

Contents

	<i>Preface</i>	<i>page vii</i>
	Introduction	1
1	Invitation to Metatheory	19
	1.1 Logical Grammar	19
	1.2 Proof Theory	20
	1.3 Semantics	22
	1.4 Translating between Theories	24
2	The Category of Sets	28
	2.1 Introduction	28
	2.2 Truth Values and Subsets	38
	2.3 Relations	42
	2.4 Colimits	46
	2.5 Sets of Functions and Sets of Subsets	48
	2.6 Cardinality	53
	2.7 The Axiom of Choice	57
	2.8 Notes	57
3	The Category of Propositional Theories	58
	3.1 Basics	58
	3.2 Boolean Algebras	62
	3.3 Equivalent Categories	66
	3.4 Propositional Theories Are Boolean Algebras	67
	3.5 Boolean Algebras Again	73
	3.6 Stone Spaces	79
	3.7 Stone Duality	86
	3.8 Notes	92
4	Syntactic Metalogic	94
	4.1 Regimenting Theories	94
	4.2 Logical Grammar	96
	4.3 Deduction Rules	101

vi	Contents	
	4.4 Empirical Theories	107
	4.5 Translation	111
	4.6 Definitional Extension and Equivalence	121
	4.7 Notes	128
5	Syntactic Metalogic Redux	129
	5.1 Many-Sorted Logic	129
	5.2 Morita Extension and Equivalence	132
	5.3 Quine on the Disposability of Many-Sorted Logic	137
	5.4 Translation Generalized	143
	5.5 Symmetry	157
	5.6 Notes	162
6	Semantic Metalogic	164
	6.1 The Semantic Turn	164
	6.2 The Semantic View of Theories	172
	6.3 Soundness, Completeness, Compactness	174
	6.4 Categories of Models	180
	6.5 Ultraproducts	182
	6.6 Relations between Theories	184
	6.7 Beth's Theorem and Implicit Definition	195
	6.8 Notes	204
7	Semantic Metalogic Redux	206
	7.1 Structures and Models	206
	7.2 The Dual Functor to a Translation	207
	7.3 Morita Equivalence Implies Categorical Equivalence	210
	7.4 From Geometry to Conceptual Relativity	225
	7.5 Morita Equivalence Is Intertranslatability	234
	7.6 Open Questions	244
	7.7 Notes	245
8	From Metatheory to Philosophy	247
	8.1 Ramsey Sentences	247
	8.2 Counting Possibilities	257
	8.3 Putnam's Paradox	263
	8.4 Realism and Equivalence	268
	8.5 Flat versus Structured Views of Theories	277
	8.6 Believing a Scientific Theory	278
	8.7 Notes	283
	<i>Bibliography</i>	284
	<i>Index</i>	293