



## Contents

---

**List of Illustrations**   xiii

**Series Foreword**   xxi

**Acknowledgments**   xxiii

**Reintroduction**   1

---

**The View from the Twenty-First Century**   1

---

**Augmenting a 1983 History of the Fourth Dimension in Culture and Art (1900–1950)**   15

**X-Rays and Ether Physics as the Context for the “Fourth Dimension”**   15

**Stuart Davis and Four-Dimensional Space-Time in the Era of Einstein**   27

---

**The Fourth Dimension 1950–2000: An Overview**   35

**“Keepers of the Flame” of the Fourth Dimension: László Moholy-Nagy, Marcel Duchamp, and Buckminster Fuller**   35

**Popular Literature on the Fourth Dimension in the 1950s–1960s, including the Writings of Martin Gardner**   46

**American Artists’ Responses to the Spatial Fourth Dimension in the 1960s: Robert Smithson and the Park Place Gallery Group**   56

**Vehicles for the Spatial Fourth Dimension in the 1970s and 1980s: *Expanded Cinema* and New Media; Computer Graphics and String Theory**   65

**The 1970s through the 1990s: The Four-Dimensional Art of Tony Robbin**   76

**The 1990s: From Hyperspace to Cyberspace and Marcos Novak’s Digital Architecture; New Developments in String Theory**   79

	<b>Concluding Thoughts</b>	<b>91</b>
	<b>Introduction</b>	<b>97</b>
<b>1</b>	<b>The Nineteenth-Century Background</b>	<b>101</b>
	Non-Euclidean Geometry	101
	The Geometry of $n$ Dimensions	105
	The Rise of Popular Interest in the New Geometries	111
<b>2</b>	<b>Cubism and the New Geometries</b>	<b>145</b>
	Paris 1900–1912: The Fourth Dimension and Non-Euclidean Geometry in Popular Literature	145
	The Visual Tradition of “The Fourth Dimension”	158
	Chronology of Events	165
	The Fourth Dimension and Non-Euclidean Geometry in Cubist Theory and Practice	176
	An Alternative View among the Cubists: The Theosophist Kupka	215
	Boccioni’s Italian Futurist Critique of Cubism’s Fourth Dimension	224
<b>3</b>	<b>Marcel Duchamp and the New Geometries</b>	<b>233</b>
	Duchamp’s Introduction to $n$ -Dimensional and Non-Euclidean Geometry	237
	The <i>Large Glass</i>	246
	The Notes in <i>A l’infinif</i>	252
	Later Works	277
<b>4</b>	<b>The Fourth Dimension and Non-Euclidean Geometry in America</b>	<b>289</b>
	Max Weber	291
	Gelett Burgess	311
	Claude Bragdon	314

	<b>New York 1913 and the Armory Show</b>	<b>332</b>
	<b>Wartime New York: Duchamp and the Arensberg Circle</b>	<b>349</b>
	<b>The 1920s</b>	<b>361</b>
<b>5</b>	<b>Transcending the Present: The Fourth Dimension in the Philosophy of Ouspensky and in Russian Futurism and Suprematism</b>	<b>371</b>
	<b>The Secondary Role of Non-Euclidean Geometry and Relativity Theory Before the Revolution</b>	<b>374</b>
	<b>Hyperspace Philosophy in Russia: Peter Demianovich Ouspensky</b>	<b>377</b>
	<b>Early Russian Futurism and Larionov's Rayonism</b>	<b>386</b>
	<b>The Fourth Dimension in Russian Futurist Philosophy: Matyushin and Kruchenykh</b>	<b>395</b>
	<b>The Fourth Dimension in the Art of Malevich</b>	<b>403</b>
	<b>The 1920s: El Lissitzky and Others</b>	<b>427</b>
<b>6</b>	<b>The New Geometries during World War I and the Postwar Period in France and Holland: Reevaluation and Transformation</b>	<b>435</b>
	<b>The Wartime Debate: Severini and Ozenfant</b>	<b>437</b>
	<b>Early De Stijl and the Fourth Dimension</b>	<b>453</b>
	<b>The Popularization of the Theory of Relativity in France</b>	<b>463</b>
	<b>Van Doesburg's Pursuit of an Art for the World of Space-Time</b>	<b>467</b>
	<b>Art and Relativity in the 1920s: An Overview</b>	<b>486</b>
	<b>Conclusion</b>	<b>491</b>
	<b>The New Geometries in Art and Theory 1900–1930</b>	<b>491</b>
	<b>The Fourth Dimension and Non-Euclidean Geometry in Art and Theory Since 1930</b>	<b>494</b>
	<b>Appendix A: The Question of Cubism and Relativity</b>	<b>511</b>
	<b>Appendix B: American Articles Popularizing the New Geometries, 1877–1920</b>	<b>523</b>

**Appendix C: Of the Book by Gleizes and Metzinger *Du Cubisme* 527**

**Notes 537**

**Bibliography from the 1983 Edition 657**

**Index to the Reintroduction 699**

**Index to the 1983 Edition 709**