fishing trip in "The Ponds" where a series of actions drives the description: bird *creaking*, perch *dimpling* the surface of the pond, and Thoreau *pulling* hand over hand.[211] Because the event cannot be reduced to a single entity's "thingness," the event becomes figurative and ideational, or in Thoreau's words "cosmological." Thoreau does not provide a scientific or even a specific name for the "unknown bird," "mysterious nocturnal fishes," and "some life prowling" about the extremity of the pond. The objects themselves become undefined by their own properties, and instead, they are defined by their effect on and their material agency within the entire causal event. Thoreau's presence, his actions of rowing and drifting, do not constitute as outside of the causal event but intertwined with the nexus of the pond's agentic materiality.

Thoreau's ideations and imaginative acts do not invalidate his scientific theories since, Walls notes, the Coleridgean-Emersonian "poet uses the results of science and philosophy, and generalizes their widest deductions."[212] William Whewell's *Philosophy of Inductive Science* (1840) clearly articulates this premise held by nineteenth-century rationalist idealism. Jonathan Smith states that Whewell "rejected empiricist claims that scientific knowledge was ultimately based on sense perceptions, arguing that fundamental ideas like causation, polarity, and substance are necessary truths essential to making empirical 'facts'."[213] For Whewell, "materialist explanation does not really explain, in the sense that they leave unresolved the

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[210] In other words, indeterminist causation cannot be determined linearly but it is not acausal.
[211] Thoreau's use of present participle shows a continuous, present action in relation to the time expressed by the past tense, finite verb.
[212] Walls, *A Life,* 275. Walls continues, "Thoreau longed to understand the working of things, and, like Emerson, he believed this was the poets work."
[213] Jonathan Smith, *Fact and Feeling,* 16.

mysteries of the human mind, of human origins, of humanity's relation to the universe."[214] This post-Kantian, rationalist idealism appears in Thoreau's assumption that "we are provided with the senses as well fitted to penetrate the spaces of the real, the substantial, the eternal, as these outward are to penetrate the material universe."[215] Just as our outward senses "penetrate the material universe," the material world incorporates our active Reason and sense perception. Thoreau, like Whewell, suggests a logical necessity in causation that presupposes the making empirical facts; he perceives in "the common train of [his] thoughts a natural and uninterested sequence, each implying the next, or, if interruption occurs, it is occasioned by a new object being presented to my *senses*." It is in the "unaccountable transition" that we can move from a "common sense view of things" (objects presented to sense perception) to an "infinitely expanded and liberating one" (a perspicacity of the thing-itself): "from seeing things as men describe them, to see them as man cannot describe them."[216] The "roving mind" can reach a space "where distance fails to follow, and law, such as science has discovered, grows weak and weary" because it "knows a distance and a space of which all those sums combined do not make a unit of measure,—the interval between that which *appears*, and that which *is*."[217] The mind itself seems to be the "unit of measure," a systematic tool to find the interval between Kant's *noumena* (thing as it *is*) and *phenomena* (thing as it *appears*). Thoreau, like Emerson and Coleridge, sees the mind as capable of creative insights into things-in-themselves and the divine

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[214] Ibid., 35. In *Life of Goethe*, Lewes echoes Whewell's premise claiming that "the truth is that science mounts on the winds of imagination into regions of the invisible and impalpable," 36.
[215] *A Week*, 310.
[216] Ibid., 311.
[217] Ibid. See Taimi Anne Olsen, *Transcending Space: Architectural Places in Henry David Thoreau, E.E. Cummings, and John Barth* (London: Asssociated UP, 2000), 53-4. Olsen writes, "Thoreau affirms the power of the mind to discover 'real' space and its qualities…. Metaphorical comparison to science—or any other field—can lead one only as far as scientific discovery. Thoreau places his faith in future exploration of spatial fields and in the mind's power intuitively to reach beyond scientific constraints. The mind not only understands the terms of measurement, it also sees the spaces in between. Thoreau takes a mystical statement, an affirmation of unusual and inexplicable powers, and actualizes it as a spatial phenomenon."

laws of Nature. However, Thoreau's approach to these creative insights differs from Emerson and Coleridge, for we can "apprehend the sublime and noble only by the perpetual instilling and drenching of the reality that surrounds us."[218] Natural causation, then, is mind-independent to the extent that it exists in the material world and can be knowable *a priori,* for intellect "discerns and rifts its way into the secret of things," but we can only realize the laws by an inundation of empirical, *a posteriori* facts.[219]

While perceiving natural causation can reveal an inherent harmony in nature's laws, the limitation and subjectivity of perception also complicate this premise.[220] The "shifting profiles" of our point of view assumes that we can only apprehend the external world through our own subjective conceiving.[221] To what extent do Thoreau's perceptions and cognitive acts create causal events? Scholars, such as James Reid, H. Daniel Peck, and Frederick Garber, address this question by considering the nature of Thoreau's perceptions and cognitive faculties to reflect on relationalities and make meaningful connections. Nelson Goodman's hypothesis on epistemic inductions and "worldmaking" claims that the act of understanding cannot be separated from cognitive creativity: "Perceiving motion, we have seen, often consists in producing it. Discovering laws involves drafting them. Recognizing patterns is very much a matter of inventing and imposing them."[222] Goodman suggests that "all worldmaking consists of taking apart and putting together" while at the same time "composing wholes and kinds out of parts and

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[218] *Walden*, 70.
[219] Ibid.
[220] Thoreau's preoccupation with his perception and cognition precipitates, as Joel Porte argues, a "double consciousness"—a division between self and nature, 45. However, like Tauber, I see Thoreau's metacognition as an "active interplay between the external and internal worlds," which instead shows an "active exchange" between the mind and nature, 96.
[221] Thoreau, however, does not hold that subjectivity invalidated significant observations: "There is no such thing as pure *objective* observation," Thoreau writes, "Your observations, to be interesting, *i.e.* to be significant, must be *subjective*," see *Journal,* 6: 236-38.
[222] Goodman, *Ways of Worldmaking* (Indianapolis: Hackett Publishing, 1978), 22.

members and subclasses, combining features into complexes, and making connections."[223] James Reid extends Goodman's theory to include Stanley Cavell's terms, "*Walden's* wording of the world," or the poet's "remaking" of a world, where facts exist "because there is a meaningful world, a site where facts cross because they've been significantly placed."[224] Possible worlds hold meaning because "we read figurative events extravagantly and momentary encounters expansively."[225] For Jonik, it is through the "poetic perception [that] we dwell with particulars, in the affinitive web of living relations in such a way that these relations can become significant poetic perceptions"—an act of "imaginative cocreation and cocommunication of and with the living world."[226] The imaginative work of worldmaking, then, entails locating meaningful facts (the objects that make the world) and co-creating relations between the particulars (the poetic perception of the world). H. Daniel Peck understands Thoreau's imagination as an act of creating categories that take shape as the "products of ranging observations and associations," and in result, Thoreau is constantly creating categories and then placing his own relational associations within the observation: "Relations are always perceived, by Thoreau, within categories—within predetermined, cognitive frameworks. These are embracing designs, the structures, in which creativity proceeds. If 'phenomena' are perceived relations between natural objects, then Thoreau's categories are clusters, coherent aggregates, of phenomena."[227] According to Peck, Thoreau seeks a "structure to contain his exploration of phenomena," or in my analysis, a discernable causal relation in the laws of nature.[228] Peck defines "phenomena" through the

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[223] Ibid., 7.
[224] James Reid, "Speaking Extravagantly: Philosophical Territory and Eccentricity in *Walden*," in *Thoreau's Importance for Philosophy,* eds. Rick Furtack, Jonathan Ellsworth, and James Reid, 1st ed. (New York: Fordham UP, 2012), 49; 51.
[225] Ibid., 57.
[226] Jonik, 207.
[227] H. Daniel Peck, *Thoreau's Morning Work* (New Haven: Yale UP, 1990), 83.
[228] Ibid., 88.

reordering of material structures where Thoreau creatively reconfigures the world into plausible categories and relational associations. Frederick Garber sees Thoreau's imagination as "visual and kinesthetic" where his "activity of locating ha[s] to be put into graphic, physical terms."[229] For Garber, Thoreau's consciousness constantly shifts as if running through "a series of interlocking mirrors which takes him from the observations of external nature to the deep recesses of the self and then out again."[230] Like Peck and Garber, I consider Thoreau's ideational and perceptual acts as actively reordering relations and observations that locate himself in the natural world. In my view, however, Thoreau's ideations seek to categorize causal relations by perceiving relational associations of natural phenomena; and, by reordering the material structure, Thoreau's cognitive actions become a part of the fluctuating and reconfiguring materiality of indeterminist causation. It becomes difficult to separate the actual phenomena—the material causality—with Thoreau's cognitive categorizations that measure himself with those motions.[231]

Nevertheless, we must acknowledge the possible complications attached to Thoreau's causal epistemology and the interaction between his empirical observations and nature. First, this view, as Walls puts it, "assumes that 'phenomena' are, as [Thoreau] put it, *not* independent of us but related to us, and that our knowledge can exist only in that shifting field *between* ourselves and our 'objects'."[232] Second, it also supposes that causal events are an inherent structure of the objective world, and by using causal inductions and cognitive acts, Thoreau enters into (or becomes entangled) with natural phenomena. Our purpose is then twofold: first, we must

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[229] Frederick Garber, *Thoreau's Redemptive Imagination* (New York: New York UP, 1977), 6.
[230] Ibid., 28.
[231] One of the methods, Walls suggests, Thoreau uses to understand this shifting relationship between man and the materiality of nature is through measurement: "Measurement shows the relative portions of one thing to another, enabling one to relate things to each other, anything to oneself. It is the very instrument of connection and differentiation, *Seeing New Worlds,* 112.
[232] Walls, *Seeing New Worlds*, 206.

understand this shifting relationship between "subject and object," "seer and seen," and discover how Thoreau's accounts of causal events become agents for interconnectivity between natural phenomena and Thoreau's subjective experiences, cognition, and inductive reasoning. Second, we must accept that this relationship, the inseparability of nonhuman and human entities within the causal event, can be realized through his imaginative inductions and inferences: anthropomorphisms, metaphors, and poetic diction that interrogate the imprint of one object on another. Thoreau's imaginative inferences do, for my purpose, demonstrate the importance of the "widest deductions" of causality and materiality, relations between human and nonhuman entities, and nature's laws. I suggest that viewing Thoreau's figurative language as causal inductions and relative cognitive phenomena, instead of mere symbols, helps approximate Thoreau's epistemological and ontological relation with the material world and laws of Nature.

2.2 Causal Thought in *Walden*

Thoreau's causal theory applied in "Spring" as he observes "the forms which thawing sand and clay assume" when the "one hillside illustrated the principle of all the operations of Nature."[233] If we read this causal phenomenon according to his epistemology, then Thoreau first needs to describe one actual phenomenon. Heat thaws the frost causing sand to flow; the sand's flows resemble "locinated lobed and imbricated thalluses of some lichen;" the sands show various shades of "iron colors;" and the forms of the streams change from semi-cylindrical to "fat and broad."[234] These configurations of empirical, scientific facts form an actual phenomenon; or what Thoreau terms, "creation of an hour," a phrase that indirectly references

[233] *Walden*, 205-7.
[234] Ibid., 205.

the visions of Charles Lyell on which Thoreau's theory bases.[235] The objective catalog of the causal series becomes increasingly vibrant as the sandy matter emanates an "excess of energy" within its designs. "I feel as if I were nearer to the vitals of the globe," Thoreau writes, "for this sandy overflow is something such a foliaceous mass as the vitals of the animal body."[236] Acknowledging the sandy overflow's agency within the causal event, Thoreau formulates the second part of his theory with an attempt to "infer all the particular results at that point." Thoreau holds that the essence of the substances, their vitalism, anticipates the form of other material things: "You find thus in the very sands an anticipation of the vegetable leaf."[237] In other words, the actual phenomenon of the "very sands" anticipates *the result*: a single law that organizes nature.[238] Thoreau continues, "No wonder that the earth expresses itself outwardly in leaves, it so labors with the idea inwardly. The atoms have already learned this law, and are pregnant by it. The overhanging leaf sees here its prototype." If the causal powers—the agency of entities in causal relations—observed in the sandy overflow is the one fact, and the one fact manifests in atoms, then Thoreau could "infer all the particular results at that point."[239]

For his causal inference to hold true, Thoreau must show how a fact can truly infer the particular results of the overhanging leaf along with other living entities. Turning toward a mereological inquiry, Thoreau scrupulously classifies the semiotics of entities in "the globe or animal body." The leaf becomes a prototype for "feathers and winged birds [that] are still drier

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[235] Here, we see the influence of Lyell's *Principles of Geology*, which outlines the laws of "Lyell's vision of deep time [that] showed that Earth's strata were the leaves of a book of creation." Geology revealed these laws of the universe through the "smallest changes," Walls, *A Life*, 274-275.
[236] *Walden*, 205.
[237] Ibid.
[238] Thoreau's catalog, Reid notes, consists "of the most general sorts of things that make up our world: inorganic material, coral, plants and animals, geological phenomena (strands and streams and riverbanks, cultural artifacts (sculptures in bronze and buildings, language, and books), the human body and its organs; even the excrement makes its appearance alongside our more sublimating moral aspirations." And, in this purview of general things that make our world, Thoreau searches for "visible evidence of a persuasive and enduring law," 60-61.
[239] *Walden*, 195.

and thinner leaves" and "ice [that] begins with crystal leaves," even the "whole tree itself is but one leaf, and rivers are still vaster leaves and towns and cities are the ova of insects in their axils."[240] He also positions the human body as a "prototype" to situate human agency and causal power: "What is man but a mass of thawing clay?" Blood vessels become branching streams, the ball of a finger a drop-like point, the ear lichen (*umbilicaria)*, the lip (*labium*), the nose "congealed drop or stalactite," and so on. Gradually, Thoreau's morphology transposes nonhuman entities onto the human body, attempting to answer his question: "Is not the hand a spreading *palm* leaf with its lobes and veins?" Thoreau extends the one fact inferred from the sandy overflow from nonhuman to human entities as if he can extrapolate the underlying essence of a singular law. Yet, Thoreau "know[s] only a few laws, and [his] result is vitiated;" he again encounters the ambivalence in "the infinite number of profiles."[241] It "seemed" like the hillside exhibited "the principle of all the operations of Nature," but Thoreau finds that "there is no end to the heaps of liver lights and bowels."[242] Instead of finding the one unifying law, this passage identifies a series of "unexpected *relation*[s]" where, as Reid puts it, "all things blend curiously together."[243]

Even the language itself blends together various ways of classifying and measuring—sounding like, in Michel Imbert's words, a "mock philology, wildcat etymology, nonsensical fantasizing rather than erudite, well-grounded 'scientific' lexicology."[244] Thoreau's amalgamation of lexicology, I argue, experimentally extends his causal theory to the institution

[240] Ibid., 205.
[241] Ibid., 195.
[242] Ibid., 207.
[243] Reid, 60.
[244] Michel Imbert, " 'Tawny Grammar': Words in the Wild," in *Thoreauvian Modernities: Transatlantic Conversations on an American Icon*, eds. Francois Specq, et al., (Athens: U of Georgia P, 2013), 272.

of language.[245] The letters materialize as if they too are in motion and inextricable from the causal event of the sandy clay: "radicals of lobe are *lb*, the soft mass of *b* (single lobed, or B, double lobed,) with liquid *l* behind it pressing it forward."[246] The material substances of the lobe, soft mass, and liquid have a sort of causal relation to the *lb, b,* and *l,* which seem to act like causal powers *pressing* the mass forward. The assemblage of things that make up the world (Thoreau's hypothesized law, organic substance, language itself) becomes an ontological unit of the phenomena, inseparable from the intra-acting components and entangled in Thoreau's poetic observations. Just as his wording reconfigures lexical mereological systems, human and nonhuman matter entangles into a mass of vital entities, a "living poetry" and "living earth."

Just as the sandy overflow becomes increasingly vibrant, a dynamic ecology of Walden emerges in "The Ponds." To introduce his record of causal events, Thoreau uses a second-person plural presence (a collective, universal "you"), a rhetoric choice that both sees the observation as a universal truth and guides the audience through a series of facts that occasion a causal explanation: "When *you* invert your head, it looks like a thread of finest gossamer stretched across the valley," "*[y]ou* would think that *you* could walk dry under it," "*you* survey its surface critically." His reader, the collective *you,* follows a progression from a seemingly determinable phenomenon (a surface as "smooth as glass") to an indeterminable series of motion where a dynamic scene interrupts the seemingly motionless waters: "where the skater insects *scattered*," "a duck *plumes,*" a "swallow *skims,*" "a fish *describes* an arc," a thistle-down *floats* on the

[245] Words (like "lobe, globe" and "lap, flap"), Imbert observes, "are parsed, decomposed letter by letter," 272. For Edward Mooney, "words resonate with other words in expanding circles that come to encompass entire languages and entire forms of life that ungird them. Radiant things become grounded as they become apparent participants in mutually constitutive weaves of relationality," see *Excursions with Thoreau* (New York: Bloomsbury, 2015), 212. In the sand clay passage, the relations between words with the phenomena seem to situate words themselves in the causal relation.
[246] *Walden,* 206.

surface, the fish *dart,* the water *dimples*.[247] The reader's assurance of a motionless, predictable observation of the pond quickly dissolves into a plenitude of motion: a list of actions that decenters the earlier perception. The following lines uncover a singular fact (a description of one phenomenon) emerging from the causal agency of the nonhuman entities: "for not a pickerel or shiner picks an insect from this smooth surface but it manifestly disturbs the equilibrium of the whole lake. It is wonderful with what elaborateness this simple fact is advertised."[248] The passage then turns to elaborate on the ways in which the "simple fact" manifests in actual occurrences, like how the water-bug's ceaseless movements *furrow* the "water slightly, making conspicuous ripple bounded by two diverging lines." A study of the cause-and-effect relations of the water-bugs and undulated water heralds a figurative meditation on indeterminist causation; Thoreau proposes that "[n]ot a fish can leap or an insect fall on the pond but it is thus reported in circling dimples, in lines of beauty, as it were the constant welling up of its fountain, the gentle pulsing of its life, the heaving of its breast."[249] The "constant welling up" and "gentle pulsing" evokes the Emersonian causal continuum where the cause-and-effect relationship cannot be linearly determined because "Nature continually repairs" and "continually receiv[es] new life and motion."[250] Because Thoreau has identified this singular fact, he can, as purported by his epistemology, infer the particular results. [251]

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[247] *Walden*, 128; emphasis mine.
[248] Ibid., 129. Thoreau later describes the vitality of the fish, the pickerel specifically, as the "animalized *nuclei* or crystals of the Walden Water," 191.
[249] Ibid., 129.
[250] Ibid.
[251] Thoreau echoes this passage in "House Warming." He writes, "If you examine [the ice] closely the morning after it freezes, you find that the greater part of the bubbles, which at first appeared to be within it, are against its under surface." The bubbles that the reader sees are "from an eighth of an inch in diameter, very clear and beautiful, and you see your face reflected in them through the ice." The precise measurement of the bubbles shifts when heat causes the bubbles to "los[e] their regularity." From his earlier calculation, Thoreau "infer[s] that the infinite number of minute bubbles which [he] had first seen against the under surface of the ice were now frozen in likewise," 167.

In Walden Pond's "seemingly bottomless water," Thoreau can extend the detected laws of causal relations to the pond's imperceptible realms, and in the process, hypothesize the possible relations of unseen objects.[252] Thoreau continues to envision causal relations beyond what is visible with an induction guided by his prior knowledge of the observed relation between the skater insects and the swallow with the sun. His use of the modal "may" signals a possible correlation between the supposed fish and the current causal event: "It *may* be that in the distance a fish describes an arc of three or four feet in the air, and there is one bright flash where it emerges, and another where it strikes the water…."[253] Predicting the causal relation, Thoreau imagines the possibilities of unseen entities physically interrelating with the visible phenomenon. Often, Thoreau's figurative language acts as a causal inference, drawing a conclusion about a causally-connected event based on the observed "effect" and the supposed "cause." Thoreau's figurative language shows what Bennett calls "a refined sensitivity to the outside-that-is-inside-too," an attempt to see the vitality of the nonhuman entities of nature through his own vitalism.[254] For example, in Thoreau's encounter with the battle of the ants in "Brute Neighbors," he inserts an explicable, anthropomorphic cause ("a war between two races of ants") imagining the ants' movements in relation to a human battle "*as if* they had been men."[255] Thoreau never discovers the "cause of the war," but instead, through his imaginative rationalities, places himself within the actions of the ant war, even allowing the phenomenon to influence his affective sensations to feel as if he "had [his] feelings excited and harrowed by witnessing the struggle."[256] Thomas Pughe notes how anthropomorphic tropes and notions of personhood demand—what Marc

[252] Ibid., 30.
[253] Ibid., 128; emphasis mine.
[254] *Vibrant Matter*, 120. Bennett's vital materialism questions the ability of anthropomorphism to "relax into resemblances discerned across ontological divides" and "discern the vitality of matter," 119-120.
[255] *Walden*, 155-6; emphasis mine.
[256] Ibid., 157.

Bekoff terms—"cognitive empathy."[257] These tropes encapsulate "our inevitably intermingled and interdependent relations with other animals."[258] The ant war becomes an epistemological site for Thoreau's causal inference but also an affective site where his empathetic response situates himself within the ant's battle, "inevitably intermingled" as part of the movement. Like the objects themselves, Thoreau's physical actions and figurative interjections become part of the causal event, inextricable from the actions of the nonhuman entities.

Thoreau's imaginative rationalizations often occur in his observations of the oscillation of birds. In *Bird Relics*, for instance, Arsić refers to birds in Thoreau's writings as "ontological borderers," claiming that birds "cross thresholds between visible and invisible, being and non-being."[259] Birds, for Arsić, become an embodiment of an ontology in which Thoreau's life "is imagined as a line that endlessly moves without ever forming a fixed shape; a constant flight that doesn't stabilize itself into a formal identity."[260] How might we view the ontological boundaries of birds in relation to his causal reasoning—Thoreau's observation of their visible "effect" and the invisible "cause"? Thoreau cannot visually distinguish the efficient cause of birds' motions except through a reflection of birds' actions and reactions. The causal equation is missing a variable that Thoreau must reconcile through the categorization and ordering of his perception.[261] Unlike the previously-mentioned cases, Thoreau does not attribute this imperceptible cause to an

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[257] Marc Bekoff, *The Emotional Lives of Animals* (Navato, Calif.: New World Library, 2007) quoted in Thomas Pughe, "Brute Neighbors: The Modernity of a Metaphor," in *Thoreauvian Modernities: Transatlantic Conversations on an American Icon*, eds. Francois Specq, et al., (Athens: U of Georgia P, 2013), 249-264.
[258] Pughe, 249-264. See Neill Matheson, "Thoreau's Inner Animal." *Arizona Quarterly: A Journal of American Literature, Culture, and Theory* 67 no. 4 (2011): 1-26. Matheson considers the complexity of Thoreau's "meditation on human-animal relations" where the compassion for nonhuman animals "cannot be extricated from his much more anxious negotiation of the split between human and animal within us."
[259] Arsić, *Bird Relics*, 156.
[260] Ibid., 162.
[261] Perhaps, it is the invisible cause of the bird's motions that prompted Stanley Cavell's claim to the "prophetic quality" of Thoreau's birds in *Senses of Walden*, 40.

anthropomorphic vitalism but rather correlates the birds' intangible motions with the mysticism and wildness of nature.

Pausing from the laborious plight of his "Bean-Field," Thoreau observes the presence of a nighthawk who "circled overhead in the sunny afternoons" and becomes absorbed in the fluid and ethereal motions of the nighthawks' "graceful and slender like ripples caught up from the pond, as leaves are raised by the wind to float in the heavens," witnessing the "kindredship" in nature.[262] In this moment, Thoreau notes the causal relationship between the nonhuman entities of nature (the birds) and a natural occurrence (the wind). While a causal relationship may not be tangible to Thoreau's visual perceptions, he cognitively reorders the phenomenon to comprehend the relationship of the visible, natural matter and the invisible, indiscernible source of motion. Again, Thoreau's account pauses to elaborate on the causal event: the birds' soaring, descending, approaching, leaving, swooping, singing. The birds' motions become "ripples," and the hawk becomes the "aerial brother of the wave," who answers to the "elemental unfledged pinions of the sea." The flight of the birds (the one actual phenomenon) extends to other organic substances with metaphors of water and the sea. Thoreau's amalgamation of birds and watery motions attempts to unveil the singular law that organizes all of nature; and, like the sandy clay passage, Thoreau must insert an aspect of his own being into the "prototype" of the actual phenomenon. Just as the hen-hawks circle "in the sky, alternately soaring and descending, approaching and leaving one another," Thoreau places the actions of his thoughts *within* the phenomena of the birds "*as if* they were embodiment of [his] own thoughts."[263] His thoughts become inseparable from the causal event; the perceived phenomena and Thoreau's imaginative expositions of birds'

[262] *Walden,* 109.
[263] Ibid., 110; emphasis mine.

causal relations to the material world become as Peck states, "coherent aggregates" of the phenomena, or causal inductions that form within the causal structures of nature.[264]

Causal events often point to unexplainable causes and emphasize the ambivalence between ontological boundaries between nonhuman and human entities. The phenomenon can only be explained in metaphysical terms: the events become Wild, uncanny, and mysterious.[265] Bennett details Thoreau's encounter with Wildness as moments when "[o]rdinary matter now appears marvelous to him, something whose very existence is inexplicable." It is through an enchantment of the Wild that Thoreau "discern[s] the awesome infra/intra/extra-human world of matter."[266] In *Realist Magic,* Timothy Morton defines causality as "an uncanny moment that happens in front of the encrypted objects, when a strange object perturbs a domain that has achieved a necessarily, structurally false ontic familiarity." [267] In other words, causality occurs "in front of" objects, meaning "the way that objects talk to one another, apprehend one another, and comprehend one another," and with objects that are "both themselves and not-themselves."[268] Theories of causality then can be seen "as a desperate attempt to normalize this uncanny state of affairs."[269] Often, Thoreau's awareness of causal events provokes a meditation on the "uncanny state" of the causal relations themselves. For instance, reflecting on his midnight fishing trip, Thoreau writes, "It was very queer," referring not to an actual example, but the phenomenon itself during the nights "when your thoughts had wandered to vast and

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[264] Peck, 83.
[265] I use Jane Bennett's meaning of Wild, or "the surprise element that lurks in every object of experience, however apparently familiar, "*Enchantment, The Enchantment of Modern Life: Attachments, Crossings, and Ethics* (Princeton: Princeton UP, 2001), 94.
[266] Ibid.
[267] Morton, 32-33. It is important to note here that Morton's "encrypted" objects refers to the "existence of at least one withdrawn object" or "1+*n* objects," whereas Bennett's "enchanted" objects means that an ordinary object becomes more vibrant in its uncanniness.
[268] Ibid., 66, 64.
[269] Ibid., 33.

cosmogonal themes in other spheres."[270] Thoreau himself admits not to the queerness of his cosmogonal thoughts, but to the queerness of the whole causal event itself. The causal event takes the shape of the sublime or uncanny where the fish are "mysterious" and the vibrations "uncertain." Perhaps, the most evident example of this type of causal inference appears the encounter of the loon in "Brute Neighbors."

The loon's motions, or what Peck refers to as a "dance between subject and object…between self and nature," also becomes a "dance" between Thoreau's visual and imaginary distinctions of causality in the loon's "maneuvering."[271] Thoreau follows the loon to "see how he would manoeuver," testing the relations between his actions and the motions of the loon: asking himself, how will the loon react to my presence and my movements towards his location? This question encourages Thoreau to consider the causal relation between "subject and object," and the boundary between "visible and invisible;" his perception constantly shifts from the tangible causal relation of the loon's actions to an unexplained, "unearthly" causality of the loon's existence. Thoreau enters into a "game," trying to calculate the loon's appearances and striving to "divine [the loon's] thoughts against [his own]." Here, Thoreau studies the loon to anticipate the possible effects using a time-order relationship: "He dived again, but I miscalculated the direction he would take, and we were fifty rods apart when he came to the surface this time, for I had helped to widen the interval."[272] He testifies to the difficulties of identifying causal relations through physical movements; in a game, thoughts become the causal agent for the player's action, but their thoughts can only be estimated by empirical observations of their actions. In the same way, Thoreau tries to dictate the loon's thoughts by an examination

[270] *Walden*, 120.
[271] Peck, 121.
[272] *Walden,* 159.

of its actions. While Thoreau categorizes this experience as "man against loon," he places himself as a "player" with the loon—his cognitive process acting *as if* he were the loon in order to find the cause of the loon's appearances.

While Thoreau occasionally glimpses "ripples where [the] loon approached the surface," they do not substitute the variable needed to predict the loon's motions; in fact, the loon's actions become progressively less tangible as "not wit could divine where in the deep pond, beneath the smooth surface, he might be speeding his way like a fish, for he had time and ability to visit the bottom of the pond in its deepest part."[273] Conceiving the loon's unseen location, Thoreau imagines the bird entering into the ethereal and, for him, unfathomable depth of the pond. What starts as an examination of the "loon (*Colymbus glacialis*)" and the explicable cause of his appearance at Walden Pond ("[the loon] came, as usual, to moult and bathe in the pond") turns into Thoreau's conception of the loon's actions as "wild," "unearthly," and "demoniac"—"perhaps the *wildest* sound that is ever heard [at Walden]."[274] The causal event becomes otherworldly and Wild. His new categorization of the loon shifts his perception of the changing material surroundings "as if [the loon's] calling from the east and rippled the surface, and filled the whole air with misty rain," imagining the loon's "prolonged howls" as the cause for the atmospheric effect of the pond's material configuration. Because of the unpredictable, and often times unseen, motions of the loon, Thoreau ineffectively measures himself with the loon unable to create a world where the loon's actions reveal the laws of nature. For Walls, the "independent action of the loon reopens the void between them, and through the void rushes chaos—the wild."[275] In my view, this chaos between Thoreau and the loon is a product of causality: when an

[273] Ibid., 159-60.
[274] Ibid., 160; emphasis mine.
[275] *Seeing New Worlds*, 227.

unexplainable object, returning to Morton's definition, "perturbs a domain that has achieved a necessarily, structurally false ontic familiarity."[276] The loon's "infinitely various, nonrepeating but patterned phenomena," as Walls claims, provide Thoreau with an understanding that "the chaos of wild nature was not meaningless or void, but information which he could process into meaning."[277] Thoreau uses meaningful facts to reach through the causal relations of Walden to understand his ontology; and, by processing the "chaos" of indeterminist causation, Thoreau finds his motions conjoined with the infinite, patterned phenomena. Thoreau's causal reasoning extends to the movements of economic and political systems—networks of relations where the inseparability of human and nonhuman (the individual and these systems) is equally as insoluble, uncanny and Wild. By conflating human and nonhuman actions, Thoreau signals to a political ecology that sees all entities as having causal efficacy, an interdependence that demands an ethical accountability.

2.3 Economy, Politics, and Ethical Accountability

Thoreau's approach to natural phenomenon parallels his examination of the human environment: economic frameworks, social customs, and collective action. Thoreau, according to Newman, "applied a natural historian's habit of mind—empirical observation and materialist analysis—to the social and political life of Concord, Massachusetts," and "[as] a result, he saw that capitalism actively managed the relationship between humans and nature by organizing labor according to the economic frameworks of property and profit."[278] At Walden, Thoreau witnessed the rapid effects of the global marketplace with the introduction of the railroad and steam-powered ships. Local labor, products, and market exchanges were now displaced for a

[276] Morton, 33.
[277] Walls, *Seeing New Worlds,* 226-7.
[278] Newman, "Thoreau's Materialism and Environmental Justice," in *Thoreau at Two Hundred,* eds. Kristen Case and K. P. Van Anglen (Cambridge: Cambridge UP, 2016,) 18.

more wholesale economic exchange, making it difficult to distinguish the outcome of labor and the source of products.[279] Take for example Thoreau's commentary when purchasing a garment from his tailoress:

> 'They do not make them so now,' not emphasizing the 'They' at all, as if she quoted an authority as impersonal as the Fates. . . . When I hear this oracular sentence, I am for a moment absorbed in thought, emphasizing to myself each word of it, that I may come to the meaning of it, that I may find out by what degree of consanguinity. *They* are related to *me*, and what authority they may have in an affair which affects me so nearly.

Thoreau introduces an insoluble causal relation between *they* and *me* whereby an unknown, removed agent "affects [Thoreau] so nearly" in his individual affairs. His semiotic inquiry, the parsing of each word, attempts to expose meaning in the words themselves that signal a "degree of consanguinity" in the remoteness of the causal relation. Similar to the example in "Spring" of the sandy overflow, the economic system becomes a complex set of relations that blend together, or in Cavell's words, economy "turns into a nightmare maze of terms about money and possessions and work, each turning toward and joining the others": words like "profit and less, rich and poor, cost and expense, borrow and pay, owe and own, business, commerce, enterprises, ventures, affairs, capital, price, amount, improvement, bargain, employment, inheritance, bankruptcy, work, trade, labor..."[280] In this unceasing flow of economic jargon and processes, Thoreau strives to locate his relation to the complex web of economic exchanges, carving through the capitalist excess to find the essential laws for the economy of living.

In "Economy," Thoreau's economic experiment relies on a deduction of "the gross necessaries of life" from the luxuries of industrial living, which would uncover "the essential

[279] See Walls, *A Life*, 8. Thoreau's neighbors "filled their pantries with China tea, slave-grown sugar, prairie wheat flour, tropical oranges and pineapples; they wore Georgia cotton, China silks, Canada furs, British woolens."
[280] Cavell, 88-89.

law's of man's existence."[281] To do this, Thoreau does not detach himself from the economic system but deliberately conducts market exchanges that will preserve human's "vital heat" through "Food, Shelter, Clothing, and Fuel."[282] For example, he lists the materials used for his shelter, noting the surplus: boards, shingles for roof and sides, two second-hand windows, one thousand old bricks, two casks of lime ("That was high"), hair ("More than I needed"), mantle-tree iron, nails, hinges and screws, latch, chalk, transportation.[283] The inventory shows a causal relationship between the items on the list and his economy of living—the fact that he could live on the items listed. Thoreau then provides a literal deduction of the "gross necessities" to determine his whole income:

	$23 44.
Deducting the outgoes, . .	14 72½
there are left	$8 71½

The calculated number reflects Thoreau's deliberation of "the importance of man's soul" remote from "the success or failure of the present economic and social arrangements."[284] In "The Bean-Field," Thoreau deliberately participates in agricultural labor and market exchanges by "planting, and hoeing, and harvesting, and threshing, and picking over, and selling them,—the last was the hardest of all,—I might add eating them, for I did taste."[285] This series of actions serves as an economic experiment more than a source of food. Thoreau writes, "Not that I wanted beans to eat, for I am by nature a Pythagorean, so far as beans are concerned, whether they mean porridge or voting, and exchanged them for rice."[286] Even though Thoreau strives to "simplify" his

[281] *Walden*, 11. See Philip Cafaro, *Thoreau's Living Ethics* (Athens: U of Georgia P, 2000), 77. He argues that Thoreau "structured his personal economy" to clarify the ethical framework, "primarily through simple living and a rejection of the division of labor."
[282] Ibid.
[283] Ibid., 37
[284] Ibid., 41.
[285] Ibid., 111.
[286] Ibid.

relation to the marketplace, the rapidly changing economic system cannot be conceived in such simple measures of mathematical deductions and agricultural experiments: "It is a labor to task the faculties of man—such a problem of profit and loss, of interest, of tare and tret, and gauging of all kinds in it, as demand a universal knowledge."[287] Without a universal law, an extrapolation of the results of human faculties seems incomprehensible to determine. This passage calls to mind Thoreau's causal reasoning in "The Pond in Winter" where a universal knowledge of *all* the laws would allow for an inference of "all the particular results."

The indeterminate "human faculties" calls forth a similar reflection of causally-connected social customs and collective actions. If we could "work and wedge our feet through the mud and slush of opinion, and prejudice, and tradition, and delusion, and appearance" (or in other words, find the effect following its cause), we could plant a "Realometer," or realize a true understanding of reality where we deduce the higher organizing law of the "shams and appearances" that have accumulated over time.[288] As Newman notes, Thoreau "acknowledged the need, not just for individual self-reform, but also for collective action in pursuit of wholesale social change…. He believed that not just our ideas, but also the socioeconomic relationships that shape our lives on the land, must be changed if we are to achieve a just society in a healthy environment."[289] Thoreau's causal reasoning then elicits a political and moral philosophy whereby individual actions are held as accountable "causes" to the collective "effect."[290] In

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[287] Ibid., 17.
[288] *Walden,* 70. Thoreau applies his thinking of nature to his social and political environment, animating his moral and political philosophy through scientific inquiry in botany, ornithology, anatomy, biology, geography, and so on. For example, in *A Week*, Thoreau writes, "As in geology, so in social institutions, we may discover the causes of all past change in the present invariable order of society,"103. See Lance Newman's *Our Common Dwelling* for more on Thoreau's materialist political and social philosophy.
[289] Newman, "Thoreau's Materialism and Environmental Justice," 18.
[290] For more on Thoreau's politics, see Bennett's *Thoreau's Nature*; Jonathan McKenzie, *The Political Thought of Henry David Thoreau* (Lexington: UP of Kentucky, 2016); Shannon Mariotti, *Thoreau's Democratic Withdrawal* (Madison: U of Wisconsin P, 2010); and Jack Turner, ed., *A Political Companion to Henry David Thoreau* (Lexington: UP of Kentucky, 2009).

"Slavery in Massachusetts," human acts become like "the odor which the plant emits."[291] The inseparability of the "odor of [human] actions" and "the general sweetness of the atmosphere" necessitates a causal moral philosophy: because "all odor is but one form of advertisement of moral quality," we may measure the sweetness (morality) of our actions by the scent (effect) they dispel into the atmosphere. An individual's actions and morals are inextricable from the political and social atmosphere and, therefore, demand an ethical responsibility: an intentional "sweetness" of actions. Again, like the midnight fishing trip, we see Thoreau's underlying premise that human actions are inseparable from the causal relations in natural phenomena, along with social and political environments.

When "[w]e are independent of the changes we detect," the less we perceive their motions, and for Thoreau detecting "the slowest pulsation" is vital to a realization of the essential laws and their relation to natural, anthropological, and economical phenomenon.[292] In this chapter, I have indicated moments in Thoreau's *Walden* that focus on "the slowest pulsation" and attempt to trace a phenomenon's cause back through a series of pulsations: a causal continuum of material reconfigurings. While observing the enfolding causal continuum, Thoreau's actions becomes entangled in the phenomenon since his actions cannot be separated from the nonhuman entities within the causal event. Thoreau's ideations give these events, borrowing Barad's words, "new sense of aliveness," an "exuberant creativeness" in the vital agency of nonhuman entities and the Wild, uncanniness of causal events. By the same token, Thoreau supports a realization of anthropological environments whereby human actions are inseparable from the collective economic, social, and political systems, and thus, necessitate an ethical responsibility to

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[291] "Slavery in Massachusetts," in *Walden, Civil Disobedience, and Other Writings*, ed. William Rossi, 3rd ed. (New York: W. W. Norton, 2008), 259.
[292] *Walden*, 130.

contemplate the causal import of individual actions. Thoreau's inability to separate himself from the capitalist and political systems becomes sort of an uncanny event in its remoteness, or an unidentifiable efficient cause for the economic exchanges and social atmosphere.[293] The premise for Thoreau's philosophy derives from this consciousness of motion and conscience of actions. Thoreau holds that "[w]e are not wholly involved in Nature" when "[b]y a conscious effort of the mind we can stand aloof from actions and their consequences; and all things, good and bad, go by us like a torrent."[294] A relation with Nature then requires a "conscious effort of the mind" to stand *within* "actions and their consequences." In *Walden*, Thoreau guides readers through an epistemological method of detecting, calculating, and inferring "the slowest pulsations" to establish an ontological relation to Nature—a process of becoming in the enfolding causal relations of dynamic materiality.

[293] Jonathan McKenzie argues that Thoreau's concept of wildness "is the disposition capable of carrying out a lived experience of existential freedom, without reducing that freedom to its correlates within the public sphere;" essentially, wildness "is a response to political life," *The Political Thought,* 108-109.
[294] Ibid., 94.

CONCLUSION

During his *Week on the Concord and Merrimack Rivers*, Thoreau envisions the progression of a canal boat hidden by fog, a picture that "impressed with us a sense of weight and *irresistible* motion."[295] Thoreau uses the same adjective "irresistible" to describe a boatman's action of "stooping his shoulder to the pole, then drawing it back slowly to set again" and its effect of the boat "moving steadily forwards through an endless valley." In the conjoined contact of human motion with the river's current, Thoreau imagines that the boatman "feels the slow irresistible movement under him with pride, as if it were his own energy."[296] In a sense, "irresistible" defines an enchantment and magnetism (or in Thoreau's words, "something impressive, even majestic") immanent in the entangled motions of human and nonhuman entities.[297] If causal events reveal an inseparability between human and nonhuman actions, then "irresistible motion" could also mean an inexorableness: an inability to reduce any one entity to a singular action (a cause or effect) since all entities are active agents in a series of causal events, as in Thoreau's journal entry, "All things are, indeed, subjected to rotary motion."[298] Thoreau's close attention to the causal relations leads to a heightened awareness of anthropocentric actions and their effects on the environment: to question what it means for human's actions to be inseparable from the motions of nature.

Thoreau's drastically-changing New England environment demands further awareness of the relation between human and nonhuman actions. For instance, the presence of the railroad looms in the background of *Walden*, necessitating a new understanding of motion. Thoreau writes,

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[295] Ibid., 153; emphasis mine. Sherman Paul, *The Shores of America* (Urbana: U of Illinois P, 1958), 199 claims that there was "something irresistible in water for Thoreau, that something so spiritually akin to him that he felt himself called to it 'by a natural impulse'."
[296] *A Week,* 168.
[297] Ibid.
[298] *Journal*, 1:332.

"When I meet the engine with its train of cars moving off with planetary motion,—or, rather, like a comet, for the beholder knows not if with that velocity and with that direction it will ever revisit this system."[299] Here, Thoreau alludes to Newton's first law of motion where if no force acts upon an object, then the object will not experience a change in its motion; and so, Thoreau's train stays in motion with a constant speed and direction until it ascends into another stratum. Meanwhile, the train's motion lingers in the local, planetary landscape of Walden Pond, and Thoreau conceives that even the "fishes in the pond" feel the rumbling. Walls suggests that the railroad brought more than just new vibrations to Walden Pond, but it signaled a new geological epoch that geologist today call the Anthropocene, or "when fossil fuels put global economies into hyperdrive."[300] Massachusetts's shifting landscape called upon the eye of natural historians and scientists to question the possible effects of these changes.[301] Thoreau responds to this call in his causal theory: his attempt to infer causes from effects and find regularity in nature so to anticipate the results of nature. Perhaps, his scientific, Baconian-Newtonian study of nature would uncover an essential fact that would anticipate these results, and by inductive practices, we could be more intentional about our actions and interactions in the natural and social environment.

In this process, Thoreau uncovers not a singular fact but a series of relations, "an inextinguishable vitality in Nature."[302] Thoreau sees all the entities as more than just moving bodies but active agents in the causal event. In Jane Bennett's political ecology, seeing bodies as "more than mere objects" offers an ethical and political aim where "a new found attentiveness to matter and its powers will not solve the problem of human exploitation or oppression, but it can

[299] *Walden*, 82.
[300] *A Life*, 8.
[301] Worster, 67.
[302] *Journal,* 14:262-63.

inspire a greater sense of the extent to which all bodies are kin in the sense of inextricably enmeshed in a dense network of relations. And in a knotted world of vibrant matter, to harm one section of the web may very well be to harm oneself."[303] For Thoreau, causal events demonstrate, perforce, a relationality along with a necessary ethical accountability. By extending his causal reasoning to human vitalism, Thoreau recognizes the inextricable imprint of his actions on the dynamics of Walden's ecosystem. The Wild and uncanny emerge in the inseparability of Thoreau's physical motions and mental processes from causal relations, a realization that cultivates reverence for the nonhuman agents that surround him.

Thoreau recognizes the *sine qua non* of wildness: "We need to tonic of wildness…we require that all things be mysterious and unexplorable, that land and sea be infinitely wild, unsurveyed and unfathomed by us because unfathomable."[304] If Thoreau knew "all the laws of Nature" and their causal relations, would the predictability of nature's motions cause a division between him and the natural world? The "mysterious and inexplorable" events of nature presuppose a desire to search for the organizing principle: to live deliberately with nature and its laws. His *wading* in the marshes, to seek the tonic of wilderness, becomes entangled with the *lurking* of "the bittern and meadow-hen," *booming* "of the snipe," *building* of the solitary fowl's nest, and *crawling* of the mink. The "infinite number of the profiles" of the mountain outline in "The Pond in Winter" occasions the opportunistic remark in "Spring," "We can never have enough of Nature."[305] Here, Thoreau delights in the unknowable wildness and variability of causal relations, considering his epistemological endeavors "to explore and learn all things" as an essential component of Nature.

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[303] Bennett, *Vibrant Matter*, 13.
[304] *Walden*, 213.
[305] Ibid.

BIBIOGRAPHY

Abrams, Robert E. “Image, Object, and Perception in Thoreau's Landscapes: The Development of Anti-Geography.” *Nineteenth-Century Literature* 46, no. 2 (1991): 245-62. doi:10.2307/3045193.

Albanese, Catherine. *Corresponding Motion: Transcendental Religion and the New America*. Philadelphia: Temple UP, 1977.

Anderson, Charles. *The Magic Circle of Walden*. New York: Holt, Rinehart and Winston, 1968

Apostle, Hippocrates G., trans. *Aristotle’s Physics*. Grinnell: The Peripatetic Press, 1969.

Arsić, Branka. *Bird Relics*: *Grief and Vitalism in Thoreau*. Cambridge, Mass.: Harvard UP, 2016.

---. “Our Things: Thoreau on Objects, Relics, and Archives.” *Qui Parle: Critical Humanities and Social Sciences* 23, no. 1 (2014): 157-181. doi: 10.5250/quiparle.23.1.0157.

Ayer, A. J. *The Central Problems of Philosophy*. Harmondsworth: Penguin, 1973.

Bacon, Francis. *Novum Oganum*. Edited by Lisa Jardine and Michel Silverthorne. Cambridge: Cambridge UP, 2000.

Barad, Karen. *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Durham: Duke UP, 2007.

---. “Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter.” *Signs* 28, no. 3 (2003): 801–831. doi:10.1086/345321.

Baym, Nina. “Thoreau’s View of Science.” *Journal of the History of Ideas* 26, no. 2 (1965): 221-234. http://www.jstor.org/stable/2708229.

Beebee, Helen. *Hume on Causation*. New York: Routledge, 2006.

Bekoff, Marc. *The Emotional Lives of Animals: A Leading Scientist Explores Animal Joy, Sorrow, and Empathy—and Why They Matter*. Novato, Calif.: New World Library, 2007.

Bennett, Jane. *The Enchantment of Modern Life: Attachments, Crossings, and Ethics*. Princeton: Princeton UP, 2001.

---. *Thoreau's Nature: Ethics, Politics, and the Wild*. Thousand Oaks: Sage Publications, 1994.

---. *Vibrant Matter: A Political Ecology of Things*. Durham: Duke University Press, 2010.

Bennett, Jonathan "Spinoza's Metaphysics." In *The Cambridge Companion to Spinoza,* edited by Don Garrett, 61-88. Cambridge: Cambridge UP, 1996.

Buell, Lawrence. *The Environmental Imagination*. Cambridge: Harvard UP, 1995.

Cafaro, Philip. *Thoreau's Living Ethics*. Athens: U of Georgia P, 2000.

Cameron, Sharon. *Writing Nature: Henry Thoreau's Journals*. Chicago: U of Chicago P, 1985.

Case, Kristen. "Knowing as Neighboring: Approaching Thoreau's Kalendar." *J19: The Journal of Nineteenth-Century Americanists* 2, no. 1 (2014): 107-129. doi*:* 10.1353/jnc.2014.0015.

Cavell, Stanley. *The Senses of Walden: An Extended Edition*. Chicago: U of Chicago P, 1992.

Clatterbaugh, Kenneth. "Descartes's Causal Likeness Principle." *The Philosophical Review* 89, no. 3 (1980): 379-402. doi:10.2307/2184395.

---. *The Causation Debate in Modern Philosophy 1637-1739*. New York: Routledge, 1999.

---. "The Early Moderns." In *The Oxford Handbook of Causation*, edited by Helen Beebee, Christopher Hitchcock, and Peter Menzies, 55-73. Oxford: Oxford UP, 2009.

Coleridge, Samuel Taylor. *Aids to Reflection*. New York: Cosimo Classics, 2005.

---. *Biographia Literaria.* Edited by James Engell and W. Jackson Bate. Princeton: Princeton UP, 1983.

---. *The Philosophical Lectures of Samuel Taylor Coleridge.* Edited by Kathleen Coburn. New York: Philosophical Library, 1949.

---. "Statesman's Manual." In *The Complete Works of Samuel Taylor Coleridge*, edited by W. G. T. Shedd, vols. 7, 417-485. New York: Harper & Brothers, 1884.

Coole, Diana H., and Samantha Frost. "Introducing New Materialisms." In *New Materialisms: Ontology, Agency, and Politics*, edited by Coole and Frost, 1-47. Durham: Duke University Press, 2010.

Craig, Edward. *The Mind of God and the Works of Man.* Oxford: Clarendon Press, 1987.

Descartes, René. *Discourse on Method, Optics, Geometry, and Meteorology.* Translated by Paul J Olscamp. Indianapolis and New York: Bobbs Merrill, 1965.

---. *The Philosophical Writings of Descartes*. Translated by John Cottingham, Robert Stoothoff, and Dugald Murdoch, vol. 1-3. Cambridge: Cambridge UP, 1984.

Emerson, Ralph Waldo. "American Scholar." In *Nature and Selected Essays*, edited by Larzer Ziff, 83-107. New York: Penguin, 2003.

---. "Circles." In *Nature and Selected Essays*, edited by Larzer Ziff, 225-239. New York: Penguin, 2003.

---. "Fate." In *Nature and Selected Essays*, edited by Larzer Ziff, 361-393. New York: Penguin, 2003.

---. "Over-Soul." In *Nature and Selected Essays*, edited by Larzer Ziff, 205-225. New York: Penguin, 2003.

---. "Power," in *The Collected Works of Ralph Waldo Emerson*, edited by Joseph Slater, et al., 9 vols. Cambridge, Mass.: Harvard UP, 2011.

---. "Self-Reliance." In *Nature and Selected Essays*, edited by Larzer Ziff, 175-205. New

York: Penguin, 2003.

---. "Thoreau." *Lectures and Biographical Sketches*. New York: Riverside Press, 1911.

Foucault, Michel. *The Order of Things.* New York: Vintage Books, 1994.

Garber, Frederick. *Thoreau's Redemptive Imagination*. New York: New York UP, 1977.

Gaukroger, Stephen. "Philosophy and the Physical Science." In *The Routledge Companion to Eighteenth Century Philosophy*, edited by Aaron Garrett, 687-705. New York: Routledge, 2014.

Giles, Paul. "Transnational Thoreau: Time, Space, and Relativity." In *Thoreau at Two Hundred,* edited by Kristen Case and K. P. Van Anglen, 138-154. Cambridge: Cambridge UP, 2016.

Goodman, Nelson. *Ways of Worldmaking.* Indianapolis: Hackett Publishing, 1978.

Grusin, Richard. "Thoreau, Extravagance, and the Economy of Nature." *American Literary History* 5, no. 1 (1993): 30–50. www.jstor.org/stable/489759.

Hall, Marie Boas. "Matter in Seventeenth Century Science." In *Concepts of Matter*, edited by Ernan McMullin, 344-368. Notre Dame: U of Notre Dame P, 1963.

Harvey, Samantha. *Transatlantic Transcendentalism: Coleridge, Emerson, and Nature*. Edinburgh: Edinburgh UP, 2013.

Hawthorne, Nathanial. "Artist of the Beautiful." In *Nathanial Hawthorne's Tales*, edited by James McIntosh, 159-177. New York: W. W. Norton, 1987.

Herschel, John. *Preliminary Discourse on the Study of Natural Philosophy.* Chicago: U of Chicago P, 1987.

Hobbes, Thomas. "Concerning Body." In *The Metaphysical System of Hobbes in Twelve Chapters from Elements of Philosophy Concerning Body*, edited by Mary Calkins, 2nd

edition. La Salle: Open Court Publishing Co, 1948.

---. *The Leviathan*. Edited by Edwin Curley. Indianapolis: Hackett Publishing Company, 1994.

Humboldt, Alexander von. *Cosmos: A Sketch of the Physical Description of the Universe*. Translated by E. C. Otté. Baltimore: John Hopkins UP, 1997.

Hume, David. *An Enquiry Concerning Human Understanding*. Edited by Eric Steinberg, 2nd edition. Indianapolis: Hackett Publishing, 1977.

---. *A Treatise of Human Nature.* Edited by David Norton and Mary Norton. Oxford: Clarendon Press, 2007.

Imbert, Michel. " 'Tawny Grammar': Words in the Wild." In *Thoreauvian Modernities: Transatlantic Conversations on an American Icon*, edited by Francois Specq, et al., 265-274. Athens: U of Georgia P, 2013.

Johnson, Rochelle L. " 'This Enchantment Is No Delusion': Henry David Thoreau, the New Materialisms, and Ineffable Materiality." *ISLE: Interdisciplinary Studies in Literature and Environment* 21, no. 3 (2014): 606-635. doi: 10.1093/isle/isu078

---. *Passions for Nature Nineteenth-Century America's Aesthetics of Alienation*. Athens: U of Georgia P, 2009.

Jonik, Michael. " 'The Maze of Phenomena': Perception and Particular Knowledge in Thoreau's Journal." In *Thoreauvian Modernities: Transatlantic Conversations on an American Icon*, edited by Francois Specq, et al., 200-218. Athens: U of Georgia P, 2013.

Kant, Immanuel. *Critique of Judgment.* Translated by Werner Pluhar. Indianapolis: Hackett Publishing, 1987.

---. *Critique of Pure Reason*. Translated by Werner Pluhar. Indianapolis: Hackett Publishing Company, 1996.

---. *Prolegomena to Any Future Metaphysics*. Edited and translated by Gary Hatfield, vol. 4. Cambridge: Cambridge UP, 2004.

Keane, Patrick. *Emerson, Romanticism, and Intuitive Reason*. Columbia: U of Missouri P, 2005.

Kerns, Stephen. *A Cultural History of Causality: Science, Murder Novels and Systems of Thought*. Princeton: Princeton UP, 2004.

Kuhn, Thomas S. *The Structure of Scientific Revolutions*, 3rd ed. Chicago: U of Chicago P, 1996.

Leibniz, G. W. *Philosophical Essays*. Edited and translated by Roger Ariew and Daniel Garber. Indianapolis: Hackett Publishing, 1989.

---. *Philosophical Papers and Letters: A Selection*. Edited and translated by Leroy Loemker, 2nd edition, 2 vols. Boston: Kluwer Academic Publishers, 1989.

Leibniz, G.W. and Samuel Clarke. *Correspondence*. Edited by Roger Ariew. Indianapolis: Hackett Publishing Company, 2000.

Locke, John. "Essay Concerning Human Understanding." In *The Empiricists*, abridged by Richard Taylor, 7-135. New York: Anchor Books, 1960.

Lyell, Charles. *Principles of Geology*, 8th ed. London: John Murray, 1850.

Lysaker, John. *Emerson and Self-Culture.* Bloomington: Indiana UP, 2008.

Matheson, Neill. "Thoreau's Inner Animal." *Arizona Quarterly: A Journal of American Literature, Culture, and Theory* 67 no. 4 (2011): 1-26.

Mariotti, Shannon. *Thoreau's Democratic Withdrawal: Alienation, Participation, and Modernity.* Madison: U of Wisconsin P, 2010.

McIntosh, James. *Thoreau as Romantic Naturalist*. Ithaca: Cornell UP, 1974.

McKelvey, Seth. " 'But One Kind' of Life: Thoreau's Subjective Theory of Value in Walden."

Nineteenth-Century Literature 70, no. 4 (2016): 448-472.

McKenzie, Jonathan. *The Political Thought of Henry David Thoreau.* Lexington: UP of Kentucky, 2016.

Mooney, Edward. *Excursions with Thoreau: Philosophy, Poetry, and Religion*. New York: Bloomsbury, 2015.

Morton, Timothy. *Realist Magic: Objects, Ontology, Causality.* Ann Arbor: Open Humanities P, 2013.

Neufeldt, Leonard. *The Economist: Henry Thoreau and Enterprise*. Oxford: Oxford U P, 1989.

Newman, Lance. "Thoreau's Materialism and Environmental Justice." In *Thoreau at Two Hundred,* edited by Kristen Case and K. P. Van Anglen, 17-31. Cambridge: Cambridge UP, 2016.

---."Thoreau's Materialism: From Walden to Wild Fruits." In *More Day to Dawn: Thoreau's Walden for the Twenty-First Century*, edited by Sandra Harbert Petrulionis and Laura Dassow Walls, 100-126. Cambridge, Mass.: U of Massachusetts P, 2007.

---. *Our Common Dwelling: Henry Thoreau, Transcendentalism, and the Class Politics of Nature*. New York: Palgrave Macmillan, 2005.

Newton, Isaac. *Principia.* Translated by Andew Motte. New York: Prometheus Books, 1995.

Olsen, Taimi. *Transcending Space: Architectural Places in Henry David Thoreau, E.E. Cummings, and John Barth.* London: Associated UP, 2000.

Ott, Walter. *Causation and Laws of Nature in Early Modern Philosophy*. Oxford: Oxford UP, 2009.

Paul, Sherman. *The Shores of America: Thoreau's Inward Exploration*. Urbana: U of Illinois P, 1958.

Peck, Daniel H. *Thoreau's Morning Work*. Yale: Yale UP, 1990.

Porte, Joel. "Emerson, Thoreau, and the Double Consciousness." T*he New England Quarterly* 41, no. 1 (1968): 40–50. www.jstor.org/stable/363332.

Prud'Homme, Richard. "Walden's Economy of Living." *Raritan: A Quarterly Review* 20, no. 3 (2001):107-131.

Pughe, Thomas. "Brute Neighbors: The Modernity of a Metaphor." In *Thoreauvian Modernities: Transatlantic Conversations on an American Icon*, edited by Francois Specq, et al., 249-264. Athens: U of Georgia P, 2013.

Radner, Daisie. *Malebranche: A Study of a Cartesian System.* Assen: Van Gorcum, 1978.

Reid, James. "Speaking Extravagantly: Philosophical Territory and Eccentricity in *Walden*," *Thoreau's Importance for Philosophy,* edited by Rick Furtack, Jonathan Ellsworth, and James Reid, 43-67. New York: Fordham UP, 2012.

Richards, Robert. *The Romantic Conception of Life*. Chicago: U of Chicago P, 2002.

Robinson, J.A. "Hume's Two Definitions of 'Cause'." *The Philosophical Quarterly* 12 (1962): 162-71.

Rossi, William. "Poetry and Progress: Thoreau, Lyell, and the Geological Principles of *A Week.*" *American Literature* 66.2 (1994): 275-300. http://www.jstor.org/stable/2927981

---. "Thoreau's Multiple Modernities." In *Thoreauvian Modernities: Transatlantic Conversations on an American Icon*, edited by Francois Specq, et al., 56-68. Athens: U of Georgia P, 2013.

Sattelmeyer, Robert and Richard A. Hocks. "Thoreau and Coleridge's Theory of Life." *Studies in the American Renaissance* (1985): 269-284. http://www.jstor.org.ezproxy.gsu.edu/stable/30227536

Saunders, Judith P. "Economic Metaphor Redefined: The Transcendental Capitalist at *Walden*." *American Transcendental Quarterly: A Journal of New England Writers* 36 (1977): 4-7.

Schnepf, Robert. "From Scholasticism to Modern Physics—and Back?" In *Thinking about Causes,* edited by Peter Machamer and Gereon Wolters, 77-99. Pittsburgh: U of Pittsburgh P, 2007.

Smith, Jonathon. *Fact and Feeling: Baconian Science and the Nineteenth-Century Literary Imagination*. Madison: U of Wisconsin P, 1994.

Spinoza, Benedict. *Ethics*. Translated by W.H. White. Hertfordshire: Wordsworth Editions, 2001.

Tanner, Stephen. "Current Motions in Thoreau's *A Week*." *Studies in Romanticism* 12, no. 4 (1973): 763-76.

Taubert, Alfred. *Henry David Thoreau and the Moral Agency of Knowing.* Berkeley: U of California P, 2001.

Thayer, H.S. *Newton's Philosophy of Nature: Selections from his Writings*. Edited by H.S. Thayer. New York: Hafner, 1953.

Thoreau, Henry David. *The Journal of Henry D. Thoreau.* Edited by Bradford Torrey and Francis Allen, vols. 14. New York: Dover Publication, 1962.

---. "Natural History of Massachusetts," in *The Essays of Henry David Thoreau*, edited by Lewis Hyde, 1-25. New York: North Point Press, 2002.

---. "Slavery in Massachusetts." In *Walden, Civil Disobedience, and Other Writings*, edited by William Rossi, 3rd edition, 247-260. New York: W.W. Norton, 2008.

---. *Walden, Civil Disobedience, and Other Writings*, Edited by William

Rossi, 3rd edition. New York: W.W. Norton, 2008.

---. *A Week on the Concord and Merrimack Rivers*. New York: Penguin, 1998.

Thorson, Robert. *Walden's Shore Henry David Thoreau and Nineteenth-Century Science.* Cambridge, Mass.: Harvard UP, 2014.

Turner, Jack ed., *A Political Companion to Henry David Thoreau*. Lexington: UP of Kentucky, 2009.

Urbas, Joseph. "'Bi-Polar' Emerson: 'Nominalist *and* Realist'." *The Pluralist* 8, no. 2, (2013): 78–105. www.jstor.org/stable/10.5406/pluralist.8.2.0078.

Walls, Laura Dassow. "Believing in Nature." In *Thoreau's Sense of Place,* edited by Richard Schneider, 15-28. Iowa City: U of Iowa P, 2000.

---. *Henry David Thoreau: A Life.* Chicago: U of Chicago P, 2017.

---. "The Man Most Alive." In *Material Faith: Thoreau on Science,* edited by Laura Dassow Walls, xi-xviii. New York: Houghton Mifflin Company, 1999.

---. *The Passage to Cosmos.* Chicago: U of Chicago P, 2009.

---. *Seeing New Worlds: Henry David Thoreau and Nineteenth-Century Natural Science*. Madison: U of Wisconsin P, 1995.

---. "The Value of Mutual Intelligence." In *Thoreau at Two Hundred,* edited by Kristen Case and K. P. Van Anglen, 185-200. Cambridge: Cambridge UP, 2016.

Watson, Richard. *The Downfall of Cartesianism 1673-1712: A Study of Epistemological Issues in Late 17th Century Cartesianism.* The Hague: Martinus Nijhoff, 1966.

Whitman, Walt. "I Sing the Body Electric." In *Leaves of Grass and Other Writings*, edited by Michael Moon, 81-82. New York: W. W. Norton, 2002.

Woolhouse, Roger. *The Empiricists.* Oxford: Oxford U P, 1988.

Wordsworth, William. "Essay, Supplementary to the Preface." In *Wordsworth: The Poems*, edited by John O. Hayde, 2 vols. New Haven: Yale UP, 1981.

---. "Preface." In *Lyrical Ballads*, edited by Fiona Stafford. Oxford: Oxford UP, 2013.

---. "Lines Composed a Few Miles Above Tintern Abbey." In *Wordsworth: The Major Works*, edited by Stephen Gill, 132-136. Oxford: Oxford UP, 1984.

Worster, Donald. *Nature's Economy*, 2nd ed. Cambridge, Mass.: Cambridge UP, 1994.