1

INTRODUCTION

The goal of this book is to understand how people and other species have shaped each other. It uses the history of wolves and people as a case study. Wolves (*Canis lupus*) make a good case study because it is easy to see the impact of people on their traits. People modified the traits of wolves to create dogs (that is, domestic wolves).[1] People further changed the traits of domestic wolves to fashion breeds.[2] Any breed would make a good case study. This book uses greyhounds in England because they have a long, documented history. The story in this book begins around 1200 CE, when greyhounds appeared in a written document. It ends around 1900, when kennel clubs initiated a new era in human–greyhound coevolution by banning cross breeding.

Overview

The thesis of the book is that people and greyhounds evolved and coevolved from 1200 to 1900. Neither people nor greyhounds were fixed. They evolved (that is, their traits changed). Some evolution came in response to broad social and ecological forces, such as economics, politics, infrastructure, and habitats. As social and ecological forces changed the world, people and greyhounds adapted. Human and greyhound populations also evolved in response to each other. People shaped greyhounds with certain traits, those traits circled back to shape human traits, which sparked further change in greyhounds, and so on.

The term for this kind of evolution, in which *traits of two or more populations change in response to each other*, is **coevolution**.[3] Charles Darwin referred to this process as **coadaptation**.[4] A classic example, identified by Darwin as well as the biologists who introduced *coevolution* as a synonym in 1964, is the interaction between plants and pollinators. The body parts of insect pollinators often match the anatomy of flowers almost perfectly. It seems unlikely that one stayed constant while the other adapted to it, so

insects and plants likely adapted to each other. As Darwin put it, "I can understand how a flower and a bee might slowly become, either simultaneously or one after the other, modified and adapted to each other in the most perfect manner, by the continued preservation of all the individuals which presented slight deviations of structure mutually favourable to each other."[5]

Darwin's *On the Origin of Species* was an extended analysis of evolution and coevolution under domestication. As he explained,

> It is, therefore, of the highest importance to gain a clear insight into the means of modification and *coadaptation*. At the commencement of my observations it seemed to me probable that a careful study of domesticated animals and of cultivated plants would offer the best chance of making out this obscure problem. Nor have I been disappointed; in this and in all other perplexing cases I have invariably found that our knowledge, imperfect though it be, of variation under domestication, afforded the best and safest clue. I may venture to express my conviction of the high value of such studies, although they have been very commonly neglected by naturalists.[6]

Greyhound Nation follows Darwin's lead in focusing on evolution and coevolution of people and domestic organisms. It differs from *On the Origin of Species* in examining the historical forces that led people to value different traits at different times in non-human populations.

English law inadvertently divided human–greyhound coevolution into two major periods. The first lasted from 1200 to 1831. I call it the **patrician era** because the only people who could legally own greyhounds were royals, aristocrats, and large landowners. The second period stretched from 1831 to the present. I call it the **modern era**. In this period, all classes of people legally owned greyhounds. The overall trend for human and greyhound evolution was from more to less variation. Greyhounds, and the people who interacted with them, varied more in 1200 than they did in 1900.

One reason for this narrowing was a loss of human and greyhound **niches**. The idea of niches comes from biologists, who have used *niche* in multiple ways.[7] Some ecologists have described niches as *occupations*. Badgers have jobs to perform in the economy of nature. Other ecologists have described niches as something like *habitats*, or the conditions in which organisms live (e.g., a marsh). Other ecologists use *niche* in other ways.

This book combines the occupational and habitat concepts of niches. It uses *niche* to mean a *job–habitat combination*. I refer to the job aspects of

a niche as the *job dimension*. I refer to the habitat aspects of a niche as the *habitat dimension*. Each niche in this book, then, has two dimensions – a job and a habitat.[8] If we know the job and habitat of an organism, we know its niche. Every population in this book had a niche. This holds true for people as well as for greyhounds. People in the book, such as men who hunted with greyhounds, held jobs. (Here, *job* includes unpaid work.) They performed their job in a specific habitat, such as a forest.

Niches have evolutionary consequences. Every niche rewards a different combination of traits. Some traits are **physical**, such as the size of a greyhound. Other traits are **behavioral**, such as the speed of a greyhound. Physical and behavioral traits optimal for one job were suboptimal for another. Large greyhounds were optimal for hauling down deer but suboptimal for catching rabbits (momentum carried them past quick-turning rabbits). Greyhound owners adapted greyhounds to specific niches. The more niches, the greater the variation in greyhounds. The same held true for human populations. Human behavioral traits suited to chasing deer, such as standing still and waiting for greyhounds to bring prey to hunters, worked poorly when chasing hares that ran far away. **Niches shaped evolution when human and canine populations adapted to them.** More jobs for people and greyhounds meant more variation in human and greyhound populations.

Niches disappeared because of long-term historical trends. Economics, politics, culture, technology, and ecology all shaped niches for people and greyhounds. They spawned a wide variety of niches (job–habitat combinations) in the medieval period. People and greyhounds used a variety of methods to pursue a variety of prey in a variety of habitats (e.g., they chased deer in forests and hares in open countryside). Each method of pursuing each species in each habitat created a different niche. Each niche called for a different package of traits in people and greyhounds. Varied niches rewarded varied traits in people and greyhounds. Historical forces narrowed the range of prey pursued over time, which narrowed the range of jobs, which narrowed variation in niches, which narrowed variation in human and canine populations. For example, deer hunting disappeared by the eighteenth century. Without deer hunting niches for people and greyhounds, traits needed for deer hunting faded. Populations evolved.

The most radical narrowing came from modernization. This book uses *modern* because greyhound owners applied the term to themselves and their greyhounds in the nineteenth century. Modernity changed the evolution of people and greyhounds. Key modern forces included capitalism, democracy, mass communication, industrial infrastructure, bureaucracy,

and standardization. Mild versions of these processes appeared in the last half-century of the patrician era (1776–1831), which leads me to term this half-century the **transitional period**. The forces of modernity roared after 1831. Modernization did more than remake human society. It remade evolution.

In addition to eliminating jobs, modernity narrowed job descriptions within occupations. In the early modern period, coursers used many sets of rules to govern coursing (pursuing animals with greyhounds while spectators bet on performance). By the late nineteenth century, they standardized rules for coursing hares. Narrowing of job descriptions (the rules to follow while coursing) narrowed the range of behavioral traits in human and canine populations. Modernity also narrowed variation in habitats. In the early modern period, greyhound owners adapted their dogs to their own estates. This practice created great national variation. In the late nineteenth century, greyhound owners across England adapted their dogs to a single estate that hosted the premier coursing championship, the Waterloo Cup. Narrowing of job descriptions, plus standardization of habitats, rewarded narrowing of traits in some human and canine populations.

A radical change in job description came in the 1880s. Before that decade, greyhound job descriptions were silent on ancestry. Greyhounds of mixed ancestry were common and prized. In the 1880s, two organizations closed the breeding pools of some greyhounds. The Kennel Club closed the breeding pool of show greyhounds. The National Coursing Club closed the breeding pool of coursing greyhounds. Now, descending from two parents registered as greyhounds was essential in job descriptions for greyhounds working in shows and coursing. Half a millennium of cross breeding came to a halt for these important greyhound populations, reducing the variation available to breeders of registered dogs up to the present. This break with tradition makes 1900 a logical ending point for this book's narrative.

Significance

The findings in this book are significant in several ways. First, they show that historical change is evolution. Differences in terminology, and the cultural divide between humanities and science, have obscured this fact. The logic for the equivalence is simple. Historical change involves change in human ideas and behaviors. Some ideas and behaviors become more common, and others become less common. Ideas and behaviors are

human traits. **Evolution** means *change in the frequency of traits in populations*. Ergo, historical change (change in the frequency of ideas and behaviors in human populations) is evolution.

Second, historical forces are evolutionary forces. Politics, economics, culture, and technology do more than shape human experience. They also shape evolution. They change the frequency of thoughts and behaviors in human populations. They shape evolution in non-human populations, too. They affected the frequency of traits in greyhounds. As for greyhounds, so for all dogs. As for dogs, so for all domestic plants and animals. Historical forces have created niches (job–habitat combinations) for all breeds of all domestic organisms since their domestication. Each niche rewarded a different package of traits, creating variation among populations.

This study shows that many historical fields can extend their analyses to include evolution in non-human populations. For legal historians, it shows that a change in the law affected greyhound evolution by enabling all classes of people to shape greyhounds to meet their goals. For political historians, it shows that democracy shaped greyhound evolution by spawning a backlash among patricians. (Anti-democratic elites isolated the breeding pool of greyhounds to reassert patrician control over animal sports and breeding.) For economic historians, it shows that capitalism shaped greyhounds. (Profit-seeking entrepreneurs created dog shows, which rewarded different greyhound traits from hunting and coursing.) For historians of technology, it shows that greyhounds were biotechnologies. They were tools shaped to do particular jobs in particular ways. The book also shows that technological change shaped evolution in indirect ways. The spread of railroads enabled greyhounds from distant regions to mate, homogenizing greyhound traits on a national scale. For environmental historians, it shows that ecological change affected greyhound evolution. Loss of habitat for deer and other species reduced the jobs available to greyhounds, which reduced the range of traits needed in greyhounds.

Third, evolution falls into historical periods. Evolutionary biologists are accustomed to dividing evolution into long periods of time, such as the Pleistocene. Recently, biologists and other scientists have recognized that we have entered a new epoch called the Anthropocene. Scientists and historians debate the beginning of this period. Industrialization? After World War II? The beginning of agriculture? I am less interested in debates over timing than in the reality of human impact. People now shape the evolution of organisms around the globe. We do so directly and indirectly, intentionally and accidentally. This fact forces us to recognize that the

same forces that shape human history also shape evolution. Not surprisingly, this pattern divides evolution of many non-human populations into the same historical periods as human history. The reason is simple. Domestic plants and animals work in the human economy. Economic change alters job markets for domestic organisms as well as people. Change in jobs rewards change in traits of employees, both human and non-human.

Fourth, evolutionary biologists should build human social forces into their models. Now that people have created an "evolution explosion," as biologist Stephen Palumbi dubbed it, we need to take the causes of that explosion seriously. Treating humanity as one large, undifferentiated population will not do. People did not have the same impact on evolution 30,000 years ago that we do now. Change in the scale of impact is not due to change in our genetic makeup. It is due to change in social forces. Ancient agricultural economies had different impacts on the evolution of domestic populations from capitalistic economies. Some evolutionary studies, then, should focus on the differences in evolutionary impacts created by differences in economic systems. The same goes for differences in political, cultural, and technological systems.

Fifth, we should understand breeds as evolving populations rather than fixed types. Many authors embrace what I call the **statue history of breeds**. In this recounting, breeds have three defining traits. First, breeds were *uniform*. The traits of breed members varied little. Second, breeds were *isolated*. Breed members mated with other breed members to create new breed members. If they mated with a member of another breed, the offspring did not belong to the breed. Third, breeds were *static*. Breeders changed the traits of organisms when developing a breed, after which breed traits stayed the same.

Historians have argued that the greyhound breed, in particular, exemplified these features throughout time. They describe greyhounds as originating 8,000 years ago in the Mediterranean. Ancient greyhounds were purebred, meaning members had uniform traits and were isolated from other breeds. Today's greyhounds descended from ancient purebreds with no change. As one greyhound historian put it, "my dog . . . is of the same type, and does the same things, as those Greyhounds of Egypt and Greece so many thousands of years ago."[9] Once created, greyhounds resembled the Venus de Milo (albeit without losing their forelegs). The world around them went through wrenching changes, but greyhounds did not. They were living statues that remained the same for thousands of years. At least, that is the received wisdom.

Greyhounds – and surely other breeds – were not uniform, isolated, or static. They were varied, porous, and changing. These population features were not mistakes. People did not aim to make greyhounds a "true" breed and fall short. Variation, porosity, and malleability were virtues. They helped people achieve their goals. Conversely, the people who interacted with greyhounds were not uniform, isolated, or static. They, too, were varied, porous, and changing. These features helped greyhounds meet their "goals" (survival and reproduction).

Sixth, we should stop projecting today's breed concept onto the past. We distort our understanding of history when we assume that greyhounds – or other breeds of animals or varieties of plants – were uniform, isolated, and static. They were not. Changing a linguistic habit will help. Historians commonly refer to animals and plants using the singular, as in *the* greyhound. This habit encourages us to see organisms as fixed types throughout time and space. *Seeing members of a group as uniform and static* is **essentialism**. A synonym is **typological thinking**.[10] One can trace it to Plato's concept of ideal **types**, in which one perfect form of each thing in the world exists (often out of sight). Variation is seen as incidental rather than important. When applied to people, we call typological thinking **stereotyping**. Stereotyping is no more accurate for non-human populations than for people. *The* greyhound never existed, except in people's heads.

Biologists refer to the opposite of typological thinking as **population thinking**. Population thinkers see variation and change in populations, rather than uniformity and stasis. This book embraces population thinking. Greyhounds had similarities, but they were not identical. This book replaces the singular (*the* greyhound) with the plural (greyhounds) to highlight that greyhounds were varied individuals rather than a fixed type.[11] It is a history of greyhounds, not of *the* greyhound.

Literatures

This book contributes to several fields. One is the young field or research program known as evolutionary history. This field situates evolution in human history. It analyzes how historical forces have shaped the traits of human and non-human populations. A subset of evolutionary history is coevolutionary history, or the analysis of how human and non-human populations have shaped each other. This book advances coevolutionary history by, among other things, incorporating cultural evolution.[12]

This book adds to environmental history, the field that studies the interaction between people and the rest of nature. Traditionally, environmental historians focused on the impact of human actions on (a) the ecology (distribution and abundance) of non-human species, and (b) the impact of pollution on human health. Evolutionary and coevolutionary history, including the ideas in this book, expand environmental history by assessing history as an evolutionary process.[13]

The book contributes to the history of technology. The most direct way is by highlighting the importance of organisms as technology. We have developed a habit of equating technology with machinery, but this concept is too narrow. Domestic animals and plants are technologies. People shape them to work for humans. Before tractors, draft animals pulled plows and wagons. Draft animals were biotechnologies in the root meaning of the word (live technologies). Recovering their history is important because, among other things, it tells us how social forces might shape the traits of biotechnologies created through genetic engineering. The traits of genetically modified organisms are not just the result of technical decisions. As historians of technology have stressed, the design of technology incorporates social values. The same holds true for domestic plants and animals. Another way this book intersects with the history of technology is in demonstrating the unintended impact of technology (railroads) on evolution (change in animal traits).[14]

This book extends ideas about periodization and transformation in British history. I am an environmental historian, a historian of technology, and an American historian. I took up the study of English dogs to broaden my horizons. I do not pretend to be an expert on the sceptered isle. I am sure British historians could offer a deeper, more nuanced interpretation of social change than this book offers. My contribution, I believe, is to show that (a) well-studied historical processes had little-studied impacts on evolution, and (b) evolution played an important role in British history.[15]

This book contributes to the young field of animal studies. Scholars in the field employ a variety of approaches, but it seems fair to say that cultural constructivism plays a key role. Such studies, including those that show how people projected ideas about themselves onto animals, informed my approach. I found, however, that it was impossible to analyze culture outside its material context. Breeders adapted animals to economics, technology, and ecology as well as to their wishes. These realities, as much as desires for social status, shaped animal traits. In addition, breeders ran into biological limits. If they could, they surely would have bred out the need for

animals to drink, eat, and defecate. They did not. The material world set limits on the ability of people to realize their dreams. The idea of prices, which animals exacted in return for enabling people to achieve their goals, offers a way to balance cultural construction with material realities.[16] Within animal studies, some key works have appeared on the history of dogs. This book adds to that body of work.[17]

The book joins a thriving literature in sports history. Scholars in this field have stressed the extent to which sports reflected, and helped to promote, social change. They have identified the nineteenth century as a revolutionary period. Team sports, formal rules, national governing organizations, and enthusiastic gambling were common features. The world of coursing and dog shows saw similar developments, which shaped evolution of greyhounds as well as human experience. Sports had evolutionary consequences.[18]

For biologists, this book proposes a model for incorporating human social forces into evolutionary models. The idea that people shape evolution is not mine. Natural historians before Charles Darwin, such as the Comte de Buffon, suggested this idea. Although often forgotten, Darwin built his argument for evolution by natural selection atop evidence of evolution by human selection. Recently, biologists have argued that human beings have become the world's most powerful evolutionary force. When biologists study anthropogenic evolution, however, the human side of the story may lack the sensitivity to variation seen in studies of non-human populations. Biologists might identify "people" or "culture" as the actors in anthropogenic evolution. These claims are correct, but they work at the same level of analysis as attributing natural selection to "nature." They are so general they offer little predictive value (a requirement for scientific hypotheses).[19]

This book contributes to the literature on cultural evolution and coevolution.[20] It follows the lead of others in pointing to memes as heritable instructions for behaviors. It emphasizes that coevolving populations can shape each other through more than affecting survival or reproduction (key elements of evolution through natural and sexual selection). The greyhounds in this book did not affect human survival or reproduction. Through what mechanism, then, did greyhounds affect their coevolving populations of people? This book focuses on two mechanisms: *creating opportunities* for people to have behavioral traits, and *exacting prices* for desired behaviors.

This book adds to the literature on niche construction, including human niche construction. Biologists traditionally saw environments as

fixed. They assumed populations adapted to environments. Recently, they have shown more appreciation for the degree to which organisms adapt environments to themselves. Beavers build dams to adapt environments to themselves. This process is known as niche construction. When people do it, it is called human niche construction. This book argues that human niches can fruitfully be divided into two dimensions: jobs and habitats. It suggests that coevolving populations co-construct niches for each other.[21] Co-construction of niches helped to shape human and greyhound evolution.

Clearing the Fog

Common misunderstanding about evolution might make arguments in this book puzzling. Here are examples of misconceptions. Evolution is biological (or genetic) determinism. Evolution involves only genetic or physical traits. Evolution happens only through natural selection. The unit of evolution is species. Evolution is speciation. Evolution takes millions of years. Evolution must be accidental. People cannot affect evolution. This section clears up these points of confusion. Readers with deeper knowledge of evolution may wish to skip to the next section.

As noted earlier, **evolution** means *change in the frequency of traits in populations. Change in frequency* means a trait becomes more or less common in a population. **Traits** are *features of organisms.* Some traits are **physical**. Rough fur is an example. Other traits are **behavioral**. Running, eating, sleeping, and killing prey are behavioral traits. Any change in frequency in any trait – large or small, permanent or temporary – is evolution. In this book, greyhound populations evolved with respect to physical and behavioral traits. Human populations evolved with respect to behavioral traits, but not physical traits (so far as we know).

This book does not make most of the arguments mistakenly thought essential to evolution. It does not argue that people or greyhounds became new species. It discusses change within populations of two species, *Homo sapiens* and *Canis lupus.* It does not argue that genes determined human behavior. So far as I know, none of the human behaviors in the book were under genetic control. Genes probably influenced greyhound behavior, but we do not know this. No one was measuring gene frequencies. Even if genes did affect behavior, they were not solely responsible. Training shaped greyhound behavior. Neither people nor greyhounds in this book evolved through natural selection (in the usual sense of non-human selection). Greyhounds evolved through two other