

# CONTENTS

<i>List of Boxes and Figures</i>	xii
<i>Acknowledgments</i>	xiii
<i>Introduction</i>	xv
1 What Is Evolutionary Theory?	1
1.1 What Is Evolution? 1	
1.2 The Place of Evolutionary Theory in Biology, 5	
1.3 Pattern and Process, 7	
1.4 Historical Particulars and General Laws, 14	
1.5 The Causes of Evolution, 18	
1.6 The Domains of Biology and Physics, 22	
1.7 Biological Explanations and Physical Explanations, 25	
Suggestions for Further Reading, 26	
2 Creationism	27
2.1 The Danger of Anachronism, 27	
2.2 Paley's Watch and the Likelihood Principle, 30	
2.3 Hume's Critique, 33	
2.4 Why Natural Selection Isn't a Random Process, 36	
2.5 Two Kinds of Similarity, 39	
2.6 The Problem of Predictive Equivalence, 42	
2.7 Is the Design Hypothesis Unscientific? 46	
2.8 The Incompleteness of Science, 55	
Suggestions for Further Reading, 57	
3 Fitness	58
3.1 An Idealized Life Cycle, 58	
3.2 The Interpretation of Probability, 61	
3.3 Two Ways to Find Out About Fitness, 68	
3.4 The Tautology Problem, 70	
3.5 Supervenience, 74	
3.6 Advantageousness and Fitness, 78	

3.7	Teleology Naturalized, 83	
	Suggestions for Further Reading, 88	
4	The Units of Selection Problem	89
4.1	Hierarchy, 89	
4.2	Adaptation and Fortuitous Benefit, 96	
4.3	Decoupling Parts and Wholes, 100	
4.4	Red Herrings, 102	
4.5	Examples, 108	
4.6	Correlation, Cost, and Benefit, 111	
	Suggestions for Further Reading, 119	
5	Adaptationism	121
5.1	What Is Adaptationism? 121	
5.2	How Genetics Can Get in the Way, 125	
5.3	Is Adaptationism Untestable? 130	
5.4	The Argument from Complex Traits, 132	
5.5	If Optimality Models Are Too Easy to Produce, Let's Make Them Harder, 133	
5.6	Game Theory, 138	
	Suggestions for Further Reading, 145	
6	Systematics	146
6.1	The Death of Essentialism, 148	
6.2	Individuality and the Species Problem, 152	
6.3	Three Systematic Philosophies, 162	
6.4	Internal Coherence, 169	
6.5	Phylogenetic Inference Based on Overall Similarity, 172	
6.6	Parsimony and Phylogenetic Inference, 176	
	Suggestions for Further Reading, 187	
7	Sociobiology and the Extension of Evolutionary Theory	188
7.1	Biological Determinism, 189	
7.2	Does Sociobiology Have an Ideological Function? 198	
7.3	Anthropomorphism Versus Linguistic Puritanism, 201	
7.4	Ethics, 206	
7.5	Models of Cultural Evolution, 213	
	Suggestions for Further Reading, 220	
	<i>References</i>	221
	<i>Index</i>	231