

**Reconstructing the Past**  
Parsimony, Evolution, and Inference

---

Elliott Sober

A Bradford Book  
The MIT Press  
Cambridge, Massachusetts  
London, England

# Contents

---

Preface ix

Acknowledgments xv

## Chapter 1

The Biological Problem of Phylogenetic Inference 1

1.1. *When Is History Knowable?* 1

1.2. *Pattern and Process* 6

1.3. *Objects and Properties* 13

1.4. *Character Incongruence and the Problem of Homoplasy* 28

## Chapter 2

The Philosophical Problem of Simplicity 37

2.1. *Local and Global Parsimony* 37

2.2. *Two Kinds of Nondeductive Inference* 40

2.3. *A Lapsed Ontological Tradition* 51

2.4. *The Methodological Critique* 55

2.5. *The Raven Paradox* 58

2.6. *Hume Was Half-Right* 67

## Chapter 3

The Principle of the Common Cause 71

3.1. *Two Pitfalls for Pheneticism* 72

3.2. *Correlation, Common Cause, and Screening-Off* 78

3.3. *An Ontological Difficulty* 83

3.4. *Epistemological Difficulties* 89

3.5. *Likelihood and the Problem of Nuisance Parameters* 102

3.6. *Concluding Remarks* 110

## Chapter 4

Cladistics and the Limits of Hypothetico-Deductivism 113

4.1. *The Problem Emerges* 114

4.2. *Falsifiability* 121

4.3. *Explanatory Power* 131

4.4. *Minimizing Assumptions versus Assuming Minimality* 135

4.5. <i>Stability</i>	141
4.6. <i>The Distinction between Observation and Hypothesis</i>	143

Chapter 5

Parsimony, Likelihood, and Consistency	149
5.1. <i>The Nuisance of Nuisance Parameters</i>	150
5.2. <i>Two Best-Case Expedients</i>	157
5.3. <i>Statistical Consistency</i>	166
5.4. <i>Why Consistency?</i>	172
5.5. <i>Evil Demons and Reliability</i>	183
5.6. <i>Necessity and Sufficiency</i>	187
5.7. <i>Concluding Remarks</i>	197

Chapter 6

A Model Branching Process	199
6.1. <i>Desiderata</i>	199
6.2. <i>Matches Confirm</i>	206
6.3. <i>The Smith/Quackdoodle Problem</i>	212
6.4. <i>History Redux</i>	216
6.5. <i>Character Polarity</i>	220
6.6. <i>Robustness</i>	229
6.7. <i>Models and Reality</i>	237
6.8. <i>Appendix: The Smith/Quackdoodle Theorem for Three Taxa</i>	239

References	253
------------	-----

Index	261
-------	-----