

The Function of Scientific Metaphor in Thoreau's *Walden*

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Abstract

Henry David Thoreau's *Walden* has often been lauded for its philosophical advice "to simplify" and for its energetic response to the question of how human beings fit into the natural world. In terms of language, the very manner in which the author describes and metaphorizes nature in the microcosm of Walden Pond furthers the theme of simplification, and further contributes a novel approach to the very concept of seeing and understanding. *Walden* is not simply about reducing life to the barest common denominator of existence, but also about understanding how to debride just enough of the superfluities to provide insights into how amalgamating nature with human language can lead to a new humanistic vision of renewal. Thus, the employment of scientific metaphor in *Walden* is linked to the humanistic quest for guidance in the conduct of life.

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One of Henry David Thoreau's memorable similes in *Walden* occurs when he describes watching a mouse clean its whiskers with its paws, and then likens the activity to the proboscis-cleaning of a housefly (225-226).¹ In this and countless other incidences of simile and metaphor in *Walden*, Thoreau's figurative rendering of a physical object or entity remains grounded in the natural world, and also grounded within the gaze of the scientist. This new way of "seeing" has been described by Laura Dassow Walls as "empirical holism." In other words, in both his writing and in his everyday forays into the world of data-gathering and specimen-collecting, Thoreau favored a praxis that "worked toward a vision of that whole through the interconnectedness of individual details, all generating their own pattern or design" (*Emerson's Life* 1). In *Seeing New Worlds*, Walls's earlier book on Thoreau's relationship with science, she asserts that the writing of *Walden* allowed Thoreau to achieve "a cosmos of his own seeing" (7). I would like to build on this idea by proposing that Thoreau's similes are often comparisons of two natural objects or natural concepts, such as the comparison of the mouse and the fly, while his scientific metaphors further tend amalgamate collections of data or observations of the investigator as "conceptual metaphors" -- that is, metaphors in which two notions are connected by some socially constructed understanding. For instance, a concept such as "heat" is paired with "up" for most of us if the source is becoming more energized, but the very choice of "up" is also socially constructed to comport with the cultural ideas that to be "up" is to be more happy, more conscious, more optimistic, or more generally alive. Lacking such a culturally determined analogue, the association of "up" with heat has no physical meaning.

Similes in *Walden*, then, are typically comparisons of two things in the natural world that have fallen within the gaze of Thoreau himself, while metaphors in the text are typically one or more natural entities he has observed that are then compared to social or cultural phenomena by amalgamation of a concept. Thoreau defines his labors as

such when he writes that bean-hoeing can be an obligatory endeavor “if only for the sake of tropes and expression, to serve a parable-maker one day” (162).

Thoreau’s employment of figurative language is worth revisiting because critics have not sufficiently explored how this novel use of scientific metaphors in description of nature enhances the book’s overall humanistic vision of simplification and social renewal. *Walden* may be an epistemological work that forges a new way of making sense of the natural world through the energetic and original use of language, but it is also a manifesto for self-regeneration and renewed self-esteem. In short, *Walden* portrays the living of a good life as well demonstrates as the nature of scientific language. The question is whether the two are intimately related, and the answer requires a closer look at the nature of scientific metaphors and the manner in which Thoreau employs them. One extended metaphor in the book, heat and the closely associated concept of ripeness, is particularly suited for the task of determining whether scientific metaphors in *Walden* are linked to the quest for natural truths to guide the conduct of life.

In the seminal 1980 book *Metaphors We Live By*, George Lakoff and Mark Johnson propose that metaphors are conceptual in nature and are impossible to avoid in everyday life and conversation—or in scientific research—Lakoff and Johnson state that “our fundamental concepts are organized in terms of one or more spatialization metaphors,” and that these concepts are “rooted in physical and cultural experience” (17) Even more strikingly, the authors demonstrate that new discoveries and theories are comprehensible only insofar as the metaphors employed in conveying the data and/or theories make sense to our individual experience. In consequence, the understanding of scientific metaphor can provide information “that can lead to general principles of understanding” (116). Thus, when Thoreau describes the ripening of beans or the preservation of body heat, then, he willfully constrains himself in adhering to data that leads to new insights within the data’s interconnections, but the overall metaphoric import of the passage tends to accrete the data and amalgamate it with a socially constructed concept such as “a proper balance of heat is life,” in effect appealing to the reader’s experience.

By arguing that a scientific result is intimately connected to the language employed in making sense of it, Lakoff and Johnson are not saying that the specific results themselves are relative to human experience. In fact, scientific progress is possible only because the results of experiments are reproducible and thereby immune at some level to changing emotions and insights. Rather, it is the “interactional properties” that allow us to extend one understanding to other phenomena.ⁱⁱ

Extended to *Walden*, the Lakoff/Johnson argument supports interpretation of the book as a recipe for reconceptualizing the world by adjusting the way we talk about experience. Thoreau, after all, did not instruct his readers to live literally as he had lived at Walden; and in fact, he says that he abandoned the program of living in the woods like a hermit because he had “several more lives to live” (323). Moreover, he neglects to tell us much of anything about the second annual cycle of his life at Walden, minimizing the entire experience of the second year with the single line, “Thus was my first year’s

life in the woods completed; and the second year was similar to it" (319). On one of the rare occasions when he alludes to the second year, he tellingly informs us that his literary aims do not require repetition: "Cooking was then, for the most part, no longer a poetic, but merely a chemic process" (254). The reader, then, is obviated from the necessity of living a minimalist existence, or even having to read a repetition of Thoreau's minimalist existence, provided that he or she understands that the author's reconstitution of experience by adjusting language to natural phenomena the first time can lead to a beneficial re-evaluation of many tacit social assumptions, such as the importance of working the greater part of the week in order to acquire certain material goods, and does not require repetition. In sum, Thoreau implies that we all need to devise or otherwise acquire a metaphoric system of our own for living in the natural world so that we can have a reliable guidepost for our actions. From such a perspective, the spending of 60 hours per week at a thankless job in order to amortize a gigantic house is not inherently bad; it's just that a metaphorical system that works through the logic of one's necessities in the natural world shows that such practices do not make sense if a smaller house will keep one just as warm.

To further investigate the nature of scientific metaphors as Thoreau employs them, it is also useful to turn to James Bono's 1986 essay "Science, Discourse, and Literature: The Role/Rule of Metaphor in Science." Calling into question the possibility that the scientific enterprise can control its own metaphors, Bono focuses on the role of scientific language in creating a "medium of exchange" that allows "metaphorical transfer of meaning" beyond the mere coining of words and phrases to "theories, frameworks, and, most significantly, discourses" (72). As a result, scientific metaphors can be either intrascientific (or consistent within a narrow range of disciplines) or extrascientific (that is, transcendent of the disciplines and extending to cultural usage) (73). The former are comparatively easy to control—and, in fact, can lead to the naïve assumption that scientific metaphor is inherently controllable—because the focus is usually narrow. But many of Thoreau's metaphors are inherently unstable, and one need only recall the "kittybenders" line to appreciate how the bottom of the pond is both a true bottom underwater as well as the thin ice on top, and how the analogy is hopelessly vague if one tries to parse any sort of physical safety with an ultimate understanding of the laws of nature. Apprehending the nature of the life under the cover of ice is one thing; preserving one's body from hypothermia in acquiring that understanding is another.ⁱⁱⁱ

The example that Bono describes is the past practice of likening the biology of race with nonbiological associations such as blackness and sin. Bono describes the use of extrascientific metaphorical exchange thus:

The power of such metaphors in science is considerable. Narrowly construed, metaphors can direct scientists to explore links that would otherwise remain obscure. In some instances, such as those of metaphors associating brains and computers or disease and military invasions, the links suggested by metaphors can prove enormously productive of theoretical advances and empirical observations. In others, such as those of race and gender analogies, the links are misleading, mistaken, embarrassing, or worse. (81)

Scientific metaphors can get away from us, in other words. But the possibility of shifting meanings that can lead to a more profound understanding of human experience can lead to a revolution in thought, and this is the value of Bono's argument to a discussion of *Walden*. For Thoreau to imply in the "kittybenders" passage that a certain kind of moral behavior or intellectual integrity is associated with the acquisition of knowledge is a useful employment of metaphor, even if that acquisition is coupled with the possibility of personal destruction. On the other hand, such a pursuit is surely valuable, for the likening of the "game" of scientific investigation to the "game" of kittybenders shows, in this case, that an enhanced seeing of the world is at stake (330).

That changes in scientific metaphor may spark revolutions in science is advanced in Thomas Kuhn's 1963 book *The Structure of Scientific Revolution*. Kuhn, in fact, devoted an entire chapter to metaphor in his follow-up book in 2000, *The Road Since Structure*. Though much of both books is not pertinent to the present discussion, it should be pointed out that the subject of changing metaphors, in Kuhn's view, lead inexorably to the subject of changing scientific theories. As scientists discover opportunities to significantly re-envision a way of analogizing reality, they are also required to better describe their new findings about the working of nature.

However, no such need to revolutionize the natural sciences was likely the case for Thoreau--or at least not at the time when *Walden* was written, for he would not have known at the time that evolution would soon result in a major scientific revolution, or even that, in another decade or so, physicists would postulate the inevitable "heat death" of the universe. He even shunned the scientific community when the American Association for the Advancement of Science after the prestigious organization offered him membership. (Harding 45). Thoreau may have become increasingly involved with data collection in the final years of his life, but there is no reason to think that he was attempting to revolutionize any science, or that he even considered himself capable of doing so. Rather, Thoreau was attempting to revolutionize the way that we speak of a wide expanse of human experience that happens to encompass our interactions with the natural world. Here, Bono is again of great help:

Once metaphors are dislodged and discarded, replaced by others, metaphoric exchange can assume the mantle of "revolution." But though their effects may appear like that of a sudden shift of gestalt, such metaphoric "revolutions" are grounded in interpretation, not, I would argue, in an unmediated perceptual shift. Given the complexity of metaphoric exchange underlying scientific change, a more fitting model for scientific change might be that of negotiation rather than revolution. (81)

Referring in a couple of footnotes to certain reservations others have had regarding Kuhn's theory of scientific revolutions, Bono states that the idea of negotiation can be more realistic for intrascientific exchanges, but extrascientific exchanges as well:

The process of negotiation, indeed, reflects more adequately the textuality of scientific discourse, its implication through the metaphoricity of its language in the "text" of other discourses. To the extent, then, that this theoretical analysis

implicates scientific discourse in the languages of other, extrascientific discourses, science can no longer regard itself as separate from literature, nor as in complete control of its metaphors and analogies. Science, in short, may suffer the rule of its own metaphors and thereby exhibit a genuinely dialogical relationship with literature. (82)

Paul Ricoeur, in *The Rule of Metaphor*, makes the relationship even more explicit:

The issue is no longer the *form* of metaphor as a word-focused figure of speech, nor even just the *sense* of metaphor as a founding of a new semantic pertinence, but the *reference* of the metaphorical statement as the power to 'redescribe' reality. The most fundamental support of this transition from semantics to hermeneutics is to be found in the connection in all discourse between sense, which is its internal organization, and reference, which is its power to refer to a reality outside of language. Accordingly, metaphor presents itself as a strategy of discourse that, while preserving and developing the creative power of language, preserves and develops the *heuristic* power wielded by fiction. (6)

When Thoreau orders the requirements of Adam and Eve myth as "a home, a place of warmth, or comfort, first of physical warmth, then the warmth of the affections"(28), he illustrates how the reference broadens our understanding of physical necessity to emotional well-being. To describe the passage in Ricoeur's terms, the internal organization is the unity of physically warm objects within the purview of heat, while the "reality outside language" is the connection between heat and mutual affection. The connection might otherwise seem tenuous, but Thoreau's careful rendering of the language persuades us that it indeed exists.

Before turning to Thoreau's dialogical relationship between literary artifice and the natural world in *Walden*, it should be pointed out that one has difficulty in determining where Thoreau's reliance on written sources ended and his empirical investigations began, because he left a record of vast accomplishment in both.^{iv} To demonstrate this point, one need only look at Thoreau's mention of the chemist Justus von Liebig and then try to determine precisely how Thoreau made use of the material from Liebig's 1842 book *Animal Chemistry*. Written for educated audiences but not necessarily for the professional scientist, *Animal Chemistry* is the source for Thoreau's ruminations on the interaction of clothes, shelter, food, fuel, and the perseverance of life. In Liebig's more reflective moments, he writes passages that are of direct pertinence to a reader of a more philosophic bent. For example:

Heat and light are the remote causes of motion in vegetables; but in animals we recognize in the nervous apparatus a source of power, capable of renewing itself at every moment of their existence. (3)

And in a passage that especially recalls Thoreau's amalgamation of scientific observation and the role of the human observer:

We know exactly the mechanisms of the eye; but neither anatomy nor chemistry

will ever explain how the rays of light act in consciousness, so as to produce vision. Natural science has fixed limits which cannot be passed; and it must always be borne in mind that, with all our discoveries, we shall never know what light, electricity, and magnetism are in their essence, because, even of those things which are material, the human intellect has only conceptions. We can ascertain, however, the laws which regulate their motion and rest, because these are manifested in phenomena. (7)

The pages that Liebig devotes to animal heat are too numerous to quote directly, but anyone who goes to the trouble of finding a copy of the book would be hard-pressed to discover a passage that Thoreau himself owes more than an acknowledgement of indirect inspiration. Liebig indeed defines animal heat as a basic necessity of life, but then goes on to discuss the interactions of carbon, hydrogen, oxygen, and later the quantitative measures that bear these assumptions out—material that Thoreau ignores entirely. In the 2004 edition of *The Annotated Walden*, in fact, editor Jeffrey S. Cramer apparently finds so little direct wording from *Animal Chemistry* in *Walden* that he assumes Thoreau must have learned of the Liebig book from a long review article in the October 1842 issue of the *North American Review*.^v Whether or not this is the case, Thoreau's usage of Liebig in both his journal and in *Walden* does not reflect the highly critical review article, which at one point informs the “gentle reader” that Liebig's assertion of the difference between venous and arterial blood is specious (489). Thoreau correctly implies that one was oxygenated and the other was not. Besides, we know that Thoreau mentioned Liebig in the aforementioned journal passage during the winter of 1845-46, and it seems no more unlikely that a copy of *Animal Chemistry* would have turned up in Concord after three years than an old copy of the *North American Review*. It's safe to say that Thoreau read the entire book, took what he needed for his own bending of the scientific metaphor of heat, and moved on.

At any rate, the point is that Thoreau's passages, both in his journal and in *Walden*, deviate so far from the wording of Liebig's relevant passages in *Animal Chemistry*—and certainly from the wording of the *North American Review* article—in both content and intention that Thoreau must be lauded for his originality and not merely evaluated for his footnoting abilities. Here is the passage from the journal:

Perhaps we may distribute the necessaries of life under the several heads of food-clothing-shelter-& fuel And this suggests how nearly the expression animal heat—is to being synonymous with animal life. (143)

These very first words are a novel synthesis and extension of Liebig's comments on animal heat, although Liebig does spell out the relationship between clothing and the retention of body warmth. The references to shelter and fuel are apparently Thoreau's own ideas, for they do not appear in the Liebig book.

Thoreau continues thus:

I have read that the New Hollander goes naked in a pretty cold winter—and warms his body by putting his feet close to a hot fire—though the rest of the body

may be in frost—On the other hand food according to Liebig is the fuel which keeps up the internal combustion which is going on in the lungs. In cold weather weather we want more of this fuel—in summer less (143)

This passage deviates from Liebig in its inclusion of the New Hollander anecdote, as well as in Thoreau's synthesis of the term "internal combustion," which does not appear either in the Liebig book or in the *North American Review* article. Besides, Thoreau ignores the information about carbon and hydrogen with oxygen as a source of animal heat. Thoreau is either bored by the details of the then-emerging field of organic chemistry, does not think that the metaphors are of any use to him in *Walden*—or perhaps, even, thinks that the metaphor has already been exhausted by Goethe in *Elective Affinities*.

A slightly less technical book available to Thoreau was Robert M. Hunt's *The Poetry of Science*, a general overview of the then-current trends in scientific research that might persuade the reader that "harmony runs through all the cosmic phenomena, by which everything is produced that is so beautiful and joyous in the world" (63). There is reason to believe that Thoreau's attitude toward science closely reflected Hunt's, albeit with a Transcendentalist slant that Walls comments upon in her book:

His transcendental training, finding its object in the river's surface, induced him to read intentionality as an either/or phenomenon: either one saw ethereal reflections, or one saw bottom mud. As with Emerson, splitting the field into two allowed Thoreau to subordinate one side to the other, as implied by the metaphor....Later, he observed that out of the same field he could choose to evoke either poetry or science. Later still, when the field was no longer double but multiple, the intentionality of the eye became a powerful and dangerous tool, capable of creating by sheer force of desire, or slaying whatever it chose not to see. (49)

When Thoreau employs a metaphor that compares natural phenomena such as heat to social phenomena, he typically likens the first to the excesses of economic overproduction that causes individuals to waste away their lives in frustration. Then he customarily moves onward to the inextricable importance of heat to living processes as a fact of nature. Finally, he concludes with the metaphor as an index of human society's confrontation and hopeful consecration in wildness. Holding both a spiritual view of nature, and at the same time a naturalistic one based on observation, then, is a way out of being obliged to sacrifice ourselves to either. The simplicity comes not from choosing one or the other, but having an uncluttered enough vision to perceive the consequences. Achieving such simplicity, which by no means presupposes ignorance or inattention to natural processes, is the first step toward regeneration. Understanding how language can be re-conceived to make seemingly unrelated arguments more related, moreover, is the first step to achieving simplicity.

This is why Thoreau was particularly interested after his *Walden* experience in creating "a science that would be relational rather than objective." (*Seeing* 147) And far from wasting away his final decade in taking temperature readings and collecting field

samples with no end in sight, Thoreau in fact had come to realize that empirical evidence was the substance of poetry only insofar as it refreshed the human experience. Thoreau's life in the woods is therefore carefully transcribed during the first year over several hundred pages of text. But when it becomes apparent that he has successfully reproduced the vocabulary of the experience, he sums up his second year with a single clause in a single sentence.

To return to an observation broached in the opening pages of this essay, the very fact that the book *Walden* has been constructed in such a way to provide a satisfactory rhetorical record of the physical experience means for Thoreau that the second year can be subsumed in a single sentence. The second year is as complete as the single clause reflecting it as a unit of thought: "and the second year was similar to it" is connected to the several-hundred-page first year by the coordinating conjunction "and." Moreover, the sentence is complete in itself but not exclusionary: the rhetorical description can always be expanded if there is newfound reason to do so. Reducing the second year by way of rhetorical parsing means that the experiences of the year had no further application to Thoreau's poetics, whether or not he managed to collect additional observations to supplement the material to be found in *Walden* that recounts the first year.

It is unlikely, however, that the second year would have been irrelevant in the collection of data, because additional information always strengthens the experimental testing of a hypothesis. The fact that Thoreau dismisses the need for further explanation, then, indicates that *Walden* is intended as a cultural and literary text rather than a popular work on science. As an inducement for Americans to rethink their various assumptions about the direction their lives and their country as a whole should take, *Walden* is sufficient.^{vi}

If ripeness is indeed a mythical construct and not just an empirical fact, then our sense of mission is a dimension of the appeal in the words themselves. But the fusion of mythical construct and empirical observation has the additional force of making us both the object of the description and the subject doing the describing, in much the same way that the whiteness of Melville's whale is both a complicated metaphor and a natural fact. In the same manner, the ripeness of the fruit as an individual observation is interconnected with a ripeness that is part of the grander pageantry of America and a cog in its economic engine, if not its spiritual engine.

This process is evident in *Walden*, where the first occurrence of the word "ripe" is to be found in a complicated interplay between the seemingly humble, almost microcosmic ripening of basic nourishment with the larger cosmos, along with the enjoinder to view the particular in the meager import that it in a sense deserves:

We might try our lives by a thousand simple tests; as, for instance, that the same sun which ripens my beans illumines at once a system of earths like ours. If I had remembered this it would have prevented some mistakes. This was not the light in which I hoed them. The stars are the apexes of what wonderful triangles! What distant and different beings in the various mansions of the universe are contemplating the same one at the same moment! Nature and human life are as

various as our several constitutions. Who shall say what prospect life offers to another? Could a greater miracle take place than for us to look through each other's eyes for an instant? We should live in all the ages of the world in an hour; ay, in all the worlds of the ages. History, Poetry, Mythology! – I know of no reading of another's experience so startling and informing as this would be. (10)

This passage provides a template for understanding the more difficult metaphorical constructions that will come later, for the “mistakes” incumbent upon the simple act of hoeing are caused by the hoer’s lack of cosmic perspective. The problem is not in the improper hoeing, of course, but in the missing of an opportunity to see the vast interconnection between the specific and the general. The author’s hoeing is only a mistake, then, if one takes into special consideration the definition of the word “mistake.” Failure to make the complete connection is not so much a lexical failure as an existential one, the missing of a referent or two clearly begging the ability of language to subsume all experience.

As a result, the simple act of hoeing a bean patch, if seen in the “light” that is fully available, melds history, poetry, and mythology—in other words, the physical details of natural history, the possibility of describing the interaction in appropriate language, and the mythic connection when referential language proves inadequate to the task. If this reading is indeed a template for Thoreau’s radical metaphors in *Walden*, then the more difficult famous passage about losing the hunting dog becomes less puzzling:

I long ago lost a hound, a bay horse, and a turtle dove, and am still on their trail. Many are the travellers I have spoken concerning them, describing their tracks and what calls they answered to. I have met one or two who had heard the hound, and the tramp of the horse, and even seen the dove disappear behind a cloud, and they seemed as anxious to recover them as if they had lost them themselves. (17)

If the hound, the bay horse, and the turtle dove are the metaphorical equivalents of the hoed bean patch, then the issue is not so much what the things precisely represent as how they fit into the larger scheme, both as contributing members and as individual components. The sense of loss is exacerbated by the lack of context, just as the act of hoeing is meiotic only if the connection to the larger context is missed. As a result, another individual (interestingly referred to with the substantives “one” and “two”) will also feel a sense of loss because the opportunity for a grander synthesis was missed when the things themselves passed by without being fully appreciated. Further, the thing “lost” is not merely the knowledge—although that’s missing as well—but the organic connection that ultimately feeds into the general economy. That this metaphoric construction occurs in the section titled “Economy” is therefore not surprising.^{vii}

Thoreau includes references in “Economy” to heat and fire. Also as in the case of the ripening metaphor, heat references work somewhat differently in the beginning pages than in the latter part, in that the initial references involve excessive heat, while the latter settle into a metaphorical structure more suited to striking a “happy medium,” which is an oversimplified way of stating Thoreau’s economic thesis. The very first

reference to heat is on the third page, when Thoreau likens the overzealous but inefficient activities of his contemporaries as a kind of needless self-sacrifice:

What I have heard of Brahmins sitting exposed to four fires and looking in the face of the sun; or hanging suspended, with their head downward, over flames; or looking at the heavens over their shoulders “until it becomes impossible for them to resume their natural position, while from the twist of the neck nothing but liquids can pass into the stomach”...even these forms of conscious penance are hardly more incredible and astonishing than the scenes which I daily witness. The twelve labors of Hercules were trifling in comparison with those which my neighbors have undertaken; for they were only twelve, and had an end; ...They have no friend Iolaus to burn with a hot iron the root of the hydra’s head, but as soon as one head is crushed, two spring up. (4)

This preliminary metaphor of the “overcooked” will turn up in subsequent pages, but Thoreau next turns to a fuel metaphor, first contrasting the older and newer generations as ones who didn’t know to “fetch fresh fuel to keep the fire a-going” with “new people” who “put a little dry wood under a pot” (8). Next, he measures life and its place in the universe with the knowledge that “the same sun which ripens my beans illumines at once a system of earths like ours,” and then listing fuel as one of the basic necessities of life, along with food, shelter, and clothing (10, 12). Moreover, the latter three can be taken as subsets of the first, because clothing is to “retain our own internal heat,” while cooking is no more than the application of “an external heat greater than our own internal” (12). Meanwhile, in warmer climes, the bare man has little need of clothing or shelter because he lacks the need to keep his internal heat from escaping, while the sun is adequate to cook the abundant tropical fruits (13).

Where is Thoreau heading with all this? It can be argued that he is bringing his analysis of human economy to such basic terms in order to simplify the question of what humans really need to survive. If the overall message of *Walden* is to “simplify,” then perhaps the way to avoid the loss of simplicity is to avoid “overcooking.” Thoreau also states the following:

When a man is warmed by the several modes which I have described, what does he want next? Surely not more warmth of the same kind, as more and richer food, larger and more splendid houses, finer and more abundant clothing, more numerous incessant and hotter fires, and the like. When he has obtained those things which are necessary to life, there is another alternative than to obtain the superfluities; and that is, to adventure on life now, his vacation from humbler toil having commenced. (15)

Thus, one way of approaching the question of how to avoid the vicious circle—of working harder at pointless tasks to finance pointless expenditures so as to better work harder at pointless tasks—is to keep the economy of basic needs in perspective. Interestingly, one of the first mentioned trades in *Walden* is the ice trade, which is explained more fully later in the book as the practice of cutting chunks of the frozen pond surface and shipping the ice to hot climes as a tradable commodity. The cutting of ice is

portrayed more or less as honest work throughout *Walden*, but there is always something unsettling about the descriptive passages, as if Thoreau doesn't entirely approve of the endeavor. But his slight disapproval is in keeping with his ironic attitude toward so much of human economic endeavor, for the ice-cutting in itself is a vicious circle: the ice men market in ice to ultimately buy the goods to protect themselves from exposure to the cold climate, and do so by selling "cold" to people in a region that cannot generate relief from the elements by burning fuel. Then, with the funds received from the people in the hot climate, the ice men purchase food, clothing, and shelter to maintain their internal heat, which Thoreau has already told us is the ultimate goal of those three commodities. And although there is no indication that Thoreau was aware of entropy, as previously stated, he fortuitously gains from a modern reading in that the hopeless task of shipping cold to a hot region runs counter to nature, for the task is ultimately doomed to failure.

The short anecdote of the brush fire is a very compact version of an interest of Thoreau's that shows up in much greater descriptive detail in his journals. Whereas he describes forest fires and brush fires as a natural process that take on an impetus of their own in the journals, he condenses this message in the truth that most observers of wildfires are interested "much more to see it burn, since burn it must." In his journal, for example, Thoreau tells the story of the brush fire he accidentally started about the beginning of June 1850, while building a campfire to cook some fish he and a companion had caught. Clearly at fault, he nonetheless writes that the "shame and regret" soon left him. "I have set fire to the forest, but I have done no wrong therein, and now it is as if the lightning had done it. These flames are but consuming their natural food" (*Journal 76-7*). Besides, "the locomotive engine has since burned over nearly all the same ground and more, and in some measure blotted out the memory of the previous fire" (*Journal 78*).

In *Walden*, references to burning and to heat in general are usually mentioned in conjunction with natural processes, and when there is an exception, it is a glaring one indeed. For example, the following passage is one of the instances where he speaks disparagingly of the railroad:

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 the system, since its orbit does not look like a returning curve—with its steam cloud in a banner streaming behind in golden and silver wreaths, like many a downy cloud which I have seen, high in the heavens, unfolding its masses to the light—as if this traveling demigod, this cloud-compeller, would ere long take the sunset sky for the livery of his train; when I hear the iron horse make the hills echo with his snort like thunder, shaking the earth with his feet, and breathing fire and smoke from his nostrils (what kind of winged horse or fiery dragon they will put into the new Mythology I don't know), it seems as if the earth had got a race now worthy to inhabit it. If all were as it seems, and men made the elements their servants for noble ends! (116)

This remarkable passage is constructed in such a way as to deliberately "hang fire" so

that the main clause of the sentence is almost intolerably delayed by 149 words in the subordinate clauses. And even then, the main thought—that earth maybe now has a society worthy to inhabit it—is not only anticlimactic but ironic. In the very next line, a subjunctive construction, Thoreau laments the fact that the harnessing of nature could not take a more noble form. As it is, the locomotive is “like a comet,” which means it shines brightly when it passes, but is a nonentity when not visible—and perhaps no longer even in existence, considering that many comets never make their returns. But little is said about industrial society having entered into this disequilibrium at the expense of staying close to nature so that people could “contemplate their journey,” for the point has already been covered in “Economy.” But Thoreau’s disapproval continues to interject in the description of the “iron horse,” and repeatedly in the form of the subjunctive: the “stabler” of the “iron horse” stokes up his “steed” in a manner that conjures the “vital heat” early in the morning. “If the enterprise were as innocent as it is early!” Again, Thoreau resorts to the subjunctive when referring to the scheduling of the train and how it sometimes blows off superfluous energy. “If the enterprise were as heroic and commanding as it is protracted and unwearied!”(117)

So what can “wash out the engine’s soot” for an individual wary of the encroachments of industrial society on his pastoral repose? One answer, at least for Thoreau, is the pond itself. The “Economy” chapter having tempered the later passages in the notion that equilibrium must be maintained, the pond itself has tempered Thoreau to look at nature in its microcosm. Even when he disturbs the “ashes of forgotten nations” when digging the ground near his cabin, Thoreau is fairly quick to move beyond lamentations for past societies that have been turned under the earth, regardless of whether they build their iron horses or stay close to nature. Instead, the mere act of hitting upon rocks scorched in long-past Indian campfires while hoeing his bean patch reminds him of the fidelity of his enterprise, and how such a simple act as tending a garden can be an indescribably joy to one who has simplified his life to such an extent that the pursuit is important. The turning up of Indian ashes, rather than conjuring up feeling of melancholy for the thankless human endeavor that has been turned into the ashes of history, rather is on par with the sights and sounds that fuse together in the pageantry of human history. In a Miltonic passage that shows how he has turned to “fresh fields anew” (undoubtedly Miltonic in its pastoral imagery, because Thoreau alludes to “Lycidas” on at least two occasions in *Walden*, and possibly more), he generates a list of equivalencies linked together with the word “or”:

It was no longer beans that I hoed, nor I that hoed beans; and I remembered with as much pity as pride, if I remembered at all, my acquaintances who had gone to the city to attend the oratorios. The night-hawk circled overhead in the sunny afternoon...Or sometimes I watched a pair of hen-hawks circling by...Or I was attracted by the passage of wild pigeons from this wood to that;...or from under a rotten stump my hoe turned up a sluggish, portentuous, and outlandish spotted salamander, a trace of Egypt and the Nile, yet our contemporary. When I paused to lean on my hoe, these sounds and sights I heard and saw anywhere in the row, a part of the inexhaustible entertainment which our country offers. (159)

The “or” is not lightly chosen, for it shows a oneness with nature that refuses to privilege

the disequilibrium of human existence manifested in monstrosities such as rolling steam-engines. To simplify is a joy in itself, and an entering into equilibrium is a source of this simplicity. Even the discussions of the villagers tends not to re-cover matters already resolved in "Economy," though the contrast one finds upon a careful reading is striking. In the chapter "The Village," for example, Thoreau finds the inhabitants "sunning themselves," but in a manner not particularly conducive to simplification as he has previously delineated it. In fact, the basic necessities of the village, the "crucial vitals," are the bank, the post office, the barroom, and the grocery (168). These institutions are a far cry from the list Thoreau has previously generated, of food, clothing, shelter, and fuel, but the point has already sufficiently been made that many if not most of the villagers are out of equilibrium. In fact, the new list parallels the old list in its essentials, in that the grocer and barroom provide food and fuel, albeit of a very highly refined and overly expensive variety, while the bank and post office allow an individual to carry on the type of interchanges necessary to acquire clothing and shelter, but at a very high cost to his pursuing a more worthwhile life. Unless one is careful, he can unconsciously steer "like pilots by certain well-known beacons and headlands," and not even realize he is lost until confronted with the "vastness and strangeness of Nature." But some good can come of it to those who confront the contradiction, for in a particularly Pauline paradox, Thoreau says, "not till we are lost...do we begin to find ourselves, and realize where we are and the infinite extent of our relations" (171).

Is the locomotive, then, a type of housewarming? In other words, is the train perhaps a necessity in certain instances that clearly points to human progress in the pursuit of utilitarian invention? Or is the dwelling, however simple, a sort of necessary evil? There may be no real difference between the questions, for Thoreau seems to hedge his enthusiasm for the simplicity of the house as the winter freeze hardens:

The show had already covered the ground since the 25th of November, and surrounded me suddenly with the scenery of winter. I withdrew yet farther into my shell, and endeavored to keep a bright fire both within my house and within my breast. My employment out of doors now was to collect the dead wood in the forest, bring it in my hands or on my shoulders, or trailing a dead pine tree under each arm to my shed. An old forest fence which had seen its best days was a great haul for me. I sacrificed it to Vulcan, for it was past serving the god Terminus. (249)

Thus, the exigencies of keeping warm against the summer months requires the same "sacrifice" as fencing off properties, perhaps for railroad right-of-way. That these descriptive touches occur toward the end of the book is probably not accidental, for Thoreau's attitude toward heat has developed to a certain extent, from the early analogies of overcooking to economic overdetermination, to the bare necessity of maintaining an organism against the elements.

It is hardly surprising, then, that a man looks on his woodpile "with a kind of affection" (251). But just as quickly we are transported back to the "bowels of the earth," for this is where a great amount of fuel source can be had in the form of pine roots. Nonetheless, the building of fires is ultimately for the purpose of warming the body, and

Thoreau ends the section “Housewarming” by admitting that he acquired a cooking stove for his second winter at Walden. The new implement simplified his life, but his ambivalence again shines through:

The stove not only took up room and scented the house, but it concealed the fire, and I felt as if I had lost a companion. You can always see a face in the fire. The laborer, looking into it at evening purifies his thoughts off the dross and earthiness which they have accumulated during the day. But I could no longer sit and look into the fire...(254)

While these lines by no means indicate that Thoreau considers his experiment to have been a failure, they do indicate that he has learned that a human—perhaps any living organism—cannot exist independently of the ambient factors, but will inexorably tend toward equalization. But since the equalization of freezing to death is not acceptable, Thoreau effectively ends the winter by acquiescing in the bounty of Vulcan. He briefly mentions other past inhabitants of Walden Pond, a few current inhabitants from the animal kingdom, the nature of the frozen pond in winter, and it is springtime.

Hence, the heat metaphor in *Walden* is complex, and several dozen additional instances could be included. But in general, the scientific metaphor of heat refers in various passages to the excesses of economic overproduction in society, the inextricable importance of heat to living process becomes a fact of nature, and finally, an index of human society’s confrontation and hopeful consecration in wildness. We can never sacrifice ourselves completely to “go with the flow,” for attaining such an equilibrium—thermic or otherwise—would be destruction. However, one requires simplicity to perceive the flow at all, and doing so is the best hope for regeneration.

The preceding reading of *Walden* has focused almost exclusively on Thoreau’s use of scientific metaphor because his use of figurative language is the most commodious pathway to apprehending his fusion of natural fact and literary artifice. Much less given to search for overviews than Emerson, Thoreau always “felt he was on a quest” in attempting “to read and tell a history of man and nature together, and as in one single, interrelated act” (Walls, *Seeing* 4). This is why Thoreau’s work is neither metaphysical poetry nor science, but an amalgam of the two: there is always a time-integration that requires an active and socially-engaged mentality for the metaphors to cohere. Unlike an allegory where an abstract idea is represented by a physical thing or being, Thoreau’s metaphors are always a combination of the idea and the actual substance that leads to the idea. His contribution to figurative language, then, is that the individual component is both a part of the whole, a representation of the whole, and a representation of itself and of the perceiver.

In conclusion, to understand the use of scientific metaphor in *Walden* is to understand the book’s sustained argument for both simplification and enhanced seeing. The comparatively gentle observation that men live out their lives in quiet desperation—and attendant warning that they may not wish to continue doing so—may lack the fire and brimstone of Edwards’ “Sinners in the Hands of an Angry God,” but the prophecy is somewhat similar. If individuals will just gain control of their personal agendas with a

more focused long-term goal in mind, then they will prosper, as will the overall enterprise of which they are a component. Further, they will enter into a cognitive enterprise with their like-minded fellow humans that may very well forge new and more profound connections among humankind.

In terms the flexibility of its scientific metaphors, *Walden* is as limited and at the same time as expansive as Thoreau's own roaming around Walden Pond. The book, after all, is about hoeing beans, cutting fishing holes in the frozen ice, and stripping the economy of living to sufficiently bare essentials so that the underpinnings of this economy could be apprehended. As Thoreau himself indicated, the purpose is not to reduce life to the barest common denominator of existence, but to debride just enough of the superfluities to allow the superstructure to reveal its underlying reality. This superstructure, in Lakoff/Johnson terminology, is the essence of the conceptual metaphor.

Notes

ⁱAll textual references to *Walden* are from the 1971 Princeton edition.

ⁱⁱSuch was the case when Benjamin Franklin made the conceptual leap between lightning and the electric charges that had been observed for years in controlled experiments. As far as the experiments themselves went, a charge was a charge; yet, Franklin certainly was not impeded in better understanding underlying causal relationships because he could employ linguistically related elements to phenomena that might well turn out to be naturally related. In sum, the metaphorical use of the word "charge" to another phenomena provides another case "of the power of metaphor to create a reality rather than to simply give us a way of conceptualizing a pre-existing reality" (Lakoff 144).

ⁱⁱⁱ As Robert Richardson points out in *Henry David Thoreau: A Life of the Mind*, Thoreau very likely exacerbated his nagging bronchitis by embarking on a trip to Minnesota during the last year of his life (386-387).

^{iv} His notebooks are brimming with the field observations he collected during his last decade or so, and we know that he read or had access to at least 1,478 library books through the years (Sattelmeyer).

^v*Walden: A Fully Annotated Edition*, New Haven: Yale, pp. 12-13. The review article is found in Vol. 55 of the *North American Review*, pp. 462-500.

^{vi}Thus, *Walden* is similar more to Franklin's *Autobiography* than to Franklin's reports on electricity, kite-flying to investigate nature, and the making of lightning rods. All the latter are sufficient only insofar as they explain precisely how to reproduce scientific results, make scientific instruments, or protect oneself reliably against natural hazards. By contrast, the *Autobiography*, like *Walden*, is a call for Americans to ask themselves whether their thinking needs readjustment and replenishing.

^{vii} A good overview of critical opinion on this famously enigmatic passage can be found in the late theorist Barbara Johnson's "*A Hound, A Bay Horse, and a Turtle Dove: Obscurity in Walden*," as well as her own compelling explanation. Johnson argues that the key is in the preceding paragraph of *Walden*, in which Thoreau writes "You will pardon some obscurities." Johnson

explains that the very act of writing has its obscurities, and further, that the hound, horse, and turtle-dove are “symbols standing for the obscure, the lost, the irretrievable” that “wake us up to our own lost losses” (444-445).

Works Cited

- Bono, James J. “Science, Discourse, and Literature: Role/Rule of Metaphor in Science.” *Literature and Science: Theory and Practice*. Ed. Stuart Peterfreund. Boston: Northeastern, 1990. 59-89.
- Franklin, Benjamin. *Autobiography and Other Writings*. Ed. Ormond Seavey. Oxford: Oxford University Press, 1993.
- Harding, Walter. “Walden’s Man of Science.” *Virginia Quarterly Review* 57 (1981): 45-61.
- Hunt, Robert M. *The Poetry of Science: Or Studies of the Physical Phenomena of Nature*. Boston: Gould, Kendall, and Lincoln, 1850.
- Johnson, Barbara. “A Hound, a Bay Horse, and a Turtle Dove: Obscurity in Walden.” Rpt. In *Walden and Resistance to Civil Government*, 2nd ed. Edited by William Rossi. New York: W.W. Norton, 1992.
- Lakoff, George, and Mark Johnson. *Metaphors We Live By*. Chicago: University of Chicago, 1980.
- Liebig, Justus von. *Animal Chemistry: or chemistry in its applications to physiology and pathology*. 2nd ed. Trans. William Gregory. London: Taylor & Walton, 1843.
- “Liebig’s Animal Chemistry.” *North American Review* 55 (1842). 462-500.
- Ricoeur, Paul. *The Rule of Metaphor: Multidisciplinary Studies of the Creation or Meaning in Language*. Toronto: University of Toronto, 1977.
- Richardson, Robert D., Jr. *Henry Thoreau: A Life of the Mind*. Berkeley: University of California, 1986.
- Sattelmeyer, Robert. *Thoreau’s Reading: A Study in Intellectual History, with Bibliographical Catalogue*. Princeton: Princeton University Press, 1988.
- Thoreau, Henry David. *Journal: Volume 2: 1842-1848*. Ed. Robert Sattelmeyer. Princeton: Princeton University Press, 1984.
- . *Journal: Volume 3: 1848-1851*. Ed. Robert Sattelmeyer, Mark R. Patterson, and William Rossi. Princeton: Princeton University Press, 1990.
- . *The Illustrated Walden*. Ed. J. Lyndon Shanley. Princeton: Princeton University Press, 1973.
- . *Walden: A Fully Annotated Edition*. Ed. Jeffrey S. Cramer. New Haven: Yale University Press, 2004.
- Walls, Laura Dassow. *Emerson’s Life in Science: The Culture of Truth*. Ithaca: Cornell University Press, 2003.
- . *Seeing New Worlds: Henry David Thoreau and Nineteenth-Century Natural Science*. Madison: University of Wisconsin Press, 1995.

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This metaphor can be applied to what Thoreau writes about life; rather than simply going through our days with select times that we devote to contemplation or beauty, Thoreau thinks that we should try for this type of moral and spiritual elevation and transcendence at all times. This type of transcendence can be compared to painting the lens through which we see the world around us. As he writes, "To affect the quality of the day, that is the highest of arts."Â Thoreau is using the metaphor of the artist in this quote. He is explaining that the artist can carve and paint a scene to make something look beautiful, such as a bowl of fruit. He is comparing that process to humanity and the human perspective.