THE HISTORY OF CARTOGRAPHY

VOLUME ONE
EDITORIAL ADVISORS

Luís de Albuquerque  
J. H. Andrews  
Józef Babicz  
Marcel Destombes†  
O. A. W. Dilke  
L. A. Goldenberg  
George Kish  
Cornelis Koeman

Joseph Needham  
David B. Quinn  
Maria Luisa Righini Bonelli†  
Walter W. Ristow  
Arthur H. Robinson  
Avelino Teixeira da Mota†  
Helen M. Wallis  
Lothar Zögner

†Deceased

THE HISTORY OF CARTOGRAPHY

1

Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean

2

Cartography in the Traditional Asian Societies

3

Cartography in the Age of Renaissance and Discovery

4

Cartography in the Age of Science, Enlightenment, and Expansion

5

Cartography in the Nineteenth Century

6

Cartography in the Twentieth Century
THE HISTORY OF CARTOGRAPHY

VOLUME ONE

Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean

Edited by

J. B. HARLEY
and

DAVID WOODWARD

THE UNIVERSITY OF CHICAGO PRESS • CHICAGO & LONDON
Contents

List of Illustrations ix

Preface xv
J. B. Harley and David Woodward

1 The Map and the Development of the History of Cartography 1
The Historical Importance of the Map
Renaissance to Enlightenment: The Early Antecedents of the History of Cartography
The History of Cartography as Handmaiden: Traditional Themes from the Nineteenth Century
The Growth of a Scholarly Identity
J. B. Harley

PART ONE Cartography in Prehistoric Europe and the Mediterranean 43

2 Prehistoric Maps and the History of Cartography: An Introduction 45
Catherine Delano Smith

3 The Origins of Cartography 50
G. Malcolm Lewis

4 Cartography in the Prehistoric Period in the Old World: Europe, the Middle East, and North Africa 54
Prehistoric Maps and Historians of Cartography
The Source Material and Its Interpretation
Recognition of Topographical Maps by Antiquarians in European Rock Art
The Classification of Prehistoric Maps from Europe, the Middle East, and North Africa in the Prehistoric Period
Topographical Maps
Celestial Maps
Cosmological Maps
Conclusion
Catherine Delano Smith

5 Cartography in the Ancient World: An Introduction 105
O. A. W. Dilke

6 Cartography in the Ancient Near East 107
Babylonian Geographical Knowledge
Babylonian Mensuration and Calculation
Babylonian Plans
Babylonian Small-Scale Maps
Celestial Geography
Cartographic Knowledge in Syria and Palestine
A. R. Millard

7 Egyptian Cartography 117
Topographical Drawing and Religious Cartography
Turin Map of the Gold Mines
Land Survey, Cadastral Maps, and Building Plans
A. F. Shore

8 The Foundations of Theoretical Cartography in Archaic and Classical Greece 130
Circular Maps and the Flat Earth: Anaximander and His Successors in the Sixth Century B.C.
The Impact of New Theories on Cartography from the Sixth to the Fourth Century B.C.: Pythagoras, Herodotus, and Democritus
Theory into Practice: New Celestial Globes and Maps in the Fourth Century B.C.
Prepared by the editors from materials supplied by Germaine Aujac

9 The Growth of an Empirical Cartography in Hellenistic Greece 148
Exploration and Discovery in the Reform of the World Map
The Measurement of the Earth and the World Map by Eratosthenes
The Dissemination of Cartographic Knowledge
Prepared by the editors from materials supplied by Germaine Aujac

PART TWO Cartography in Ancient Europe and the Mediterranean 103

5 Cartography in the Ancient World: An Introduction 105
O. A. W. Dilke

6 Cartography in the Ancient Near East 107
Babylonian Geographical Knowledge
Babylonian Mensuration and Calculation
Babylonian Plans
Babylonian Small-Scale Maps
Celestial Geography
Cartographic Knowledge in Syria and Palestine
A. R. Millard

7 Egyptian Cartography 117
Topographical Drawing and Religious Cartography
Turin Map of the Gold Mines
Land Survey, Cadastral Maps, and Building Plans
A. F. Shore

8 The Foundations of Theoretical Cartography in Archaic and Classical Greece 130
Circular Maps and the Flat Earth: Anaximander and His Successors in the Sixth Century B.C.
The Impact of New Theories on Cartography from the Sixth to the Fourth Century B.C.: Pythagoras, Herodotus, and Democritus
Theory into Practice: New Celestial Globes and Maps in the Fourth Century B.C.
Prepared by the editors from materials supplied by Germaine Aujac

9 The Growth of an Empirical Cartography in Hellenistic Greece 148
Exploration and Discovery in the Reform of the World Map
The Measurement of the Earth and the World Map by Eratosthenes
The Dissemination of Cartographic Knowledge
Prepared by the editors from materials supplied by Germaine Aujac

v
10 Greek Cartography in the Early Roman World 161
Continuity and Change in Theoretical Cartography: Polybius, Crates, and Hipparchus
Maps and Globes in Education
The Map of the Inhabited World Recommended by Strabo
Prepared by the editors from materials supplied by Germaine Aujac

11 The Culmination of Greek Cartography in Ptolemy 177
Updating the World Map: Ptolemy’s Criticism of Marinus of Tyre
Ptolemy’s Instructions for Mapmaking
The Celestial Globe in the Almagest
The Climata in the Almagest
The Geography
Size and Dimensions of the Inhabited World in the Geography
Map Projections
Ptolemy as a Mapmaker: The Tables of Coordinates
Cartographic Insights from Ptolemy’s Topography: The Coordinates and the Regional Maps
Ptolemy’s Topography in the Coordinates and Maps: General Considerations
Ptolemy’s Coordinates: The Examples of the British Isles and Italy
Ptolemy’s Maps: Some Regional Examples
O. A. W. Dilke with additional material supplied by the editors

12 Maps in the Service of the State: Roman Cartography to the End of the Augustan Era 201
Etruscan Beginnings
Geographical and Cadastral Maps from the Republican Period
Geographical Maps
Agrippa’s World Map
Cadastral Maps
O. A. W. Dilke

13 Roman Large-Scale Mapping in the Early Empire 212
Survey Methods of the Agrimensores
The Corpus Agrimenorum
The Cadasters of Arausio
Large-Scale Town Maps: The Forma Urbis Romae
Engineering Plans for Tunnels and Aqueducts
O. A. W. Dilke

14 Itineraries and Geographical Maps in the Early and Late Roman Empires 234
Itineraries and the Peutinger Map
The Latin Geographical Manuscripts and Their Maps
Maps as Decorative and Symbolic Images
The Use of Maps in the Roman Period
O. A. W. Dilke

15 Cartography in the Byzantine Empire 258
Roman Influences: The Theodosian Map and the Ravenna Cosmography
Religious Cartography: Cosmas Indicopleustes and the Map Mosaics
The Greek Revival and Ptolemy’s Geography
The Greek Manuscripts of Ptolemy’s Geography
O. A. W. Dilke with additional material supplied by the editors

16 Cartography in the Ancient World: A Conclusion 276
O. A. W. Dilke

PART THREE Cartography in Medieval Europe and the Mediterranean 281

17 Medieval Maps: An Introduction 283
P. D. A. Harvey

18 Medieval Mappaemundi 286
The Context and Study of Mappaemundi
Map and Text
Terms
Realism versus Symbolism
Relationship of Mappaemundi to Other Medieval Maps
Problems in the Study of Mappaemundi
Classification Systems
Main Periods of Mappaemundi
Macrobius to Isidore: The Late Greco-Roman and Patristic Period
Bede to Lambert of Saint-Omer
Henry of Mainz to Richard of Haldingham
Pietro Vesconte to Fra Mauro: The Transitional Period to 1460
Themes in the Study of Mappaemundi
Form
Content and Meaning
Conclusions
David Woodward
19  Portolan Charts from the Late Thirteenth Century to 1500  371
   Introduction
   The Origin and Compilation of the Portolan Charts
   Drafting
   Stylistic Content
   Hydrographic Development
   Toponymic Development
   The Business of Chartmaking
   The Function of the Portolan Charts
   Conclusions
   Tony Campbell

20  Local and Regional Cartography in Medieval Europe  464
   Scope and Characteristics
   Origins and Development
   Maps of Palestine and Its Cities
   Maps of Italian Cities
   Northern Italian District Maps

The Isolarii: Buondelmonti's Liber Insularum Arcipelagi
Other Local Maps
Purpose and Use
Surveying and Mapping
Itinerary Maps and the Development of Maps Drawn to Scale
P. D. A. Harvey

21  Concluding Remarks  502
   Gaps and Discontinuities
   Cognitive Transformations
   Social Contexts
   J. B. Harley and David Woodward

List of Contributors  511
Bibliographical Index  513
General Index  559
Jeffrey Pinkham
Illustrations
With Tables and Appendixes

COLOR PLATES

(Following page 106)

1 The Star Fresco from Teleilat Ghassul, Jordan
2 Map in the Book of the Two Ways
3 The Thera fresco
4 Fresco from the Boscoreale villa, near Pompeii
5 The Peutinger map: Rome
6 The Notitia Dignitatum: Britain
7 The Madaba mosaic map
8 Jerusalem on the Madaba mosaic map
9 Map of the inhabited world from a thirteenth-century Byzantine manuscript of Ptolemy’s Geography
10 Emperor Charles IV with orb
11 Orb in the Last Judgment
12 The three sons of Noah
13 The Beatus map from the Silos Apocalypse
14 The Duchy of Cornwall mappamundi
15 Higden’s mappamundi: Oval type, mid-fourteenth century
16 Vesconte’s mappamundi, 1321
17 Western Europe in the Catalan atlas
18 The Fra Mauro map
19 Mappamundi of Pirrus de Noha
20 Mappamundi of Giovanni Leardo, 1448
21 The world map of Andreas Walsperger
22 The “Anglo-Saxon” map
23 An extended “normal-portolano”
24 The 1439 Valseca chart
25 A contemporary derivative of a portolan chart
26 A Catalan chart in the Italian style
27 An Italian chart in the Catalan style
28 Representation of the Madonna and Child
29 City flags
30 The Carte Pisane
31 Portrait of a chartmaker
32 The wheel diagram from the Catalan atlas
33 Rome from an undated manuscript of Ptolemy’s Geography
34 Map of the district around Verona
35 Plan of the Isle of Thanet, Kent
36 A portion of the boundary of the Duchy of Burgundy, 1460
37 Map of Inclesmoor, Yorkshire

FIGURES

4.1 Principal areas and sites associated with prehistoric rock art in the Old World 56
4.2 The prehistoric and historical time scale 57
4.3 The Rajum Hani’ stone 61
4.4 Elements in a modern topographical map 62
4.5 Cup-and-ring marks from Northumberland 65
4.6 Kesslerloch bone plaques 65
4.7 Kesslerloch lignite ornament 65
4.8 “Topographical figures” from Mont Bégo 67
4.9 Picture with possible map elements from Peñalsordo, Badajoz, Spain 69
4.10 Rock paintings from La Pileta, Malaga, Spain 69
4.11 Picture with possible map elements from I-n-Eten, Tassili Mountains, Algeria 70
4.12 Picture with possible map elements from the Tassili Mountains, Algeria 70
4.13 Picture with possible map elements: Side 4 of the Borno stone from Valcamonica 71
4.14 Paleolithic engraving on mammoth bone 71
4.15 The Tepe Gawra (Iraq) Landscape Jar 72
4.16 Picture map on the Tepe Gawra (Iraq) Landscape Jar 72
4.17 Picture map: The “Great Disk” from Talat N’lisk, Morocco 73
4.18 Picture map on the silver vase from Maikop, Russia 73
4.19 Picture map: The Neolithic wall painting from Çatal Hüyük, Turkey 74
4.20 Petroglyph map from Val Fontanalba, Mont Bégo 74
4.21 Petroglyph map from Val Fontanalba, Mont Bégo 74
<table>
<thead>
<tr>
<th>Illustrations</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noncartographic petroglyph from Val Fontanalba, Mont Bégo</td>
<td>7.1</td>
</tr>
<tr>
<td>Simple topographical map from Seradina, Italy</td>
<td>7.2</td>
</tr>
<tr>
<td>Photograph of Capo di Ponte, Valcamonica</td>
<td>7.3</td>
</tr>
<tr>
<td>Simple topographical map from Ponte San Rocco, Italy</td>
<td>7.4</td>
</tr>
<tr>
<td>The “Skin Hill Village” map from Val Fontanalba, Mont Bégo</td>
<td>7.5</td>
</tr>
<tr>
<td>The “Monte Bégo Village”</td>
<td>7.6</td>
</tr>
<tr>
<td>Composite petroglyph map from Bedolina, Valcamonica</td>
<td>7.7</td>
</tr>
<tr>
<td>Petroglyph map from Giadighe, Valcamonica</td>
<td>7.8</td>
</tr>
<tr>
<td>The Clapier rock, Italy</td>
<td>7.9</td>
</tr>
<tr>
<td>The limestone sculpture from Tarxien, Malta</td>
<td>8.0</td>
</tr>
<tr>
<td>Cup marks on stones at Venslev, Denmark</td>
<td>8.1</td>
</tr>
<tr>
<td>Cup marks on stones at Dalby, Denmark</td>
<td>8.2</td>
</tr>
<tr>
<td>The “Star Stone” from Tal Qadi, Malta</td>
<td>8.3</td>
</tr>
<tr>
<td>Celestial ladders</td>
<td>8.4</td>
</tr>
<tr>
<td>Tree of Life representations</td>
<td>8.5</td>
</tr>
<tr>
<td>Cosmographical sign on the Bagnolo stone</td>
<td>8.6</td>
</tr>
<tr>
<td>Cosmological map on a predynastic bowl from Egypt</td>
<td>8.7</td>
</tr>
<tr>
<td>Labyrinthlike rock painting from North Africa</td>
<td>8.8</td>
</tr>
<tr>
<td>Cosmological painting from the Magourata cave, Bulgaria</td>
<td>8.9</td>
</tr>
<tr>
<td>The Triora stela</td>
<td>9.0</td>
</tr>
<tr>
<td>Cosmological map: The gold disk from Moordorf</td>
<td>9.1</td>
</tr>
<tr>
<td>Principal places associated with maps in the ancient Near East</td>
<td>9.2</td>
</tr>
<tr>
<td>The Gudea statue, ca. 2141–2122 B.C.</td>
<td>9.3</td>
</tr>
<tr>
<td>The tablet on the Gudea statue</td>
<td>9.4</td>
</tr>
<tr>
<td>Fragment of a city map, probably Babylon</td>
<td>9.5</td>
</tr>
<tr>
<td>Fragment of a city map of Uruk</td>
<td>9.6</td>
</tr>
<tr>
<td>Fragment of a city plan, possibly Tūbu</td>
<td>9.7</td>
</tr>
<tr>
<td>Plan of Nippur, ca. 1500 B.C.</td>
<td>9.8</td>
</tr>
<tr>
<td>Plan of fields from Nippur, ca. 1500 B.C.</td>
<td>9.9</td>
</tr>
<tr>
<td>Map of Sippar and its surroundings, first millennium B.C.</td>
<td>10.0</td>
</tr>
<tr>
<td>The Babylonian world map, ca. 600 B.C.</td>
<td>10.1</td>
</tr>
<tr>
<td>Clay tablet map excavated at Yorgan Tepe</td>
<td>10.2</td>
</tr>
<tr>
<td>The Louvre tablet map</td>
<td>10.3</td>
</tr>
<tr>
<td>Illustrations</td>
<td></td>
</tr>
<tr>
<td>The main dynasties and periods of Egyptian history</td>
<td>118</td>
</tr>
<tr>
<td>Rudimentary topographic designs on Egyptian decorated pottery</td>
<td>118</td>
</tr>
<tr>
<td>Plan of an Egyptian garden</td>
<td>119</td>
</tr>
<tr>
<td>Sekhet-Hetepet, or the “Fields of Peace”</td>
<td>119</td>
</tr>
<tr>
<td>Cosmographical map: The land of Egypt with the goddess Nut</td>
<td>120</td>
</tr>
<tr>
<td>Celestial map of the planets, constellations, and zodiac</td>
<td>121</td>
</tr>
<tr>
<td>Map of gold mines from the Turin papyrus</td>
<td>122</td>
</tr>
<tr>
<td>The second section of the Turin papyrus</td>
<td>124</td>
</tr>
<tr>
<td>Plan of Egyptian tomb from the Valley of the Kings</td>
<td>126</td>
</tr>
<tr>
<td>Papyrus plan of Egyptian tomb</td>
<td>127</td>
</tr>
<tr>
<td>Architectural drawing from Dīr al-Baḥrī</td>
<td>127</td>
</tr>
<tr>
<td>Schematic plan of dikes and canals in the Faiyum</td>
<td>128</td>
</tr>
<tr>
<td>Plan of canal and palisade</td>
<td>129</td>
</tr>
<tr>
<td>Reconstruction of the shield of Achilles from Homer’s Iliad</td>
<td>130</td>
</tr>
<tr>
<td>Principal places associated with maps in the Greek world</td>
<td>133</td>
</tr>
<tr>
<td>The Aegean (detail of fig. 8.2)</td>
<td>133</td>
</tr>
<tr>
<td>Asia Minor from the third century B.C. (detail of fig. 8.2)</td>
<td>133</td>
</tr>
<tr>
<td>Reconstruction of the world according to Hecataeus</td>
<td>135</td>
</tr>
<tr>
<td>Reconstruction of Plato’s spindle of necessity</td>
<td>138</td>
</tr>
<tr>
<td>Mine diagram from Thorikos, Attica</td>
<td>139</td>
</tr>
<tr>
<td>The celestial circles</td>
<td>141</td>
</tr>
<tr>
<td>Reconstruction of latitude of observer</td>
<td>141</td>
</tr>
<tr>
<td>The Farnese Atlas</td>
<td>142</td>
</tr>
<tr>
<td>Detail of the Farnese Atlas</td>
<td>143</td>
</tr>
<tr>
<td>Cosmas’s schematic representation of the earth</td>
<td>144</td>
</tr>
<tr>
<td>Aristotle’s concept of the position and shape of the inhabited world</td>
<td>145</td>
</tr>
<tr>
<td>Aristotle’s system of the winds</td>
<td>145</td>
</tr>
<tr>
<td>The “ever-visible circle” at 66°N (a) and at 24°N (b)</td>
<td>146</td>
</tr>
<tr>
<td>Pytheas’s observation of the latitude of Marseilles</td>
<td>151</td>
</tr>
<tr>
<td>Reconstructed world map of Dicaearchus, third century B.C.</td>
<td>153</td>
</tr>
<tr>
<td>Timosthenes’ system of the winds</td>
<td>153</td>
</tr>
<tr>
<td>Eratosthenes’ measurement of the earth</td>
<td>155</td>
</tr>
<tr>
<td>The chlamys</td>
<td>156</td>
</tr>
<tr>
<td>Reconstruction of Eratosthenes’ Sphragides</td>
<td>157</td>
</tr>
<tr>
<td>Ionian coin map</td>
<td>158</td>
</tr>
</tbody>
</table>
Illustrations

10.1 Polybius’s estimate of the length of the western Mediterranean 162
10.2 Reconstruction of the globe of Crates of Mallos, ca. 150 B.C. 163
10.3 Coin of Lucius Aemilius Buca, 44 B.C. 164
10.4 The lion of Commagene 166
10.5 The meridian of Alexandria 167
10.6 Theodosius’s figure of a celestial sphere 168
10.7 Distances between the parallel circles according to Geminus 170
10.8 The reconstructed world of Dionysius Periegetes, a.D. 124 172
10.9 The shape of the inhabited world reconstructed from Strabo 175
11.1 Marinus’s projection reconstructed from Ptolemy’s description 180
11.2 Ptolemy’s instructions for constructing a star globe 182
11.3 A reconstruction of the world of Claudius Ptolemy 184
11.4 Ptolemy’s first projection 187
11.5 Ptolemy’s second projection 187
11.6 Ptolemy’s third projection 188
11.7 Ptolemy’s third projection as seen by the observer 188
11.8 Britain according to Ptolemy 193
11.9 The Mull of Galloway in different versions of Ptolemy 194
11.10 Britain represented as an obtuse-angled triangle 194
11.11 The Ptolemaic map of Italy 195
11.12 Comparison of Ptolemaic and modern coordinates of towns on the Via Aemilia, northern Italy 196
11.13 Centuriation in the Po valley around Parma and Reggio Emilia 196
12.1 Principal places associated with maps in ancient Italy and Sicily 202
12.2 The Bronze Liver of Piacenza 203
12.3 The Bronze Liver of Piacenza, side view 204
12.4 Caesar’s edict on the Hereford world map 206
12.5 The stone “map of Gaul” from the Roman camp at Mauchamp, France 207
12.6 The inscription on the Tusculum aqueduct 211
13.1 The method of numbering centuries 213
13.2 Inscription on a Roman surveyor’s tombstone 213
13.3 Reconstruction of a groma 214
13.4 A portable sundial, disassembled 215
13.5 A portable sundial, assembled 215
13.6 Roman areal units 216
13.7 Miniature of the centuriation around Tarracina, Italy 218
13.8 Miniature of the centuriation around Minturnae, Italy 219
13.9 Miniature of the centuriation around Hispellum, Italy 219
13.10 Ager Arcifinius 220
13.11 A ground plan from the Corpus Agrimensorum 221
13.12 Miniature from the Corpus Agrimensorum 221
13.13 Adjacent centuriation schemes 221
13.14 The mapping of smallholdings 221
13.15 The probable layout of Orange Cadaster A 222
13.16 Fragment 7 of Orange Cadaster A 223
13.17 The probable layout of Orange Cadaster B 224
13.18 Reassembled plaque III J from Orange Cadaster B 224
13.19 Orange Cadaster C 225
13.20 Fragment of a Roman plan 225
13.21 Plan of Roman baths 226
13.22 The “Urbino plan” 227
13.23 Vignettes from the Casae litterarum 228
13.24 The Isola Sacra fragment 229
13.25 Forma Urbis Romae 229
13.26 The Ludus Magnus on the Forma Urbis Romae 230
13.27 Aqueduct arches on the Forma Urbis Romae 230
13.28 The Cisiarii mosaic, Ostia 231
13.29 Heron’s technique for tunneling through a hillside 232
14.1 Principal places associated with itineraries and geographical maps from the Roman Empire 235
14.2 The Peutinger map: Western Asia Minor and Egypt 240
14.3 The Peutinger map: The eastern Mediterranean 241
14.4 Town signs on the Peutinger map 240
14.5 The Notitia Dignitatum: Lower Egypt 245
14.6 A sesterce of Nero showing Ostia harbor 246
14.7 The Ostia River mosaic 247
14.8 The Pesaro wind-rose map 249
14.9 The map on the Dura Europos shield 250
14.10 Principal place-names from the Dura Europos shield 250
14.11 Plan on a Roman lamp 251
14.12 Labyrinth designs on Cretan coins 251
15.1 The universe of Cosmas Indicopleustes 262
The world according to Cosmas Indicopleustes 263
The Nicopolis mosaic 264
The Beth-Alpha mosaic 267
India according to Eustathius of Byzantium 268
“Jerome” map of Asia 289
Christ’s head in the Ebstorf map 291
Christ’s left hand in the Ebstorf map 291
The tripartite type of mappamundi 297
The zonal type of mappamundi 297
The quadripartite type of mappamundi 297
The transitional type of mappamundi 297
Extant mappamundi: Absolute numbers by category from the eighth to the fifteenth century 298
Extant mappamundi: Relative numbers by category from the eighth to the fifteenth century 298
The Macrobian model of mappamundi 300
Isidorian T-O map 302
Isidorian T-O map with the Sea of Azov 302
Isidorian T-O map with the fourth continent 303
Mappamundi from Isidore 303
General stemma for the large Beatus maps 305
The treatise of Sacrobosco 307
The Vercelli map 308
The Vercelli map: Detail of Philip 309
The Ebstorf map 310
The Hereford map, ca. 1290 311
General stemma for the extant world maps of Ranulf Higden 313
A Higden world map: Mandorla type, mid-fifteenth century 313
A scale on a mappamundi 314
Sketch from the Vienna-Klosterneuburg corpus 317
Paradise on a Higden world map 319
Isidore’s view of the earth’s five zones 321
Demonstration of the earth’s sphericity in the thirteenth century 321
Reconstruction of Roger Bacon’s map projection 322
An eleventh-century graph 323
Map on vellum showing repair 325
The rivers of paradise 329
The Nile as an extension of the four rivers of paradise 330
Descendants of Noah 331
Cynocephali on the Borgia map 332
The wall about the kingdom of Magog 333
Prester John 333
T-O map with tau cross 334
The symbolism of the number four 335
Diagram of the elements from Isidore 337
Leardo world map, 1452 338
The mosaic of the goddess Fortuna 339
The twelfth-century world map of Henry of Mainz 341
Figures 18.43–18.79 comprise a graphic index characterizing the various types of mappamundi discussed.
Isidore T-O map 343
Sallust T-O map, west orientation 344
Sallust T-O map, south orientation 344
Sallust T-O map, Africa as the largest continent 344
Sallust T-O map with truncated rivers 344
Gautier de Metz T-O map 345
Miscellaneous T-O map, Y-O variant 346
Miscellaneous T-O map, symmetrical rivers 346
Miscellaneous T-O map, modified river Nile 346
Miscellaneous T-O map, high crossbar 346
Reverse T-O map 347
Y-O map with Sea of Azov 347
V-in-square map 347
The Albi map 348
The “Anglo-Saxon” map 348
Mappamundi by Matthew Paris 349
The Henry of Mainz world map 349
The Hereford map, ca. 1290 350
Orosian-Isidorian mappamundi 350
Mappamundi by Guido of Pisa, 1119 350
The Psalter map, thirteenth century 350
The Wiesbaden fragment 351
The Ebston map 351
Cosmas Indicopleustes’ map from the Christian Topography 351
Higden’s oval mappamundi 352
Higden’s circular mappamundi 352
Higden’s mandorla-shaped mappamundi 353
Macrobian zonal mappamundi 354
Zonal mappamundi by Lambert of Saint-Omer 354
Zonal mappamundi by William of Conches 354
Zonal mappamundi by Petrus Alphonsus 355
Tripartite/zonal mappamundi 355
Quadrripartite mappamundi: Beatus type 355
Vesconte’s mappamundi 355
The Catalan atlas, [1375] 356
Illustrations

18.78  Mappamundi from the Vienna-Klosterneuburg school  357
18.79  Mappamundi showing Ptolemaic influence 357
19.1  Physical characteristics of a portolan atlas 376
19.2  Major place-names on medieval portolan charts 379
19.3  A chart in an intermediate style 394
19.4  Scale bar on an early portolan chart 395
19.5  Compass rose from the Catalan atlas 396
19.6  Compass rose from the 1492 chart of Jorge de Aguiar 396
19.7  Rhumb line centers 397
19.8  Genoa and Venice in a fourteenth-century calendar diagram 398
19.9  Paleographic comparison (1) 402
19.10  Paleographic comparison (2) 403
19.11  The Cortona chart 405
19.12  The changing configuration of the British Isles (1) 408
19.13  The changing configuration of the British Isles (2) 408
19.14  The changing configuration of the British Isles (3) 408
19.15  The changing configuration of the British Isles (4) 409
19.16  Scandinavia by Bianco 409
19.17  The address to the reader on the 1403 Beccari chart 428
19.18  A timely postscript on a portolan chart 436
19.19  Istria in the Medici atlas 439
19.20  A toleta 442
19.21  The Black Sea on the 1409 chart of Albertin de Virga 445
19.22  A whaling scene 446
19.23  A combined lunar calendar and Easter table from a portolan atlas 447
20.1  Rosselli’s map of Florence, ca. 1485 465
20.2  Plan of the Holy Sepulcher 467
20.3  The plan of Saint Gall 468
20.4  Plan of Canterbury Cathedral and its priory 469
20.5  Plan of a water supply 470
20.6  Map of an area near Sluis, Zeeland 471
20.7  Plan from Winchester College 472
20.8  Plan of Vienna and Bratislava 474
20.9  Jerusalem 475
20.10  Palestine 475
20.11  Palestine by Vesconte 476
20.12  Bird’s-eye view of Rome 477
20.13  Verona 479
20.14  Map of Lombardy 480
20.15  The district of Padua 480
20.16  Map of Italy, ca. 1320 481
20.17  Corfu by Cristoforo Buondelmonti 483
20.18  Cos by Cristoforo Buondelmonti 483
20.19  Principal places in England associated with medieval local maps 484
20.20  Plan of Clenchwarton, Norfolk 485
20.21  Principal places in the Low Countries associated with medieval local maps 486
20.22  Map of the Picardy-Netherlands border, 1357 487
20.23  Map of part of Overflakkee, South Holland 487
20.24  The lower Scheldt, 1468 488-89
20.25  Principal places in Central Europe and Italy associated with medieval local and regional maps 490
20.26  Map of the county of Gâpençais 491
20.27  Talamone harbor, 1306 492

Tables

10.1  Posidonius’s terrestrial zones 169
11.1  Selected Greek manuscripts of Ptolemy’s Geography 192
12.1  Ancient measurements for Sicily in Roman miles 209
18.1  Comparison of the main features of classification of mappaemundi 295
18.2  Proposed classification of mappaemundi 295
18.3  Dates of translation of the main Greek and Arabic manuscripts of cartographic interest into Latin 306
18.4  Survey of representational styles of selected medieval maps 327
18.5  List of the main semimythical races found on mappaemundi 331
18.6  The number four and its symbolic association with medieval mappaemundi 336
19.1  Flags and chartmakers’ response to political change 400
19.2  The cartographic record of the western coast of Africa 412
19.3  Significant place-name additions from dated works applied to undated atlases and charts 416
19.4  Adriatic names between Otranto and Vlorë (Valona) on the three relevant sheets of the Medici atlas 448
**APPENDIXES**

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>List of prehistoric maps</td>
<td>93</td>
</tr>
<tr>
<td>4.2</td>
<td>Short list of prehistoric landscape figures</td>
<td>97</td>
</tr>
<tr>
<td>8.1</td>
<td>Definitions of some basic terms relating to the celestial sphere</td>
<td>146</td>
</tr>
<tr>
<td>15.1</td>
<td>Greek manuscripts of Ptolemy's <em>Geography</em></td>
<td>272</td>
</tr>
<tr>
<td>18.1</td>
<td>Reference guide to types of <em>mappaemundi</em></td>
<td>343</td>
</tr>
<tr>
<td>18.2</td>
<td>Chronological list of major medieval <em>mappaemundi</em>, A.D. 300–1460</td>
<td>359</td>
</tr>
<tr>
<td>19.1</td>
<td>Calendars as a guide to dating: The case of the Medici and Pinelli-Walckenaer atlases</td>
<td>446</td>
</tr>
<tr>
<td>19.2</td>
<td>Biographical index to the atlases and charts produced up to 1500</td>
<td>449</td>
</tr>
<tr>
<td>19.3</td>
<td>Atlases and charts known by name</td>
<td>459</td>
</tr>
<tr>
<td>19.4</td>
<td>Chronological index of the atlases and charts produced up to 1500</td>
<td>460</td>
</tr>
<tr>
<td>19.5</td>
<td>Methodology of the toponymic analysis</td>
<td>461</td>
</tr>
<tr>
<td>20.1</td>
<td>Chronological list of local maps from northern Italy before 1500</td>
<td>498</td>
</tr>
<tr>
<td>20.2</td>
<td>Chronological list of local maps and plans from England before 1500</td>
<td>498</td>
</tr>
<tr>
<td>20.3</td>
<td>Chronological list of local maps and plans from the Low Countries before 1500</td>
<td>499</td>
</tr>
</tbody>
</table>