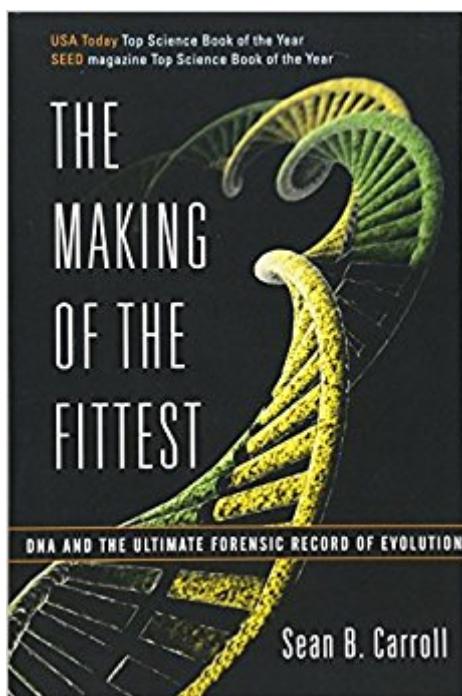


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# The Making Of The Fittest: DNA And The Ultimate Forensic Record Of Evolution



## **Synopsis**

DNA evidence not only solves crimesâ in Sean Carroll's hands it will now end the Evolution Wars. DNA, the genetic blueprint of all creatures, is a stunningly rich and detailed record of evolution. Every change or new trait, from the gaudy colors of tropical birds to our color vision with which we admire them, is due to changes in DNA that leave a record and can be traced. Just as importantly, the DNA evidence has revealed several profound surprises about how evolution actually works. 50 black-and-white illustrations and 8 pages of color

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## **Customer Reviews**

Picking up where scientists like Richard Dawkins have left off, Carroll, a professor of genetics at the University of Wisconsinâ Madison (Endless Forms Most Beautiful: The New Science of Evo-Devo), has written a fast-paced look at how DNA demonstrates the evolutionary process. Natural selection eliminates harmful changes and embraces beneficial ones, and each change leaves its signature on a species' DNA codes. For example, the Antarctic ice fish today has no red blood cells; yet a fossilized gene for hemoglobin remains in its DNA, showing that the fish has adapted over 55 million years by losing the red blood cells that thicken blood and make it harder to pump in extreme cold. The fish has developed other features that allow it to absorb and circulate blood without hemoglobin. . Carroll points out that by examining the DNA of these ice fish species, it's possible to map its origins as well as the history of the South Atlantic's geology. He also uses dolphins, colobus monkeys and microbes to demonstrate how deeply evolution is etched in DNA. While searches for the genetic basis for evolution are hardly new, Carroll offers some provocative and convincing

evidence. 7 pages of color illus.; 50 b&w illus. (Oct.) Copyright © Reed Business Information, a division of Reed Elsevier Inc. All rights reserved. --This text refers to an out of print or unavailable edition of this title.

Sensing that many people misunderstand evolution or don't believe it, geneticist Carroll here hopes to teach the interested and convince the doubters. He uses popular interest in animals as his lure and selects specific creatures, beginning with bloodless fishes of the Antarctic seas, as stages for his substantive points about evolution. More particularly, Carroll focuses on specific genes carried by his cast of animals to demonstrate natural selection. Carroll considers the animals' most favorable adaptations, preserved in what he calls "immortal genes

I've read three or four other books that explore the evidence for evolution and in all of those books they cover the familiar areas of the fossil record, geographical distribution, etc. and sometimes briefly discuss molecular evidence, but "The Making of the Fittest" deals specifically with that area (as you can tell from the subtitle). The book is a fantastic exploration of how DNA (literally the text of the base pairs or the specific amino acids of a protein) provides incontrovertible evidence for evolution. To deny evolution after seeing some of the impressive examples in this book is a clear indication that the denial is based purely on theological grounds and certainly not scientific ones. The book is divided as such: Chapter 1: An introduction to what the rest of the book will be discussing. However, I would have preferred that this actually have been an introduction instead of being chapter 1, because it doesn't really get into the topic of the book so much as summarize what each of the following chapters will be about. Chapter 2: A somewhat difficult chapter that deals with the math of evolution. I love math but I felt at times that Carroll was simply telling us what the results of particular equations mean, as opposed to explaining the math itself. I would like to have learned how to do the calculations myself in the event I need to present this evidence to someone else. At one point he uses a logarithm without even explaining how the equation works, so it raises the question of why he even bothered to show us the math at all if he wasn't going to explain it. Chapter 3: This is where the book really hits its stride and doesn't slow down for several chapters. This chapter discusses specific genes in our DNA that have remained unchanged for billions of years, evidence that natural selection has worked to keep these genes in place because of their fundamental usefulness to life. Chapter 4: An utterly fascinating chapter on how new genes have evolved in order to create new features across various species. In particular Carroll discusses color vision and the similarities/differences between species in the genes that affect vision in various

animals. Chapter 5: Yet another completely absorbing chapter on "fossil genes" -- genes that have mutated over time and have become inactive, yet still can be used to trace their heritage far back through the past. Chapter 6: Discusses the phenomenon of evolution repeating itself when given the same set of selection pressures with which to work, and how different species have independently evolved similar (or the same) features as a result. Chapter 7: Deals specifically with human issues such as the "arms race" between increasingly drug-resistant bacteria and human-created methods to deal with such germs. Chapter 8: A discussion on how complex features (such as the eye) can evolve. Intelligent designers, pay attention! Chapter 9: Carroll stops with the science at this point and in this chapter deals with the common arguments against evolution and the rational responses to these arguments. Chapter 10: The final chapter discusses how acceptance of evolution is more than just a philosophical exercise but instead can help us shape the future of not only our species but of many other species on the planet (especially those on the verge of extinction because of human activity). Even though Carroll discusses things such as overfishing, overhunting, pollution, and global warming, I didn't get the impression that he tied all of this up neatly with the actual idea that accepting the truth of evolution can help us with these things. A few complaints I had were that: 1. At some points the explanations got a little difficult to follow, and not so much because the science (or math) was over my head, but because Carroll didn't seem to fully explain what he was describing. I feel like it was a fault of the writing in certain sections. 2. There are many charts, graphs, and pictures, but they weren't all explained very well. For example, Figure 4.3 (DNA Typing and Hominoid Evolution) shows a comparison of junk DNA called "SINES" among various animals (Human, Bonobo, Chimpanzee, Gorilla, etc.), but for the life of me I couldn't figure out what I was looking at or how to read the lines. I got the general idea of what I was seeing, but the caption and even the text itself didn't seem to explain the figure very well. 3. A problem many authors, including Carroll, seem to have is the habit of summing up the topics they are about to discuss. Chapter 1 is mainly a setup for the rest of the book and the final part of it actually sums up what each of the following chapters will discuss. Furthermore, within each chapter Carroll also will sometimes close a section by describing what the next section will be about, or close a chapter by describing what the next chapter will be about. Personally, I find this kind of writing to be somewhat lazy. It contains no real content, no new information, and reads like filler. It's as if the authors are not confident enough to simply end a section or chapter as-is without resorting to some type of segue into the next part. However, overall the book is a fantastic exploration of how DNA reveals the evidence for evolution across just about every species. If you've read other books about the evidence for evolution, chances are they dealt with a little of this material, but not as in-depth as Carroll's book.

does. I definitely recommend this book to complement those other books, because it deals thoroughly with the DNA record. You will be amazed to see how similar DNA is across various species, and equally amazed to see that it differs in exactly the ways we would expect it to differ if evolution is true.

Love this book and learned tons of stuff. Strongly recommend for those who still might have certain level of discomfort with the theory of Evolution. This provides lots of confidence and "proof" examples if you still have any doubt. Also recommend Richard Dawkins' books: Greatest Show On Earth and Extended Phenotype. Love science!

This was a great book and helped me understand mutations within the framework of evolution much more clearly. By far it's probably my favorite and most informative book on DNA that I've read. If you are wanting to learn about how evolution through natural selection works I highly recommend this book!

This is a gem of a book - a large beautifully cut diamond, flashing many insights, clear, well structured. The logic of the arguments is persuasive, and the evidence overwhelming in its endless variety. Well done. My particular thank goes to the Editor, who (I presume) helped in structuring the arguments and found all but a few ambiguities in the text. It is pleasing, for a change, to be able to say: well written, and well edited. If I'm not giving the book the five stars it actually deserves, it is for three reasons. Chpt. 9: I find it useless and wasteful of good space. The creationist/ID crowd has not addressed DNA-based evidence, and for good reason. As staunch defenders of law and order they'd more than gladly use DNA to convict a criminal. How could they reject its value for evolution? They conceded this part of the conversation without a fight (or at least Dr. Carroll has not provided DNA-refuting arguments on their part). So, let's be magnanimous, and ignore them - that dead horse has been flogged long enough. The book's title: "Making of the fittest" harks back to Spencer & Co. Would not "fit" suffice, thereby signifying distance from the social Darwinist crowd, as well as indicating that evolution does not jump to ever higher branches in the "tree of life" (sorry Dr. Darwin, you put the term in belatedly, and unwillingly), but just hops here and there as the conditions of selection change? In the same vein "forensic record" implies judicial truth. Albie SACHS, of the South African Supreme Court, argues, however: "Yet the very notion of judgment presupposes that there is no inevitable outcome. (...) Instead, it seeks to woo the consent of the reader by the persuasiveness of its argument. (p. 142) The Strange Alchemy of Life and Law (0). I'd soft-pedal

the recurring "forensic" terminology.Chpt. 10: There is nothing wrong with the bleak picture of the condition of the sea as presented, except that it is far too rosy, and fragmentary. Ocean acidification has emerged as an (albeit limited-awareness) issue only this century, though its import may by far exceed the impact of many of the horrors that have projected to follow climate change. Gaia, to borrow Lovelock's metaphor, is a sea creature. So if one wants to raise the subject - more than welcome, but it has to be with much more muscle, breadth and depth. In fact it cries out for a whole book. So instead of these last three somewhat loosely constructed chapters I'd have a final one, tightly recapitulating the logic of arguments in order to impart on readers a well-structured, easily remembered understanding of the arguments. And - if the issue of climate change is to be raised, a student of evolution may wonder why we approach this problem by intelligent design...Chpt 8 finally I found somewhat confusing, not having read Carroll's prior evo-devo book. There is some loose wording there. So is Pax-6 a gene or a protein; and what are "tool-kit proteins"? One gets the drift, but is soon let adrift in a sea of Drosophila wings.

This is an excellent book. It is detailed, wide-ranging in its topics and examples and still quite readable. Carroll discusses not just DNA and its fossil record but also the contemporary large-scale rejection of anything to do with evolution. His final chapter is a chilling and thorough warning of what the consequences are if we ignore the lessons of evolution. This includes the devastation of over-fishing and hunting.

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