## Contents for Volume II

48  The Revolutionary, The Reactionary and The Revivalist: Architecture and Mathematics After 1500 ................. 1
    Michael J. Ostwald and Kim Williams

Part VII  Theories of Representation
49  Architecture, Mathematics and Theology in Raphael’s Paintings ....... 31
    David Speiser

50  Raphael and the Pantheon’s Interior: A Pivotal Moment in Architectural Representation ......................... 43
    Kristina Luce

51  Design and Perspective Construction: Why Is the Chalice the Shape It Is? ............................................. 57
    Richard Talbot

52  Perspective in António Rodrigues’s Tratado de Arquitectura ....... 73
    João Pedro Xavier

Part VIII  1500 A.D.–1900 A.D.
53  Ottoman Architecture: Relationships between Architectural Design and Mathematics in Sinan’s Works ................. 95
    Zafer Sağdiç

54  The Mathematics of Palladio’s Villas ................................. 107
    Stephen R. Wassell

55  Golden Proportions in a Great House: Palladio’s Villa Emo ........ 121
    Rachel Fletcher

56  The Hidden Pavement Designs of the Laurentian Library .......... 139
    Ben Nicholson, Jay Kappraff, and Saori Hisano
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>57</td>
<td>Measuring up to Michelangelo: A Methodology</td>
<td>Paul A. Calter and Kim Williams</td>
<td>151</td>
</tr>
<tr>
<td>58</td>
<td>António Rodrigues, a Portuguese Architect with a Scientific Inclination</td>
<td>João Pedro Xavier</td>
<td>165</td>
</tr>
<tr>
<td>59</td>
<td>Villalpando’s Sacred Architecture in the Light of Isaac Newton’s Commentary</td>
<td>Tessa Morrison</td>
<td>183</td>
</tr>
<tr>
<td>60</td>
<td>Coelum Britannicum: Inigo Jones and Symbolic Geometry</td>
<td>Rumiko Handa</td>
<td>197</td>
</tr>
<tr>
<td>61</td>
<td>The Science Behind Francesco Borromini’s Divine Geometry</td>
<td>John G. Hatch</td>
<td>217</td>
</tr>
<tr>
<td>62</td>
<td>Transformational Geometry and the Central European Baroque Church</td>
<td>John Clagett</td>
<td>231</td>
</tr>
<tr>
<td>63</td>
<td>Are There Connections Between the Mathematical Thought and Architecture of Sir Christopher Wren?</td>
<td>Maria Zack</td>
<td>243</td>
</tr>
<tr>
<td>64</td>
<td>Robert Hooke’s Fire Monument: Architecture as a Scientific Instrument</td>
<td>Maria Zack</td>
<td>257</td>
</tr>
<tr>
<td>65</td>
<td>Practical and Theoretical Applications of Geometry at Claude Perrault’s Observatoire de Paris (1667–1672)</td>
<td>Randy S. Swanson</td>
<td>269</td>
</tr>
<tr>
<td></td>
<td><strong>Part IX 1800–2000</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>66</td>
<td>Geomantic (Re)Creation: Magic Squares and Claude Bragdon’s Theosophic Architecture</td>
<td>Eugenia Victoria Ellis</td>
<td>289</td>
</tr>
<tr>
<td>67</td>
<td>Mathematics and Music in the Art Glass Windows of Frank Lloyd Wright</td>
<td>Leonard K. Eaton</td>
<td>305</td>
</tr>
<tr>
<td>68</td>
<td>Fractal Geometry in the Late Work of Frank Lloyd Wright: The Palmer House</td>
<td>Leonard K. Eaton</td>
<td>325</td>
</tr>
</tbody>
</table>
70 From Cosmic City to Esoteric Cinema: Pythagorean Mathematics and Design in Australia ........................... 355
Graham Pont and Peter Proudfoot

71 The Ruled Geometries of Marcel Breuer ..................... 367
John Poros

72 Conoids and Hyperbolic Paraboloids in Le Corbusier’s Philips Pavilion ..................... 377
Alessandra Capanna

73 Oscar Niemeyer Curved Lines: Few Words Many Sentences ...... 389
Benamy Turkienicz and Rosirene Mayer

74 Dom Hans van der Laan and the Plastic Number .............. 407
Richard Padovan

75 Louis Kahn’s Platonic Approach to Number and Geometry ...... 421
Steven Fleming

76 The Salk: A Geometrical Analysis Supported by Historical Evidence ................................................. 435
Steven Fleming and Mark A. Reynolds

Part X Contemporary Approaches to Design and Analysis

77 Architecture and Mathematics: Soap Bubbles and Soap Films ...... 449
Michele Emmer

78 Aperiodic Tiling, Penrose Tiling and the Generation of Architectural Forms ............................. 459
Michael J. Ostwald

79 Paving the Alexanderplatz Efficiently with a Quasi-Periodic Tiling ........................................... 473
Ulrich Kortenkamp

80 Generation of Architectural Forms Through Linear Algebra ...... 483
Franca Caliò and Elena Marchetti

81 The Praxis of Roman Geometrical Ordering in the Design of a New American Prairie House .................. 497
Donald J. Watts

82 Exploring Architectural Form in Perspective: A Fractal Hypercube-Building .......................... 513
Tomás García-Salgado

83 The Compass, the Ruler and the Computer: An Analysis of the Design of the Amphitheatre of Pompeii .... 525
Sylvie Duvernoy and Paul L. Rosin
Correlation of Laser-Scan Surveys of Irish Classical Architecture with Historic Documentation from Architectural Pattern Books 541
Maurice Murphy, Sara Pavia, and Eugene McGovern

Part XI Theories and Applications of Computer Sciences

Mathematics and Architecture Since 1960 553
Lionel March

BiOrganic Design: A New Method for Architecture and the City 579
Alessandra Capanna

Formal Mutations: Variation, Constraint, Selection 593
Andrzej Zarzycki

The Role of Mathematics in the Design Process Under the Influence of Computational and Information Technologies 609
Arzu Gönenç Sorguç

Generative Design Grammars: An Intelligent Approach Towards Dynamic and Autonomous Design 619
Ning Gu

Ethics and Geometry: Computational Transformations and the Curved Surface in Architecture 633
Michael J. Ostwald

Equiangular Numbers 649
Henry Crapo and Claude Le Conte De Poly-Barbut

Architecture as Verb and the Ethics of Making 661
Alberto Pérez-Gómez

Index for Volume II 675
Index for Volume I 683
Architecture and Mathematics from Antiquity to the Future
Volume II: The 1500s to the Future
Williams, K.; Ostwald, M.J. (Eds.)
2015, XIX, 690 p. 365 illus., 79 illus. in color., Hardcover
ISBN: 978-3-319-00142-5
A product of Birkhäuser Basel