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Investigating Domestication through an Evolutionary Lens

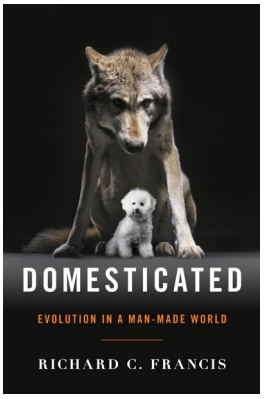
Domesticated: Evolution in a Man-Made World. Richard C. Francis. Norton, 2015. 496 pp., illus. $27.95 (ISBN: 9780393064605).

The year 2009 marked both the bicentenary of Darwin's birth and 150 years since the publication of *On the Origin of Species*. Among the multitude of meetings held worldwide to celebrate the double anniversary, there were four major conferences in Stony Brook, London, Chicago, and Beijing. Despite the fact that Darwin used breeding practices as the central analogy to introduce the concept of natural selection and focused the entire first chapter of *Origin* on a discussion of pigeon breeding, domestication was featured in only 3 of the 106 presentations, and none of the 3 took place in North America.

I suspect that the lack of attention paid to domestication at these meetings stems ironically from the fact that Darwin used breeding practices of domestic animals as his initial metaphor and drew (in retrospect, an unfortunate) distinction between artificial and natural selection. As a result, many evolutionary biologists easily dismiss domestication ("artificial" selection) as a topic unworthy of consideration within the scope of "natural" evolution.

Of course, domestication is nothing more than descent with modification, like all other forms of evolution. The addition of a human selective component on top of a "natural" selective regime only enhances the power of domestication to reveal insights into long-standing evolutionary issues, including, to name just a few, the genetic basis of phenotypic traits, the relative role of coding and regulatory change in driving evolutionary change, the speed with which selection can alter morphology, how shifts in developmental timing can alter adult forms, and the role of genetics in determining the degree of phenotypic plasticity exhibited in response to environmental change.

To his credit, Richard Francis places his survey of domestic animals firmly within an evolutionary context, going so far as to include the word *evolution* in the subtitle. And to ensure there can be no misinterpretation, the epilogue begins, "Domestication is an evolutionary process." Francis is so committed to portraying domestication from an evolutionary perspective that much of the book is peppered with cladograms depicting the deep evolutionary relationships of the wild ancestors of modern domestic animals. This serves Francis's primary conclusion that despite the significant morphological disparity between different breeds of dogs and cows, for example, all domestic animals retain critical ties to their ancestry, no matter how grotesquely more recent human selection for novelty has altered their appearance or behavior.



Domesticated is not structured according to any obvious rationale (e.g., in chronological order of each animal's first domestication) but instead proceeds somewhat arbitrarily, ricocheting from the stories of individual animals (foxes, dogs, cats) to groups of closely related animals (other predators, rodents). Some animals, such as chickens, are left out entirely (despite the fact that chickens are the most numerous domestic animal on Earth), and there is no mention of domestic plants. Rather than serving any broader purpose, each chapter follows a virtually identical pattern that includes a discussion of each animal's association with people, an explanation of the evolution of the wild ancestor, a few paragraphs on domestication and dispersal, and finally, a mostly genic-focused discussion of selection and the formation of modern breeds.

This modular approach is ideal for dipping in and gaining an appreciation for any one specific domestic animal via a whistle-stop tour, but the book fails to provide the reader with a nuanced understanding of the larger phenomenon of domestication. Why did animals enter the human-made world only over the past 15,000 years? Were there different pathways that animals followed into a domestic circumstance? Was independent domestication frequent or unusual, and how much of a role has gene flow between wild and domestic populations played in the formation of our modern pets and herds? Although these topics are touched on and many references that could have been used to discuss them appear in the impressively lengthy bibliography, Francis never engages with the larger or theoretical issues that are among the most crucial unanswered questions surrounding domestication. The book quickly becomes a series of trees with no hint of a forest.

In the final chapters, Francis explores the topic of whether humans can be considered domesticated. After discussing differences in developmental timing between humans and other hominins and whether human social behavior is responsible for the proposed self-domestication theory, Francis concludes that there is not enough evidence to make any firm conclusions. In this he is probably

right, but it is difficult not to feel that the weight of this anticlimax leaves the book lacking a satisfying and robust conclusion.

The domestication of plants and animals was easily the most significant thing to happen to our species. Understanding when, where, and how we became so entangled with such a myriad of interesting plants and animals is crucial for appreciating the origins of modern society. And, as Francis rightly states, that understanding is impossible without an evolutionary perspective. Unfortunately, despite properly advocating this key component, *Domesticated* never quite transcends the (at times tedious) detailed histories of specific animals. Although each chapter provides the reader with interesting dinner party conversation fodder regarding domestic animals, the lack of a comprehensive linking narrative means that they are unlikely to either understand or fully appreciate domestication.

Note

Unknown to me at the time I began the review, the author acknowledged me for comments I was asked by the book's editor to make on early versions of two chapters.

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