

C O N T E N T S

Acknowledgments	xi
Abbreviations	xiii
Introduction	3
I The Motivation for the Theory of Demonstration	7
II The Approach to the Principles	21
Scientific Knowledge and Scientific Demonstrations	23
The Premises of Scientific Demonstrations	24
Six Requirements for Scientific Principles	24
PRINCIPLES ARE PRIMARY AND IMMEDIATE	24
PRINCIPLES ARE TRUE	29
PRINCIPLES ARE BETTER KNOWN, PRIOR, AND GROUNDS	29
III The Kinds of Principles	36
Summary	49
	vii

IV	The Subject Genus	50
	The Composition of the Subject Genus	57
	Interpretations of the Subject Genus	60
V	The Subordinate Sciences	64
VI	Axioms or Common Principles	68
	The Analogical Nature of Axioms	71
	The Alleged Regulative Role of Axioms	74
	Summary	75
	Axioms and Subordinate Sciences	75
	Appendix: I.11 77a10–21 and the Law of Noncontradiction	76
VII	Definitions, I: The Per Se	80
	In Every Case	84
	Per Se	85
	Per Se 1	85
	Per Se 2	87
	Per Se 1 and Per Se 2: Summary and Comparison	90
	Per Se 2 and Definitions of Attributes	91
	Per Se 2 and Compound Subjects	92
	Per Se 3	93
	Per Se 4	94
	Universal	95
	Are Conclusions of Demonstrations Per Se?	98
	In Every Case, Per Se, Universal, and Necessary	101
VIII	Scientific Essences	103
	Scientific Facts	104
	Individuals, Intelligibility, and Per Se Facts	105
	Subjects and Attributes	106
	Essence and Necessity	107
IX	Definitions, II: Form and Content	111

x	Existence Claims	122
	The Role of Existence Claims	123
	Existence Claims and the Requirements for Principles	125
	Existence and Necessity	125
x i	Aristotle's Principles and Greek Mathematics	133
	Pre-Euclidean Principles	136
	Differences between Aristotle and Euclid	137
x ii	Aristotle's Demonstrations and Euclid's <i>Elements</i>	144
	Geometrical Diagrams	146
	Existence vs. Constructibility	147
	Proofs and Syllogisms	149
x iii	The Varieties of Demonstration, I: Universal Subject-Attribute Demonstrations	164
	The Nature of Demonstrations	164
	Subjects and Attributes	165
	An Aristotelian Demonstration	167
	Per Se 1 and Per Se 2	169
	Commensurate Universals	171
x iv	The Varieties of Demonstration, II: Application Arguments	177
	Applications to Species	177
	Applications to Individuals	181
	Applications to Natural Phenomena	184
	Applications in the Preliminary Stages of Science	186
	Application Arguments and Syllogisms	186
x v	The Varieties of Demonstration, III: Demonstrations of Existence	188
x vi	Demonstration of Essence: Another Form of Scientific Proof?	198

X CONTENTS

XVII	Scientific Explanation	209
	Middle Terms and Immediate Premises	209
	Grounds of Truth or Grounds of Knowledge?	212
	Knowledge of the Fact and Knowledge of the Reason Why	213
	Two Kinds of Unsatisfactory Demonstrations	213
	CASE 1: NONRECIPROCATION	214
	CASE 2: RECIPROCATION IS NOT ENOUGH	216
	Criteria for Grounds	217
	PRIORITY OF THE ACCOUNT	218
	PRIORITY OF WHAT IS BETTER KNOWN	219
	Priority, Primacy, and Ungrounded Grounds	222
	CASE 2A: ANOTHER CASE OF NON-EXPERT KNOWLEDGE?	224
	I.13 Summary	225
	Scientific Explanations and the Four Causes	226
	Aristotelian Grounds and Humean Causes	230
	Aristotelian Explanations and the Deductive-Nomological Theory	230
	Demonstration, Teaching, and Ideal Explanations	231
XVIII	Our Knowledge of the Principles	235
	Perception and Science	237
	The Path to the Principles	240
	Grasping the Universals	244
	Induction	250
	<i>Noûs</i>	257
	Dialectic, Expertise, and the Principles	259
	The Kinds of Principles	267
	Assembling a Science	268
	Research and the Good Life	269
	Notes	273
	Bibliography	309
	Index Locorum	321
	General Index	335