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Narrative and natural history in the eighteenth century

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ABSTRACT

In the eighteenth century, natural histories of animals incorporated narratives about animal behaviour and narratives of discovery and experimentation. Naturalists used first-person accounts to link the stories of their scientific investigations to the stories of the animal lives they were studying. Understanding nature depended on narratives that shifted back and forth in any given text between animal and human, and between individual cases and generalizations about species. This paper explores the uses of narrative through examples from the work of René-Antoine Ferchault de Réaumur and Abraham Trembley. In all cases, narrative took the genre of natural history well beyond straightforward description and classification. Prose accounts of insect actions and mechanisms worked in tandem with visual narratives embedded in the accompanying illustrations, where artists developed strategies for representing sequences of minute changes over time. By throwing into relief the narrative sections of natural histories, the examples considered here expose the role played by these tales of encounters with the insect world in the making of natural historical knowledge.

1. Introduction

The French naturalist René de Réaumur, arguably the standard-bearer for observational natural history in the eighteenth century, often recounted his search for the empirical facts of natural history as tales of quest and discovery. Within these first-person accounts he embedded narratives of animal life, tracing the plots of natural processes such as metamorphosis, mating and egg-laying, the cycle of life in colonies of social insects, the building of egg cases and hatching of young, or the trapping and eating of prey. For Réaumur, as for many of his empirically-minded contemporaries, writing natural history meant explaining not only what he had seen, but how he had managed to see it, and by extension, how his reader would be able to do the same. A very particular literary genre, the natural history of any given species incorporated narratives about animal behaviour into linked narratives of discovery or investigation. The latter, often set in a specified locality and fleshed out with the interventions of minor characters, recounted experiments and other interventions as part of the discovery story. The naturalist presented himself as protagonist of the story, deploying his tools and techniques to expose the hidden lives of animals, and to tell their stories in turn.

In what follows, I explore the uses of narrative in eighteenth-century natural history through examples from the work of Réaumur and his protégé Abraham Trembley. The "histories" of insects produced by these authors characteristically braided together narratives of nature and narratives of discovery.[1] Narrative functioned quite differently from anatomical description and taxonomy, the other key elements of natural history. Whether chronicling the stages of a life cycle, or telling the story of a spider eating her prey or spinning an egg case, naturalist-authors used narrative to show the dynamism of nature. Complex behaviours and processes – bumblebees constructing their nests and feeding their larvae, the stages of the chick's emergence from an egg, spiders spinning their webs and trapping their prey – were common currency in natural history writing. Tracking the life cycle of any creature meant following the sequential steps of its growth and development– a trajectory with a beginning, middle, and end like any good narrative. Static anatomical descriptions could go only so far; without the narratives of movements, mechanisms, and behaviours, Réaumur regarded natural history as barren and incomplete. Attending to how naturalist-authors deployed narrative brings us to the core of natural historical knowledge, the sequences of events that string together into the processes of life. Once he was in a position to construct the narrative, with all its ins and outs, the naturalist could claim knowledge of the species in question – with

[1] The general category "insects" was considerably more capacious in the eighteenth century than it is today. Spiders, worms, crustaceans and the microscopic bodies in organic infusions were all considered insects.

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the caveat that the narrative could always be refined and amended when new opportunities afforded new knowledge. The other narrative strand, in which the naturalist and his associates took the active roles, served a slightly different function: by showing the naturalist in action, first-person accounts certified the truth of the narratives of insect life. At the same time, the protagonist was demonstrating how to do natural history. To put this slightly differently, narrative served to show how nature behaves (with the animal as protagonist) and also how naturalists behave when observing nature in action.

Natural histories, like experimental reports, routinely slipped in and out of first-person exposition, as Réaumur introduced his assistants and correspondents and friends into the story, alongside the non-human actors whose stories they followed. The life of a honeybee hive, for example, could be recounted in the third person as a sequence of tasks and transformations of the queen, the larvae and the drones. But when the life history of the bees unfolds within a discovery narrative about deciphering the complex sequence of activities in and around the hive – designing and building special glass-fronted hives, counting and sexing the bees, identifying the queen and drones, and so on – the whole "history" becomes a tale about doing natural history, with the story of the bees themselves interpolated within it. These nested narratives reveal both animal and human registers, shifting perspective from one to the other quite fluidly. Understanding nature, and the nature of living things, depended on these narratives, moving back and forth not only between animal and human, but also between individual cases and generalizations. Thus another function of narrative was to incorporate the particular and individual, with their contingencies, into a general account of the species, and perhaps of the broader class as well. Histories of different processes or different species wove together multiple interleaved narratives. These might include details about specific individuals, which in turn could be generalized to a narrative about how the species normally operates, and sometimes generalized further to encompass related species for a more inclusive history. Such generalizations then fold back into the investigation narrative, with the naturalist and his helpers building on previous, incomplete, knowledge to see what had not been seen before. At this level, another plot emerges, that of the progress of knowledge, where the author-naturalist claims a spot farther along the road to knowledge than his predecessors. In the seventeenth century, Réaumur reflected, "when the new philosophy had made some progress, … it was recognized that sudden transformations were not among the means that nature uses in the production of her works." The anatomists Malpighi and Swammerdam had exposed such transformations as "chimerical," through their artful and unprecedented dissections of insects. However admirable their techniques, "neither of them, nor any subsequent authors, pushed their observations as far as one would wish" (Réaumur, 1734, pp. 350–1). It remained to Réaumur himself to build on the insights of his predecessors, and thereby to advance the plot to the next chapter.

2. Metamorphosis: core narrative of the insect world

In the natural history of insects, the overarching narrative for each species was always structured around orderly development from pre-existing structures; generalized, this became the grand narrative for all forms of life. Réaumur devoted several long chapters of his multi-volume work on insects to unpacking every aspect of the mystery of metamorphosis, bringing to light the maneuvers of caterpillars as they took on the form first of chrysalis, and then of butterfly (or moth) with the capacity to mate and deposit eggs to start the cycle again. Based on hundreds and hundreds of observations of many different species, these chapters trace narratives and sub-narratives, frequently digressing from the central plotline to explore anatomical structures or properties of materials. For Réaumur, the focus on orderly development was also a definitive rejection of any sort of spontaneous production, whether of new life from inert matter or of one form transformed into something entirely different. He pursued the mechanics and behaviours associated with metamorphosis in the service of his anti-spontaneist program.[2] "If there were true productions of plants and animals, as some other philosophers suppose, we would have to give up on explaining how they make themselves" (Réaumur, 1734, p. 360). The kind of explanation he had in mind would take the form of narrative, unfolding step by step and punctuated with descriptions of every aspect of the process, however minute. Metamorphosis in insects may look like a spontaneous transformation from one thing into another, as new structures emerge and old ones disappear, but Réaumur insisted that this could not be the true story. With the appropriate methods and tools, a seasoned observer could uncover the complex sequence of subtle changes in the growth and consistency of structures already detectable within the caterpillar, and presumed by extrapolation to have been present in the egg as well, beyond the reach of the human senses.

Réaumur's exhaustive chapters on insect development zoom in from the teleological grand narrative of development to corroborating details amassed to compel assent from the reader, grounding general conclusions in particular observations of different kinds of insects. We learn that the caterpillar "animal machine" is an "organized garment" that gathers, processes, and delivers nourishment to that other "animal machine" contained within it, the chrysalis. And this turns out to be nothing other than the butterfly, with its delicate structures folded tightly inside the outer shell of the chrysalis. "A butterfly in the form of a caterpillar is in its infancy; it has only arrived at the state of perfection, at the age of full strength, when it appears as a butterfly" (Réaumur, 1734, pp. 362–3). This is a big claim, with theoretical consequences. Confirmation would depend on what the naturalist could contrive to see and then show (in text and image) to the reader, who might then attempt to witness the process directly by observing living insects.

Like many other naturalists, Réaumur embedded narratives about nature in a first-person narrative of exploration and discovery, recounting his line of reasoning, as well as his actions, and shifting frequently between levels of generality. Consider this general statement, synthesized from the simple inspection of many instances: "A chrysalis stays immobile for several weeks, and often for several months, without taking in any sustenance." The general observation led him to conjecture that some moisture must evaporate from the dormant creature over this period. Then he reflected on the quality and function of the internal fluids and how to detect and measure transpiration through the outer shell. Preliminary investigations afforded quite a different sort of general statement. "From any part where you [*on*] cut into a newly uncovered chrysalis, water comes out. … If you cut a little bit off the wings or antennae, immediately you see a great deal of water run out from the wound." I translate the impersonal pronoun "*on*" as "you" to capture the clear implication that anyone could slice into a chrysalis and see just what the narrator has seen. A little further down the page, such general statements give way to the first-person narrative report on a specific experiment: "To learn whether this last idea was correct, in the month of July I weighed two chrysalises at the instant when they had just emerged from the casing of the caterpillar skin" (Réaumur, 1734, p. 373). Weighing them each day until just before the butterfly emerged, he found that, contrary to

[2] On opposition to spontaneous generation, and the ongoing controversy in the 18th century, see Ratcliff (2009) and Terrall (2014).