

'The art itself is nature': Darwin, domestic varieties and the scientific revolution

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Common to both the scientific and Darwinian revolutions were discussions challenging the distinction between art and nature. Was art a part of nature? Could art be used as a model for nature? This intellectual congruence, however, is more than just nominal. Charles Darwin and Asa Gray, for example, were well-aware of the 17th century debates which preceded them through the works of such revered English writers as William Shakespeare and Thomas Browne. Furthermore, they used their understandings of these debates to inform and express their own thinking about the relation between artificial and natural selection.

Domestic varieties and human interference

In a well-known 1860 review of Darwin's *Origin of Species* (1859), the Harvard botanist Asa Gray wrote the following about the art of breeding (what Darwin had termed 'artificial selection'):

'the art itself is Nature,' since the whole art consists in allowing the most universal of all natural tendencies in organic things (inheritance) to operate uncontrolled by other and obviously incidental tendencies. No new power, no artificial force, is brought into play.³

Perhaps a little enigmatic, this quotation succinctly captures and defends a major theme in Darwin's work. In the first four chapters of the *Origin* Darwin developed an extended analogy between artificial and natural selection. Likening nature to a breeder, he compared the creation of domestic varieties through artificial selection to the creation of natural races in the 'state of nature.' Just as human selective breeding produces new domestic varieties with desirable characteristics, he argued,

selection in nature, a result of the 'struggle for existence,' produces new varieties and even species, filling up cracks in the economy of nature. In a letter written prior to the publication of the *Origin*, he explained to Gray that Nature is an 'unerring' breeder, 'which selects exclusively for the good of each organic being' (Darwin to Gray, Sept 5, 1857).⁴

In the eyes of his contemporaries, however, the value of Darwin's comparison hinged on whether the creation of domestic varieties was *merely* a result of the artificial conditions in which they were raised and bred. As products of human art, domestic varieties were often seen as lacking the reality of natural species. A common sentiment in circulation prior to the publication of the *Origin* held that breeding was too unnatural to represent a natural process. This sentiment was often employed in support of arguments against drawing an analogy between domestic varieties and wild species. The geologist and naturalist, and later close friend of Darwin's, Charles Lyell, wrote in 1832 that domesticated varieties were 'extreme cases brought about by human interference, and not [...] phenomena which indicate a capability of indefinite modification in the natural world.'⁵ In 1837, Edward Blyth, another soon-to-be friend and collaborator of Darwin's, held that the 'influence of human interference' on the constitution of domestic varieties was a testament to the power of humans over nature, but because it produced an 'unfitting' of these varieties for

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³ Gray, A. [1860] 1963. "The Origin of Species by Means of Natural Selection," in A. H. Dupree (ed.), *Darwiniana*. Harvard University Press: Cambridge. See p. 27. Darwin, C. 1859. *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*. John Murray: London.

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⁴ There is a voluminous literature about Darwin's analogy, much of which is tangential. See Young, R. 1971. "Darwin's metaphor: does nature select?" *Monist* 55: 442–503; Ruse, M. 1975. "Charles Darwin and artificial selection." *Journal of the History of Ideas* 36: 339–350; Evans, L. T. 1984. "Darwin's use of the analogy between artificial and natural selection." *Journal of the History of Biology* 17: 113–140; Waters, K. 1986. "Taking analogical inference seriously: Darwin's argument from artificial selection." *PSA: Proceedings of the Biennial Meeting of the Philosophy of Science Association* 1986 1: 502–513; Bartley, M. 1992. "Darwin and Domestication: Studies on Inheritance." *Journal of the History of Biology*, 25: 307–333; Richards, R. 1998. "Darwin, domestic breeding and artificial selection." *Endeavour*: 22, 106–109; Gayon, J. 1998. *Darwinism's struggle for survival*. Cambridge: Cambridge University Press; Theunissen, B. 2012. "Darwin and his pigeons: the analogy between artificial and natural selection revisited." *Journal of the History of Biology* 45: 179–212. See also the works cited in the following footnotes. Unless otherwise noted, Darwin letters were retrieved from the Darwin Correspondence Database: <https://www.darwinproject.ac.uk>.

⁵ Lyell, G. 1832. *Principles of Geology*. 2nd volume. London: John Murray. See p. 32.

life in the wild, evidenced nothing more.⁶ The mathematician-geologist William Hopkins asserted in a review of Darwin's *Origin*, that 'we have no right whatever to assume that nature will necessarily produce such effects at all when left to her own unobstructed operations, as those which she produces under man's interference'; he maintained that we 'commit an error' when we assert that under ordinary conditions nature is capable of producing modifications similar to those observed in domestic varieties.⁷ And Gray's colleague at Harvard, Louis Agassiz, wrote in his copy of the newly published *Origin* that Darwin's mistake 'has been to study the origin of species among domesticated animals' rather than wild ones.⁸

Darwin disagreed with these assessments, responding to one commentator, 'it is an error to speak of man 'tampering with nature'.⁹ In the opening quotation, Gray defends Darwin: artificial selection should not be seen as an unnatural interference in nature's otherwise normal development. Instead, he responds, 'the art itself [that is, of breeding] is Nature,' 'no artificial force [...] is brought into play.'

Understood as such, Gray's comment should be recognized as part of a broader theme running through the Darwinian revolution – a theme referred to by historian John Cornell as, 'Darwin's reinterpretation of the meaning of art and nature.'¹⁰ Darwin said, or implied, something significant – albeit highly contested – about the art-nature relationship which was not lost on his peers. This theme, we might recall, is central to another very well-known revolutionary period: the reconfiguration of 17th century natural philosophy known as the scientific revolution. Floris Cohen, author of the most comprehensive historiographical inquiry of the scientific revolution, writes, 'Every interested thinker in the 17th century had to grapple with the distinction between 'natural' and 'artificially produced'

nature and the root issue of how one was related to the other.'¹¹ Lorraine Daston provides my favorite articulation of this theme: 'It is a platitude among historians of the Scientific Revolution that the seminal thinkers of the seventeenth century, most notably Bacon and Descartes, abolished the nature/art distinction by subsuming the artificial under the natural. However, it would be just as, if not more, accurate to claim that the distinction was collapsed [...] by subsuming the natural under the artificial.'¹² Regardless of the direction of subsumption, scholars of the early modern period generally agree that the relationship between these two categories was transformed in the 17th century.

If discussions impinging on the relationship between nature and art played a pivotal role in both the scientific and Darwinian revolutions, what similarities do they share and what can we learn from them? It is my contention that this intellectual congruence is more than just nominal. Darwin and Gray were aware of 17th century debates about art and nature, and furthermore, used their understandings of these debates to inform and express their own thinking about the relation between artificial and natural selection. Let me begin with a typical 17th century discussion of art and nature. After I shall return to the Darwinian revolution.

Nature and artifice in the seventeenth-century

Early modern discussions of the relationship between art and nature found expression in a variety of contexts.¹³ Here I will take as an exemplar the mechanical philosophy of Robert Boyle, not because his reflections are representative of natural philosophical thought *tout court*, but because they introduce the terms of 17th century debates about art and nature, give a sense of their significance, and are well known to historians of science.

Robert Boyle – prominent member of the Royal Society of London and foremost proponent of their mechanical philosophy – likened nature to an intricate work of art: a machine, or as he characteristically put it, an 'engine.' In his view, clocks provided a commonplace and appropriate model for the natural world (Figure 1).

In likening nature to an engine, Boyle sought to distance himself from what he called the 'vulgarly received notion of nature,' a confused and confusing notion, fabricated by the ancients, and passed down through the Medieval period and Renaissance.¹⁴ The vulgar notion of nature was problematic for a number of reasons, notably, it encouraged what Boyle deemed unintelligible anthropomorphisms that appropriated praise rightfully belonging to God. A typical example was 'nature abhors a vacuum.' Nature, Boyle thought, could not abhor anything, nor could it serve

⁶ Blyth, E. 1837. "Psychological Distinctions Between Man and Other Animals." *The Magazine of Natural History*, 1 (New Series): 80. It is worth mentioning that both Lyell's, Blyth's, and many other early- to mid-19th century assessments of domestic varieties were informed by the commonly held idea that domestic species "revert" to their wild type when released back into the wild (see for instance, Wallace's contribution to Darwin, C. and A. R. Wallace. 1858. "On the tendency of species to form varieties; and on the perpetuation of varieties and species by natural means of selection." *Journal of the Proceedings of the Linnean Society of London. Zoology*: 3, 45–62). A full history of the concept of reversion has yet to be written but scattered discussions of the topic can be found in numerous places. See Bartley, "Darwin and Domestication." For the Darwinian context and a discussion of the ambiguity of the concept of "reversion," see Chapter 5 of Inkpen, S. A. 2014. *Denaturing Nature: Philosophical and Historical Reflections on the Artificial-Natural Distinction in the Life Sciences*. PhD Dissertation. University of British Columbia. For a discussion of the political and scientific context of reversion in the early-20th century, see Wang, M. 2012. "Heavy Breeding." *Cabinet*, 45.

⁷ Hopkins, W. 1860. "Physical Theories of the Phenomena of Life: Part II." *Fraser's Magazine*, 62: 74–90. See p. 75.

⁸ Agassiz wrote in his copy – sent to him to review – of the first edition of Darwin's *Origin of Species*, "The mistake of Darwin has been to study the origin of species among domesticated animals exclusively instead of wild ones; his results concerning species are founded not on an investigation of species but on an investigation of breeds" (Agassiz papers, *Ernst Mayr Library*, Harvard University). Agassiz repeated his opinion in a review: "this process of raising breeds by the selection of favorable subjects, is in no way similar to that which regulates specific differences. Nothing is more remote from the truth than the attempted parallelism between the breeds of domesticated animals and the species of wild ones." Agassiz, L. 1860. "On the Origin of species." *American Journal of Science and Arts*, 30 (July): 142–154. See p. 147.

⁹ These comments were made by the French anatomist Georges Pouchet. See Darwin, C. 1868. *The Variation of Animals and Plants under Domestication* (2 vol). John Murray: London. See p. 2.

¹⁰ Cornell, J. 1984. "Analogy and technology in Darwin's vision of nature." *Journal of the History of Biology*, 17: 303–344. See p. 308. See also, Burnett, D. G. 2009. "Savage selection: analogy and elision in *On the Origin of Species*." *Endeavour*, 33: 120–125.

¹¹ Cohen, F. 1994. *The Scientific Revolution: A Historiographical Inquiry*. University of Chicago Press: Chicago. See p. 188.

¹² Daston, L. 1995. "How Nature Became the Other: Anthropomorphism and Anthropocentrism in Early Modern Natural Philosophy," in S. Maassen, E. Mendelsohn, and P. Weingart (eds.), *Biology as Society, Society as Biology: Metaphors*. Kluwer Academic Publishers: Netherlands. See pp. 41–42.

¹³ See, Daston, L. 1998. "The Nature of Nature in Early Modern Europe." *Configurations*, 6:149–172. Also, Bensaude-Vincent, B. and W. Newman. 2007. *The Artificial and the Natural: An Evolving Polarity*. MIT Press: Cambridge.

¹⁴ Boyle, R. [1686] 1999. *A Free Enquiry into the Vulgarly Receiv'd Notion of Nature* in M. Hunter and E. Davis (eds.), *The Works of Robert Boyle: Volume 10*. Pickering and Chatto: London.

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