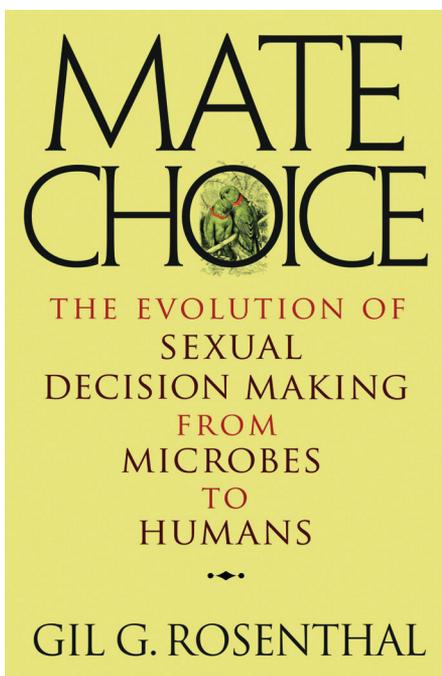


adapt to a warming world? This is again where curiosity-driven research about how burrowing animals reacted to and survived mass extinctions in the geologic past might apply. For one, I predict that research on fossil burrows used originally to find fossil fuels will have its utility flipped. Instead, we will use these traces of past lives to discern climatic cycles, which in turn should help us better predict and prepare for the grimmest of climate change scenarios in our near future. (pp. 291–292)



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**Mate Choice: The Evolution of Sexual Decision Making from Microbes to Humans.** By Gil G. Rosenthal. 2017. Princeton University Press. (ISBN 9780691150673). 632 pp. Hardcover, \$55.00.

*Mate Choice* is an extremely thorough gathering of studies and analysis of how organisms choose mates. Many fields of science, including evolution, behavior, statistics, and economics, are used to explain how organisms go about choosing a mate. In the first chapter, the author distinguishes mate choice from sexual selection. He argues that mate choice is not as closely tied to sexual selection as is often implied, but that “mate-choice decisions

can be adaptive, non-adaptive, or maladaptive” (p. 13). The first third of the book covers the history, definition, measurements, and studies on mate choice. The middle section covers variations in mate choice as well as how choice is affected by ecological interactions. The rest of the book describes how mate choice affects and is affected by evolution, including sexual selection. The final chapters specifically address mate choice among humans, and the author finishes with a suggested theory about how mates are chosen.

At first glance, this book is overwhelming. It is rich with example after example from multiple types of organisms. Sensory mechanisms such as chemoreceptors, vision, hearing, and touch are the beginnings of the process of mate choice. The author notes that these mechanisms are often the subject of arguments that they are adaptations, since many of them require differing amounts of energy in order to attract a mate. The book doesn’t consider mate choice to be over once the mate has been selected: “Mating, therefore, is just the end of the beginning in mate choice” (p. 176). Once a mate is chosen and copulation has occurred, there are still choices to be made.

From females rejecting sperm to resource allocation, there are still quite a few mechanisms that allow for choice in which offspring survive. The author refers to this as cryptic mate choice, noting that “it may be useful to think about a chooser’s preferences before, during, and after mating as part of an integrated phenotype” (p. 200). Additionally, the book has a chapter on mutual mate choice and extensive chapters on the influence of genetic variation, the environment, and social interactions on choosing a mate.

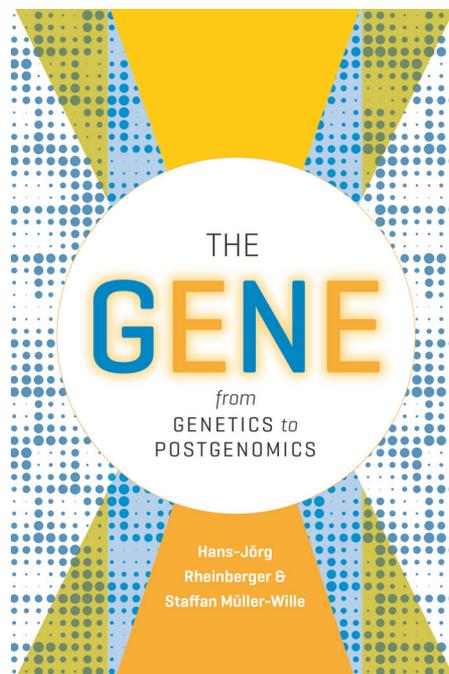
Later chapters connect mate choice with evolution: “When sex is about producing zygotes, there will be coevolution between the sexes; part of the coevolutionary dynamic will involve mate-choice mechanisms” (p. 482). One of the more interesting parts of this section is one of the last chapters, focused on humans. Humans are “astonishingly diverse in their preferences” (p. 475), which makes studying them in a quantitative or qualitative manner rather difficult. The author makes some suggestions about how to study humans but admits that this will continue to be a challenge.

One of the things I really appreciate about *Mate Choice* is that the author ends each chapter with a section titled “Synthesis.” After the very detailed, and often statistics-heavy, discussions about the different topics, the synthesis sections sum up the main points. This makes what seems like a very difficult and technical read more user friendly. High school teachers and professors will find this book a useful reference when

teaching behavior, evolution, and sexual selection. The examples span prokaryotic as well as eukaryotic organisms. Additionally, the examples of how studies were conducted and analyzed can be utilized as case studies for scientific method and statistical analysis.



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#### GENETICS

**The Gene: From Genetics to Postgenomics.** By Hans-Jörg Rheinberger and Staffan Müller-Wille. 2018. University of Chicago Press. (ISBN 9780226510002). 176 pp. Paperback, \$25.00.

In my final decade of biology teaching, I began offering an annual end-of-year challenge to my 10th-graders. We finished up with a 12-week study of genetics, and my charge to the students was this: “If you work hard and devote yourself to the study of genetics throughout this unit, you will realize at the end that you have *no* idea what a gene is.”

There is no consensus on the definition of a gene, yet *gene* is a term we use, appropriately and effectively, throughout our discourse in biology. What a paradox!? Hans-Jörg Rheinberger and Staffan Müller-Wille have published a book that succinctly and brilliantly addresses this current state of things. Rheinberger is emeritus director at the Max Planck Institute for the History of