

# Contents

Preface xiii

<b>Chapter 1</b>	<b>Introduction</b>	<b>1</b>
	1.1	<i>Setting Out</i> 2
	1.2	<i>The Scope of the Investigation</i> 3
	1.3	<i>What Kind of Theory?</i> 7
	1.4	<i>Three Answers, or Pieces of an Answer</i> 11
	1.5	<i>A Sketch of the Scientific Revolution and What Came Afterward</i> 17
		<i>Further Reading and Notes</i> 23
<b>Chapter 2</b>	<b>Empiricism</b>	<b>26</b>
	2.1	<i>The Empiricist Tradition</i> 27
	2.2	<i>The Vienna Circle</i> 30
	2.3	<i>Central Ideas of Logical Positivism</i> 34
	2.4	<i>Problems and Changes</i> 40
	2.5	<i>Logical Empiricism and the Web of Belief</i> 44
	2.6	<i>Experience, Experiment, and Action</i> 49
		<i>Further Reading and Notes</i> 51

<b>Chapter 3</b>	<b>Evidence and Induction</b>	<b>53</b>
3.1	<i>The Mother of All Problems</i>	54
3.2	<i>Induction, Deduction, Confirmation, and Explanatory Inference</i>	55
3.3	<i>The Ravens Problem</i>	61
3.4	<i>Goodman's "New Riddle of Induction"</i>	67
3.5	<i>Optional Section: A Little More about Hypothetico-Deductivism</i>	74
	<i>Further Reading and Notes</i>	75
<b>Chapter 4</b>	<b>Popper: Conjecture and Refutation</b>	<b>77</b>
4.1	<i>Popper's Unique Place in the Philosophy of Science</i>	78
4.2	<i>Popper's Theory of Science</i>	78
4.3	<i>Popper on Scientific Change</i>	83
4.4	<i>Objections to Popper on Falsification</i>	86
4.5	<i>Objections to Popper on Confirmation</i>	91
4.6	<i>Further Comments on the Demarcation Problem</i>	95
	<i>Further Reading and Notes</i>	100
<b>Chapter 5</b>	<b>Kuhn's Revolution</b>	<b>101</b>
5.1	<i>"The Paradigm Has Shifted"</i>	102
5.2	<i>Paradigms: A Closer Look</i>	104
5.3	<i>Normal Science</i>	106
5.4	<i>Anomaly and Crisis</i>	109
5.5	<i>Revolutions and Their Aftermath</i>	113
5.6	<i>Incommensurability, Relativism, and Progress</i>	118
5.7	<i>The X-Rated "Chapter X"</i>	123
5.8	<i>Final Thoughts about Kuhn</i>	127
	<i>Further Reading and Notes</i>	129

<b>Chapter 6</b>	<b>Theories and Frameworks</b>	<b>131</b>
6.1	<i>After Structure</i>	132
6.2	<i>Lakatos and Research Programs</i>	133
6.3	<i>Laudan and Research Traditions</i>	138
6.4	<i>Anything Goes</i>	141
6.5	<i>An Argument from History That Haunts Philosophy</i>	144
6.6	<i>Frameworks, Theories, and Empiricism</i>	146
	<i>Further Reading and Notes</i>	149
<b>Chapter 7</b>	<b>The Challenge from Sociology of Science</b>	<b>151</b>
7.1	<i>Beyond Philosophy?</i>	152
7.2	<i>Robert Merton and the “Old” Sociology of Science</i>	152
7.3	<i>The Rise of the Strong Program</i>	157
7.4	<i>Leviathan, Latour, and the Manufacture of Facts</i>	162
	<i>Further Reading and Notes</i>	171
<b>Chapter 8</b>	<b>Science Is Political</b>	<b>172</b>
8.1	<i>A Changing Image of Science</i>	173
8.2	<i>The Man of Reason</i>	174
8.3	<i>Sex and Gender in Behavioral Biology</i>	177
8.4	<i>Feminist Epistemology</i>	179
8.5	<i>Postmodernism and the Science Wars</i>	185
8.6	<i>Values in Science</i>	189
	<i>Further Reading and Notes</i>	194
<b>Chapter 9</b>	<b>Naturalistic Philosophy</b>	<b>196</b>
9.1	<i>What Is Naturalism?</i>	197
9.2	<i>Quine and Others</i>	198

	9.3	<i>The Role of Observation in Science</i>	203
	9.4	<i>Science as a Process</i>	209
	9.5	<i>The Division of Scientific Labor</i>	213
	9.6	<i>More on Competition and the Goals of Science</i>	216
		<i>Further Reading and Notes</i>	218
<b>Chapter 10</b>		<b>Scientific Realism</b>	221
	10.1	<i>Strange Debates</i>	222
	10.2	<i>Realism</i>	223
	10.3	<i>Approaching Scientific Realism</i>	225
	10.4	<i>Challenges from Empiricism</i>	229
	10.5	<i>Metaphysical Constructivism</i>	233
	10.6	<i>Underdetermination and Progress</i>	237
	10.7	<i>Natural Kinds</i>	240
		<i>Further Reading and Notes</i>	243
<b>Chapter 11</b>		<b>Explanation, Laws, and Causes</b>	246
	11.1	<i>Knowing Why</i>	247
	11.2	<i>The Rise and Fall of the Covering Law Theory of Explanation</i>	248
	11.3	<i>Causation and Unification</i>	252
	11.4	<i>Laws, Causes, and Interventions</i>	258
		<i>Further Reading and Notes</i>	264
<b>Chapter 12</b>		<b>Bayesianism and New Views of Evidence</b>	266
	12.1	<i>New Hope</i>	267
	12.2	<i>Degrees of Belief</i>	268
	12.3	<i>Understanding Evidence with Probability</i>	270
	12.4	<i>The Subjectivist Interpretation of Probability</i>	273
	12.5	<i>Bayesianism and Evidence</i>	277
	12.6	<i>Procedures and Experiments</i>	284
		<i>Further Reading and Notes</i>	291

**Chapter 13 Truth, Simplicity, and Other Problems 293**

13.1 *The Problem of Truth* 294

13.2 *Correspondence, Coherence, and Usefulness* 296

13.3 *An Indirect Approach, via Ramsey* 298

13.4 *Models* 303

13.5 *Consensus* 308

13.6 *Occam's Razor* 313

*Further Reading and Notes* 319

**Chapter 14 The Future 321**

14.1 *Empiricism, Naturalism, and Scientific Realism* 322

14.2 *Another Kind of Scientific Change* 330

Glossary 337

Websites 349

References 351

Index 373