
RESEARCH

Henry David Thoreau and Scientific Culture

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Henry David Thoreau's life and writings are notoriously resilient—they have remained relevant throughout crisis and change in contemporary societies. This could be because readers have found in Thoreau an ongoing awareness of some humanizing/dehumanizing features of a world increasingly shaped by science and technology.

Metaphors can facilitate the public's engagement with some emancipatory aspects of science that are increasingly disappearing from the contemporary world (Pilkington 2016; Garcés 2017). Through a discussion of the bream passage in Thoreau's 1858 journal, and the metaphors used in connection with this particular fish, the paper shows how Thoreau managed to establish an emotional connection between the reader's world and the world of science, thus reuniting knowledge and empowerment through scientific culture (as opposed to the "two cultures" thesis).

The conclusion is that one of the most interesting uses of Thoreau today could be the radical illustration or enactment of a wide set of rapports or reactions to scientific activities. Because his work provides a permanent resource of emotional reactions to science—including wonder, perplexity, inquiry and critique—it could help re-humanize science by means of an enlargement of the emotional palette used in scientific culture communication.

Keywords: Henry D. Thoreau; science; poetry; nature; relationships

A vida e a obra de Henry David Thoreau são notoriamente resilientes, permanecendo relevantes perante a crise e a transformação das sociedades contemporâneas. A justificação para isso reside no facto de os leitores encontrarem em Thoreau uma permanente consciência de certas características humanas / desumanas num mundo cada vez mais moldado pela ciência e tecnologia.

As metáforas podem facilitar o envolvimento do público com alguns dos aspetos emancipatórios da ciência, esses mesmo que estão a desaparecer cada vez mais do mundo contemporâneo (Pilkington 2016; Garcés 2017). A partir de uma reflexão sobre o peixe-sol-bandado no *Diário* de Thoreau (1858) e das metáforas usadas em relação com este peixe em particular, o artigo mostra como Thoreau conseguiu estabelecer uma ligação emocional entre o mundo do leitor e o mundo da ciência, aliando conhecimento e capacitação através cultura científica (em oposição à tese das "duas culturas").

A conclusão é que um dos usos mais interessantes da obra de Thoreau no mundo contemporâneo pode ser o modo como esta se afirma ilustração radical de um amplo conjunto de relações ou reações a atividades científicas. Porque o seu trabalho se apresenta como um recurso permanente de reações emocionais à ciência – incluindo maravilhamento, perplexidade, investigação e crítica – este pode ajudar a re-humanizar a ciência por meio de uma ampliação da paleta emocional usada na comunicação da cultura científica.

Palavras-chave: Henry D. Thoreau; ciência; poesia; natureza; relações

1. Introduction

According to contemporary philosophers such as Marina Garcés, nowadays there is a wide spread reaction against the ideals of the Enlightenment, due to increasing disillusionment in society concerning some destructive effects of modernization. The expansion of culture, literacy and information does not auto-

matically equal to more freedom or well-being, because “we know a lot, but we can very little [...] we live in times of enlightened illiteracy” (Garcés 45). There are at least three factors contributing to this situation: (1) The huge amount of information now in our hands, in contrast with the lack of integration and intercommunication between the segmented fields. (2) The standardization of knowledge, in the sense of it being produced and evaluated through bureaucratic/market procedures irrespective of the content. (3) Technological “solutionism” and the ensuing “delegation of intelligence,” the idea that all problems will eventually be solved by some new technological advancement. All three problems were anticipated in some way or another by Henry David Thoreau, and could be summarized in the following question: How is it that we know more and more, but do and understand less and less?

This paradoxical question could be clarified by a commonplace distinction between three different dimensions of knowledge (or “facets”, as Baiyin Yang calls them): explicit, implicit, and emancipatory. *Explicit* knowledge is the “cognitive component of knowledge that represents one’s understanding about reality” (Yang 108). *Implicit* knowledge is essentially practical, based on “personal, content-specific familiarity” and usually comes from “one’s behavior, action, and accumulated experience”. And, finally, *emancipatory* knowledge is the embodied, affective, value-laden knowledge, “indicated by feeling and emotions people have in relation to the objects and situations around them” (109). Yang argues that people learn not only through mental correspondence or representations (explicit knowledge), but also by direct personal involvement (implicit knowledge) leading to personal and social transformation (emancipatory knowledge). He suggests that the three facets or types of knowledge are inseparable, and that measuring just one of them provides false impressions about expertise or intelligence (Yang 108; 111–113).

Thoreau’s work as a naturalist is an outstanding example of active public involvement by “enlightened amateurs” who ended up making scientific contributions. However, until the first half of the 19th century natural science was a domain of specialized knowledge accessible to amateurs and interested citizens. According to Olga Pilkington (120), public interest in science remained strong during the second half of the 19th century, throughout the years of the professionalization of the scientific community. This professionalization process created a gap between the scientist (expert person) and the amateur (lay person), in which the transmission of knowledge began to be seen as a *translation* of expert language into lay language. Translation became the dominant model approach in science communication, focused mainly on the transmission of facts, that is, on the explicit dimension of knowledge.

Now we can reformulate Garcés’s diagnosis in Yang’s terms: the Enlightenment ideals are failing today in the sense that we have more explicit knowledge, but at the cost of losing the emancipatory dimension. In part, this is happening because the technological progress and narrow specialization of sciences no longer allow for the majority of the public to take part in the actual experiments and engage with explicit knowledge. The interaction between the scientists and lay people has moved from the laboratory to the printed or online page where the public shares its reactions to the knowledge produced by the scientific community, thereby creating its own knowledge (Pilkington 122–3). In this process, the creation and transmission of implicit knowledge become crucial factors.

To test the later point, this paper examines Thoreau’s rapport to science. The research corpus is relevant because he was writing his journal precisely in those years when the professionalization of the scientific community was becoming more and more evident, at least in the USA.¹

2. Materials and Methods

The suggestions and conclusions expressed in this article are a result of a non-systematic review of three years in Thoreau’s journal (1857, 1858, and 1860) searching for entries dealing with scientific culture and science communication. The three sections that follow (“Findings”) introduce a synthesis of the materials examined, focusing on the interactive elements that are present in both implicit and emancipatory knowledge, and on some elements of explicit knowledge, such as scientific names, which were a topic Thoreau often wrote about.

2.1. Relation

Thoreau’s time was the Age of the American Lyceum, an institution that prepared the common citizen to debate all kinds of matters, from science to history, poetry, biology, etc. This made a true difference in terms

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of university formation, and helps understand Thoreau's scorn for a certain type of academic scholarship. In this, Thoreau was very much a product of his time, an attempt to live up to the ideals of the self-reliant American Scholar, as described by Ralph Waldo Emerson. Nevertheless, Thoreau's time was also the time when science was beginning to claim the place it enjoys today as the most reliable source of knowledge. It was beginning to be professionalized and institutionalized in universities. Following Emerson, Thoreau was aware that those who lived non-academic lives off campus, like him, were sometimes in a better position to study nature, in the intervals of their pursuits at the fields, than professional scientists or philosophers living in academic environments. "We are most interested", writes Thoreau, "when science reports what those men [fishermen, hunters, woodchoppers, and others] already know practically or instinctively, for that alone is a true humanity, or account of human experience." (*Walden* 143)

In his book *The Senses of Walden*, Stanley Cavell comments this very passage and concludes that providing such an "account of human experience" should be the true goal of the humanities. Humanities and the arts provide universities and society at large with accounts of human experience, of what is like to be human. Such work remains unfinished, because too often the role of universities is understood only as the creation and transmission of explicit knowledge. As long as the implicit and emancipatory dimensions (conviction and action, in Cavell's terms) are left behind, something fundamental is missing:

"So long as we will not take our beliefs all the way to genuine knowledge, to conviction, but keep letting ourselves be driven to more or less hasty conclusions, we will keep misplacing the infinite, and so grasp neither heaven nor earth. There is a solid bottom everywhere. But how are we going to weigh toward it, arrive at confident conclusions from which we can [...] choose our lives, and go about our business?" (Cavell 75–76)

Science is the generally accepted way to arrive at "confident conclusions" in the contemporary world. Nevertheless, in his journal Thoreau spent much time thinking about whether a scientific account of the world could really make justice to the plurality of human experience. "The man of science," he wrote in September 5, 1851, "discovers no world for the mind of man with all its faculties to inhabit" (*Journal*). The world that science was creating for middle 19th century Americans was smaller than Thoreau wanted it to be, because it left out some important human faculties.

It was a crucial time because before that date, science was still an element of the common collective culture in the USA, and there was no central authority or professional science center giving their credentials to those who would later work in science, often outside the universities. Thoreau was educated in Harvard and worked with scholars such as Louis Agassiz, but the word "scientist" was not of common use in Thoreau's lifetime (Walls, *Material Faith* xii). However, during the 1850s "men of science" began to be identified as a distinct group, educated in universities, and in those years Thoreau observed how the "two cultures," that of letters and that of the sciences, began to separate. It was not a comfortable situation for him, and in his journal Thoreau regretted that it was no longer possible "for the same person to see things from the poet's point of view and that of the man of science." (*Journal*, February 18, 1852)

Thoreau's opposition to the split of the two cultures is visible in his writings about the perception and appreciation of natural elements such as rainbows, clouds, or the landscape. According to Daniel Peck (65), much of Thoreau's contribution to literary natural history derives from his creation of a new mode of aesthetical apprehension that mediates between "science and art," "naturalism and poetry," drifting back and forth between these poles. Against the rising tide of positivism, Thoreau described landscape as something not purely natural or cultural, objective or subjective, but as a *relationship* between subject and object, as a process that is not independent of the observer but rather interacts with him or her. For an example, let us see what Thoreau wrote on November 1857:

"I think that the man of science makes this mistake, and the mass of mankind along with him: that you should coolly give your chief attention to the phenomenon which excites you as something independent on you, and not as it is related to you. The important fact is its effect on me. He thinks that I have no business to see anything else but just what he defines the rainbow to be, but I care not whether my vision of truth is a waking thought or dream remembered, whether it is seen in the light or in the dark. It is the subject of the vision, the truth alone, that concerns me. The philosopher for whom rainbows, etc., can be explained away never saw them. With regard to such objects, I find that it is not they themselves (with which the men of science deal) that concern me; the point of interest is somewhere between me and them (i. e. the objects)." (*Journal*, November 5, 1857)

The lesson from this passage, whose main idea appears repeatedly in Thoreau's writings, is that it is a mistake to think that scientific facts are something *neutral*, something separate from the scientist and his or her values. The important thing for Thoreau is not the natural object as something independent from his life, but *in relation* to it.

2.2. Recognition

November 25, 1858, was a very cold day in Concord, Massachusetts. It was then that Thoreau discovered at Walden Pond some frozen fish he had never seen before, which were "shaped like bream, but had the transverse bars of perch," as he wrote the following day in his journal. "Are they not a new species?" he wondered, and presented them at the next meeting of the Boston Society of Natural History. Opinion was divided, but eventually the specimens were identified as the previously described *Enneacanthus obesus*. No matter what the final adjudication was, in the following days Thoreau extensively wrote in his journal about this little scientific adventure. Even though some time had passed, his exhilaration about the discovery is remarkable, as the following quotations show:

"I cannot but see still in my mind's eye those little striped breams poised in Walden's glaucous water. They balance all the rest of the world in my estimation at present, for this is the bream that I have just found [...] It is not like a new bird, a transient visitor that may not be seen again for years, but there it dwells and has dwelt permanently, who can tell how long?" (*Journal*, November 30, 1857)

Thoreau had not seen this fish before, but the recognition of its presence, past and present, brings him a feeling of wonder and almost religious awe. Thoreau knows that the bream is radically different from him, and yet he tries to understand it as a neighbor or contemporary, in its own terms, "to think like a bream for a moment" (*ibid.*). To do that kind of job he needs more than the science of his time: as he puts it, he needs "music, poetry, beauty," the arts, so that his anthropocentric system is destabilized and, for a moment, the bream becomes the center of the universe.

"The bream, appreciated," is much more than simply the bream in a bottle or in a classification. For Thoreau, understanding "the mystery of the bream" is equal to understanding himself or humanity, and thus it makes his own life "more rich and eventful" (*ibid.*). Then he compares this feeling with the conventional response of science to a new species: "A new species of fish signifies hardly more than a new name. See what is contributed in the scientific reports. One counts the fin-rays, another measures the intestines, a third daguerreotypes a scale, etc., etc.; otherwise there's nothing to be said" (*ibid.*). In contrast, Thoreau asks himself about the *meaning* of the discovery:

"It is not that I have got one [bream] in a bottle, that it has got a name in a book, but that I have a little fishy friend in the pond. How was it when the youth first discovered fishes? Was it the number of their fin-rays or their arrangement, or the place of the fish in some system that made the boy dream of them? Is it these things that interest mankind in the fish, the inhabitant of the water? No, but a faint recognition of a living contemporary, a provoking mystery. One boy thinks of fishes and goes a-fishing from the same motive that his brother searches the poets for rare lines." (*Journal*, November 30, 1858)

In this passage, Thoreau is linking science and the arts, biology and poetry, in order to get the best of both worlds. The metaphor goes a long way, because ultimately what Thoreau is after is "the poetry of fishes," not simply their flesh, which according to him is "their lowest use" (*ibid.*). The means of life, including science or explicit knowledge, need to be connected with the meanings or goals of human life, including the creation of emancipatory knowledge: a life in relation to other humans, fishes, birds, plants, ponds, rivers, mountains, houses, books, tools, and all the natural and cultural phenomena that make up our common world. According to Thoreau, positive emotions such as delight or joy are not only necessary to arrive at scientific truths, but to communicate them.

For Thoreau, the world is never finished; it keeps getting bigger and richer. This world-enlarging work is mostly made by linguistic means. According to Laura Walls (*Seeing New Worlds* 7), Thoreau saw science primarily as a language, and it is for this reason that he became so interested in it first. Science gave Thoreau new expressive possibilities, making visible modes of reality that otherwise went unseen. This makes him appreciate in the *Journal* a feature of explicit knowledge, such as that of scientific names:

“How hard one must work in order to acquire his language,—words by which to express himself! I have known a particular rush, for instance, for at least twenty years, but have ever been prevented from describing some [of] its peculiarities, because I did not know its name nor any one in the neighborhood who could tell me it. With the knowledge of the name comes a distincter recognition and knowledge of the thing. That shore is now more describable, and poetic even. My knowledge was cramped and confined before, and grew rusty because not used,—for it could not be used. My knowledge now becomes communicable and grows by communication. I can now learn what others know about the same thing.” (*Journal*, August 29, 1858)

There are two interesting things in this entry. First, the recognition that the world-enlarging work of science and culture is not easy: it takes hard work. Second, in this journal passage Thoreau compares or even equates the acquisition of knowledge with the acquisition of a language. Of course, communication is essential to science because it helps the diffusion and revision of knowledge. Science moves forward by communication. However, according to Walls (*Seeing New Worlds* 7), Thoreau sometimes experimented with a more radical formulation: literature and science were not different languages, but in their purest and highest form they were inseparable, they both were “simply some human experience” (*Journal*, May 5, 1854). As personal experience, the best of both worlds—the best science and the best poetry—would come together and would *read* the same.

2.3. Reading

In October 13, 1860, Thoreau wonders how a person can most readily recognize a plant or flower, and he contrasts the scientific description (explicit knowledge) with what he calls “the poetic or lively description” (implicit and emancipatory). The scientific one is impersonal like a photograph, which to Thoreau is something dull and dry; he favors paintings and sketches, because they are more human, they are closer to the personal reaction inspired by the sight of the flower, which is “unmeasured and eloquent” (*Journal*, October 13, 1860). That is, according to him, the truest description, and cannot be replaced by a scientific one, even if you could “count and measure and analyze every atom that seems to compose” the flower.

Thoreau continues suggesting that positive emotions such as delight or joy are necessary to arrive at scientific truths: “unconsidered expressions of our delight which any natural object draws from us are something complete and final in themselves, since all nature is to be regarded as it concerns man; and who knows how near to absolute truth such unconscious affirmations may come?” (*ibid.*). He concludes that science without emancipatory elements such as beauty, emotion, or humanity itself, is not good science:

“A scientific description is such as you would get if you should send out the scholars of the polytechnic school with all sorts of metres made and patented to take the measures for you of any natural object. In a sense you have got nothing new thus, for every object that we see mechanically is mechanically daguerreotyped on our eyes, but a true description growing out [of] the perception and appreciation of it is itself a new fact, never to be daguerreotyped, indicating the highest quality of the plant,—its relation to man,—of far more importance than any merely medicinal quality that it may possess, or be thought to-day to possess. There is a certainty and permanence about this kind of observation, too, that does not belong to the other, for every flower and weed has its day in the medical pharmacopoeia, but the beauty of flowers is perennial in the taste of men.” (*Journal*, October 13, 1860)

There are facts that indicate the “the highest quality of the plant” (*ibid.*), which according to Thoreau is its relation to us. Moreover, these facts are more endurable than others that are simply data. It is as if Thoreau wanted to keep the best of both worlds: an actual world explicit, open and accessible to science but also a human world, one that is implicit, enchanted and ever mysterious. The world has limits but, according to Thoreau, they are not rigid, they are not fixed forever. By means of human activity and conscious endeavor, he writes in the *Journal*, “The limits of the actual are set some thoughts further off” (May 31, 1853). Thus the universe becomes “wider than our views of it” (*Walden* 214), thanks to “the elasticity of our imaginations” (*Journal*, *ibid.*).

During his last five years of life, Thoreau read extensively about natural science. In his journal he often laments that science was led by Harvard professors who were mainly interested in what we call today *data mining*, extracting from nature massive amounts of facts without a personal relation to the objects they study:

“We read the English poets; we study botany and zoology and geology, lean and dry as they are; and it is rare that we get a new suggestion. [...] We would fain know something more about these animals and stones and trees around us. We are ready to skin the animals alive to come at them. Our scientific names convey a very partial information only; they suggest certain thoughts only.” (*Journal*, March 5, 1858)

Thoreau complains that the activities of reading the English poets and studying biology do not fertilize each other. He was beginning to see the split between science and the arts getting wider and deeper, making the ideal of a unified scientific culture no longer possible. That pessimism about the current state of science appears in other places in the journal. Thoreau was concerned about the effects that an impersonal and partial approach to knowledge might cause in the natural world and their inhabitants: “Science is inhuman. Things seen with a microscope begin to be insignificant. [...] With our prying instruments we disturb the balance and harmony of nature” (*Journal*, May 1, 1859). It was not something new in his experience as a naturalist: “The inhumanity of science concerns me, as when I am tempted to kill a rare snake that I may ascertain its species. I feel that this is not the means of acquiring true knowledge” (*Journal*, May 28, 1854).

3. Discussion: Inhumane Science and Scientific Culture

Thoreau was concerned about the exponential growth American science and technology experimented during the 19th century. Its effective mechanization of the pastoral world made Thoreau see science as inhuman. However, he also knew that science could and should be humanized. By way of contrast, just after the 1858 passage quoted above, Thoreau compares his knowledge with that of the Native Americans he was meeting in his trips to Maine, who were teaching him new names in addition to the scientific ones Thoreau had learnt in his books:

“It does not occur to me that there are other names for most of these [natural] objects, given by a people who stood between me and them, who had better senses than our race. [...] No science does more than arrange what knowledge we have of any class of objects. But, generally speaking, how much more conversant was the Indian with any wild animal or plant than we are, and in his language is implied all that intimacy, as much as ours is expressed in our language. [...] It was a new light when my guide gave me Indian names for things for which I had only scientific ones before. In proportion as I understood the language, I saw them from a new point of view.” (*Journal*, March 5, 1858)

Language and communication help avoid the risk of making science inhuman. Science is humanized by communicating it, by connecting its explicit and implicit dimensions in order to arrive at emancipatory results. That is not an easy job, since it requires an effort similar to that of learning a new language. It might be the language of another human culture, or it might be that other language of literature and the arts. The key for Thoreau is that by means of that language-learning process one should get closer to some human experience, so that one can share the scientist’s experience or feeling *from the inside*: “A fact stated barely is dry. It must be the vehicle of some humanity in order to interest us. [...] It must be warm, moist, incarnated,—have been breathed on at least. A man has not seen a thing who has not felt it.” (*Journal*, February 23, 1860)

Thoreau wanted warm, moist, incarnated, breathing facts. This is not the same to say that there are no facts, or that any “alternative fact” is as good as any other. We now live in a post-truth or post-factual world whose politics is framed largely by appeals to emotion, disconnected from the details of policy. Thoreau did not go that way: he wanted the details, too, so that he could humanize the facts, to make better sense of them and arrive to a more encompassing truth. In this sense, there are no neutral facts and we can read Thoreau in a more or less post-modern fashion, but he believed in some form of absolute truth. This truth was not the result of science alone, but of a unified scientific culture, the combined effort of both science and the arts (what Thoreau calls “poetry” is not restricted to verse).

4. Concluding Remarks

Henry David Thoreau’s life and writings are notoriously resilient—they have remained relevant for different people all over the world throughout crisis and change in societies increasingly shaped by science and technology.

Emotions can facilitate the public’s engagement with some emancipatory aspects of science that are increasingly disappearing from the contemporary world. Through a discussion of several entries in Thoreau’s

late journal and the main metaphors used in them, in this paper I have tried to show how he established an emotional connection between his (and the reader's) world, and the outer world of science. Thoreau repeatedly suggests that positive emotions such as delight or joy are necessary to understand scientific truths. Seen this way, he is advocating for the emancipatory dimension of knowledge: *empowerment through scientific culture; scientific culture through enlarged language and communication*. This conclusion qualifies the "two cultures" position, which sometimes places Thoreau as a green humanist in frontal opposition to science and technology.

This is a more nuanced view, one that suggests that Thoreau's work could be used today as a radical illustration or enactment of a wide set of rapports or reactions to scientific activities. Because Thoreau provides a permanent resource of emotional reactions to science—including wonder, perplexity, inquiry and critique—studying his writings could help re-humanize science by means of an enlargement of the emotional palette used in scientific culture communication. This is an open task, one in which both humanity and the humanities have much at stake.

Competing Interests

The author has no competing interests to declare.

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