

Contents

1	Perspectiva Naturalis/Artificialis	1
1.1	Perspective in the Classification of the Sciences	2
1.2	The Phases in the Development of Optics	4
1.3	The Similarities Between <i>Perspectiva</i> and Perspective	5
1.4	The Differences Between <i>Perspectiva</i> and Perspective	9
 Part I Errors		
2	Knowledge and Beliefs Regarding Linear Perspective	15
2.1	The Myth of Perspective	16
2.1.1	Filippo Brunelleschi	16
2.2	Perspective and Knowledge	23
2.2.1	Geometry and the Perspective of the Circle	23
2.2.2	Optics and Binocular Vision	30
2.3	Conclusion	33
3	Understanding Errors in Perspective	37
3.1	The Classification of Errors	38
3.2	Methods of Foreshortening	39
3.2.1	Correct Foreshortening	41
3.2.2	Under-Foreshortening	41
3.2.3	Over-Foreshortening	44
3.3	Some Examples of Erroneous Foreshortening in Renaissance Painting	45
3.4	Conclusion	51
4	Fact and Fiction Regarding Masaccio's <i>Trinity</i> Fresco	53
4.1	Recent Research	54
4.2	The Construction of the Vault Ribs	58
4.3	Masaccio's Use of the So-Called <i>Costruzione Legittima</i>	61
4.4	The Determination of the Viewing Distance	65
4.5	Conclusion	67

Part II Theory

5	Ibn al-Haytham on Binocular Vision	71
5.1	The Cases of Homonymous and Heteronymous Diplopia.	75
5.2	The Notion of Corresponding Points in Binocular Vision.	77
5.3	The Study of Physiological Diplopia (Experiments 1 and 2) . . .	79
5.4	The Determination of the Horopter (Experiments 3 and 4).	80
5.4.1	The Theoretical Horopter.	81
5.4.2	The Experimental Horopter	86
5.5	Panum's Fusional Area (Experiment 5)	89
6	The Legacy of Ibn al-Haytham	95
6.1	The Availability of the Texts of Ibn al-Haytham in the West.	95
6.2	Obstacles to the Binocular Theory of Vision	101
6.2.1	Physiological and Pathological Diplopia	102
6.2.2	Diplopia Is not an Unusual Phenomenon.	103
6.2.3	Images Are not Blurred in Diplopia	104
6.2.4	Different Theories Regarding the Unification of Binocular Images	105
6.2.5	Neutralization Is not Constant	111
6.3	Conclusion	114
7	The Rejection of the Two-Point Perspective System	115
7.1	In the Earliest Italian Art Academies	116
7.1.1	Vignola and Danti (1559–1583)	116
7.1.2	Martino Bassi (1572).	121
7.2	In the Circles of the Académie Royale de Peinture	122
7.2.1	Grégoire Huret (1670).	122
7.2.2	Sébastien Le Clerc (1679).	124
7.3	Conclusion	129

Part III Sifting the Hypotheses

8	The Properties of Two-Point Perspective	133
8.1	Typical Constructions	135
8.2	Perspectives in Which the Spectator Is not Placed at Infinity	136
8.3	Perspectives that Differ from Linear Perspective.	137
8.3.1	Central Perspective	137
8.3.2	Bifocal Perspective	140
8.3.3	Trifocal Perspective	146
8.4	The Principles of Binocular Perspective	146
8.4.1	The Vantage Point and the Vanishing Point	146
8.4.2	Depth Gives Rise to Disparate Images	147
8.4.3	The Determination of the Fixation Point	149

8.4.4	The Crossing of the Orthogonals on the Axis <i>Communis</i>	151
8.4.5	Examination of the Plans and Elevations.	155
8.4.6	An Exploration of the Relationship $FF' \propto XP/HX$	155
8.5	Conclusion	158
9	The Hauck–Panofsky Conjecture Regarding Curvilinear Perspective	161
9.1	Compositions Based on a Vanishing Axis	164
9.1.1	The Basis of Panofsky’s Interpretation	165
9.1.2	The Limitations of Panofsky’s Interpretation	167
9.2	Our Methodological Approach	167
9.2.1	Errors in Panofsky’s Reconstruction	167
9.2.2	The Criteria Used to Test Panofsky’s Hypothesis	168
9.3	Analysis of a Corpus of Works	171
9.4	Conclusion	174
10	The White–Carter Conjecture on Synthetic Perspective	177
10.1	The Mathematical Properties of Synthetic Perspective	181
10.1.1	The Case of Linear Perspective	182
10.1.2	The Case of Synthetic Perspective	184
10.2	Conclusion	186
11	De Mesa’s Hypothesis Regarding the Arithmetic Construction of Perspective	191
11.1	The Arithmetic Construction Hypothesis	194
11.2	The Absence of Multiples or Submultiples of the Measurement Units.	196
11.3	The Absence of Simple Proportional Ratios	203
11.4	The Length of the Operating Series	208
11.5	The Coincidence of Points at Infinity with Visible Loci	211
11.6	Reinterpreting Perspective Anomalies	212
	Conclusion	215
	Appendix A: Error Analysis and Perspective Reconstruction	225
	Appendix B: Catalogue of the Works	245
	Appendix C: Errors of Reconstruction	247
	Appendix D: Distance Between the Vanishing Points	249
	Appendix E: Plates	251
	Bibliography	267
	Index Nominum	283
	Index Rerum	289