In the millennium that links the ancient and modern worlds, from about the fifth to the fifteenth century after Christ, there developed a genre of world maps or map-paintings originating in the classical tradition but adopted by the Christian church. The primary purpose of these mappaemundi, as they are called, was to instruct the faithful about the significant events in Christian history rather than to record their precise locations. They rarely had a graticule or an expressed scale, and they were often schematic in character and geometric—usually circular or oval—in shape. Although several maps fitting this description are also found in the medieval Arabic culture or the cosmographies of South and East Asia during this period (as described in volume 2), the western mappaemundi form a well-defined group. They provide a body of documents whose form, content, and meaning reflect many aspects of medieval life.

THE CONTEXT AND STUDY OF MAPPAEMUNDI

MAP AND TEXT

In the Middle Ages, the word (especially the oral word) was predominant over the image and was prescribed as such by the nature of the biblical narrative and the views of the early church fathers. Saint Gregory the Great stated that pictures were for the illiterate what the Scriptures were for those who could read. What then was the role of the mappaemundi, and at what audience were they aimed? Were they merely illustrations, subservient to the text and adding little in the way of information, or were they independently valuable?

The answers to these questions depend greatly on the type of mappamundi under discussion. The making of world maps was not an identifiably separate activity in the medieval period. Their makers were not called cartographers and did not form a characteristic group as, for example, the portolan chartmakers seem to have done by the fourteenth century. Some 900 of the 1,100 surviving mappaemundi are found in manuscript books. Moreover, they seem not to have required the services of a specialized scribe: the lettering on the maps and the adjacent text, for example, can usually be identified as being in the same hand. The vast majority of the maps that survive were produced as ipso facto book illustrations. In the late Middle Ages of the fourteenth and fifteenth centuries, there was a tendency to place maps on the first or second page of a codex, which may reflect the growing importance of maps in giving the reader an overview of the text.

The relation between map and text is also seen in the frequent reliance on early texts as sources for the compilation of mappaemundi. This raises the general question of how efficiently a map could be drawn from verbal directions, particularly without benefit of a list of coordinates from which places could be plotted. Modern reconstructions from textual sources of the lost maps of Herodotus, Eratosthenes, Strabo, Agrippa, the Ravenna cosmographer, Marco Polo, and others, attempted by geographers and historians in the nineteenth and early twentieth centuries, illustrate the potential difficulties of such exercises.

However, there were large and detailed mappaemundi, particularly in the later Middle Ages, that were conceived and drawn as independent documents, though only a handful survives. Since these contained extensive text or rubrics, they can hardly have been designed only for the illiterate. There is other evidence that such maps appealed strongly to a learned audience. Jacques de Vitry, the thirteenth-century bishop of Acre, specifically

The author gratefully acknowledges the assistance of Peter Arvedson, Tony Campbell, William Courtenay, O. A. W. Dilke, P. D. A. Harvey, Frank Horlbeck, George Kish, Mark Monmonier, and Juergen Schulz in the preparation of this chapter.


mentioned that he found a _mappamundi_ to be a useful source of information. Fra Paolino Veneto, an early fourteenth-century Minorite friar, was also explicit in endorsing their value:

I think that it is not just difficult but impossible without a world map to make [oneself] an image of, or even for the mind to grasp, what is said of the children and grandchildren of Noah and of the Four Kingdoms and other nations and regions, both in divine and human writings. There is needed moreover a twofold map, [composed] of painting and writing. Nor wilt thou deem one sufficient without the other, because painting without writing indicates regions or nations unclearly, [and] writing without the aid of painting truly does not mark the boundaries of the provinces of a region in their various parts sufficiently [clearly] for them to be described almost at a glance. 

### TERMS

The term _mappamundi_ (plural _mappaemundi_) is from the Latin _mappa_ (a tablecloth or napkin) and _mundus_ (world). Since their geometric construction was by no means consistent, _mappamundi_ can thus be distinguished from the planisphere (Italian _planisfero_), which usually refers to a world map that has been consciously constructed according to the principles of transformation from a spherical to a flat surface and whose primary purpose is location-related. The early use of the planisphere was in astronomical charts employing a stereographic projection, as in Ptolemy’s *Planisphaerium*.

It should be stressed that this rather restrictive meaning of the term _mappamundi_ was not the contemporaneous use. In the thirteenth and fourteenth centuries, for example, the term was used generically to mean any map of the world, whether in the style of the portolan chart or not. Thus in a contract for world maps at Barcelona in 1399–1400, the terms _mappamundi_ or _mappaemundi_ and _carta da navigare_ or _carte da navigare_ were all used interchangeably. In modern Italian, the term _mappamondo_ is of broad significance and even specifically includes globes.

Nor was the term used in classical Latin of the late Roman era, where the preference was for _forma_, _figura_, _orbis pictus_, or _orbis terrarum descriptio_. _Figura_ was usually reserved for the small diagrams in manuscripts that functioned as scientific illustrations. The eighth-century Beatus of Liebana used _formula picturarum_. For medieval Latin, Du Cange defines _mappa mundi_ as an “expository chart or map, in which a description of the earth or the world is contained.” In the late Middle Ages other terms were also used, such as _imagines mundi_, _pictura_, _descriptio_, _tabula_, or even the _estoire_ of the Hereford map, although _mappamundi_ was by far the most common. On the Ebstorf map we find a rubric

that may be rendered: “A map is called a figure, whence a mappa mundi is a figure of the world.” _Imago mundi_ usually indicated a theoretical treatment of cosmography rather than a graphic description.

It is unwise to assume that _mappamundi_ necessarily meant a graphic depiction of the world. It is common to find the term used to mean a verbal description in a metaphorical sense, much as we talk today of “mapping a strategy.” For example, when Ranulf Higden wrote of a _mappamundi_ in the *Polychronicon*, he was referring not to the world map that frequently accompanies it, but to a verbal description of the world. A manuscript in the British Library entitled *“Mappa mundi sive orbis descriptio”* is also purely a textual account. Peter of Beauvais was the author of a French verse “*mappamonde*” for Philip of Dreux, bishop of Beauvais (fl. 1175–1217). This use of the term was still common


5. According to Thomas Philipps, “*Mappae Clavicula: A Treatise on the Preparation of Pigments during the Middle Ages*,” _Archaeologia_ 32 (1847): 183–244, the word _mappa_, as in _Mappae clavicula_, the late twelfth-century technical treatise, could also mean drawing or painting. In classical Latin the term could also mean a starting cloth for chariot races.


10. _Imago mundi_ (or its translated equivalent) appears as the title of several medieval cosmographical works, including those by Honorius Gautier de Metz, and Pierre d’Ailly.

11. This theme is well developed in Ruberg, “*Mappae Mundi,*” 552–55 (note 2).


into the eighteenth century: thus an eighteenth-century manuscript version of the thirteenth-century Spanish geography, the Semearia del mundo, was entitled Mappa mundi. The late twelfth- to early thirteenth-century chronicler Gervase of Canterbury described a gazetteer of religious houses in England, Wales, and part of Scotland as a mappa mundi.

REALISM VERSUS SYMBOLISM

Two themes relating to the geographical utility of medieval world maps can be identified in the literature since the late nineteenth century. On the one hand, Beazley’s desire to view the mappaemundi as a static phase in the gradually improving representation of the earth’s features resulted from an assumption, shared by many other authors, that the sole function of maps was to provide correct locations of geographical features. In his basic work on medieval geography, he was to dismiss two of the most celebrated mappaemundi with the following words: “the non-scientific maps of the later Middle Ages . . . are of such complete futility . . . that a bare allusion to the monstratosities of Hereford and Ebstorf should suffice.” This view was challenged by John K. Wright who pointed out that since geometric accuracy in the mappaemundi was not a primary aim, the lack of it could hardly be criticized. We are now accustomed to the notion that Euclidean geometry is by no means the only effective graphic structure for ordering our thoughts about space: distance-decay maps, in which logarithmic or other scalars modify conventional latitude and longitude, were among the first products of the digital mapping age, but the concept is far from new. The twelfth-century map of Asia known as one of the “Jerome” maps exaggerates Asia Minor—its main point of interest—to the point that it is almost as large as the representation of the rest of Asia (fig. 18.1). A legend on the Matthew Paris map of Britain also demonstrates how map scale could be adjusted to fit the circumstances: “if the page had allowed it, this whole island would have been longer.”

The geographical content of the mappaemundi was not always solely symbolic and fanciful, however. Crone has demonstrated that, in the case of the Hereford map, its content was expanded from time to time using available resources, providing a more or less continuous cartographic tradition from the Roman Empire to the thirteenth century. The scribe of the Hereford map seems to have systematically plotted lists of place-names on the map from various written itineraries, in an attempt to fulfill a secular as well as a spiritual need. Far from being a mere anthology of mythical lore, the map was thus also a repository of contemporary geographical information of use for planning pilgrimages and stimulating the intended traveler.

The second theme, which Bevan and Phillott introduced as early as 1873, draws attention to the historical or narrative function of the medieval world maps. This theme has recently been developed in detail by Anna-Dorothee von den Brincken in a series of articles where the mappaemundi are seen as pictorial analogies to the medieval historical textual chronicles. Von den
FIG. 18.1. "JEROME" MAP OF ASIA. This twelfth-century manuscript map illustrating the writings of Saint Jerome (fourth/fifth century) exaggerates its principal area of interest, Asia Minor, to be almost as large as the rest of Asia. Such variations in metrical scale were common in mappaemundi.
Brincken illustrates this historical function by listing, in a series of tables, the place-names appearing on twenty-one selected maps. In addition to the expected frequent occurrence of the centers of Christianity (Jerusalem, Rome, Constantinople, Antioch, and Patmos), a surprising number of secular places of historical interest are found—such as Olympus, Taprobane, and Bergamon—together with several secular places of particular interest at the time, such as Kiev, Novgorod, Samarkand, and Georgia. More specialized studies on the early appearance of place-names on medieval maps confirm this view. For example, the tenth-century Cotton map contains an early reference to Bulgaria.25

The *mappaemundi* may thus be seen as analogous to the narrative medieval pictures that portray several events separated by time and included within the same scene. Instead of being presented in sequence as in a frieze or cartoon, they are placed in their logical positions in the picture. For the *mappaemundi*, this meant the approximate geographical or topological location of the event.26

The origins of the didactic world map can be traced to late antiquity. It seems that maps had a place in everyday life. Eumenius, a teacher and orator of distinction, delivered a discourse in A.D. 297 on the subject of restoring the well-known Roman school at Augustodunum in Gaul, present-day Autun. Among other admonitions, he advised that schoolboys should be made to study geography, using furthermore the *mappamundi* found in the portico of the Autun school.27

The medieval view of the *mappaemundi* seems to have been expressed by Hugh of Saint Victor about 1126: “We must collect a brief summary of all things... which the mind may grasp and the memory retain with ease. The mind chiefly esteems events by three things: the persons by whom deeds were done, the places in which they were done, and the times when they were done.”28

There was more than a mnemonic function, however. The monumental size and method of display of some of these world maps suggest that there was also a public iconographic role: thus the Agrippa map (see pp. 207–9) and the one referred to by Eumenius above may have stood for the dominance of the Roman Empire over most of the world. Medieval literature and the *mappaemundi* both mirrored this classical symbolism and adapted this function to religious ends. The medieval romances, particularly those describing the exploits of the classical heroes, frequently use a *mappamundi* as a symbol of military dominance. In medieval religious life, a *mappamundi* might stand as a representation of the world, for the transitoriness of earthly life, the divine wisdom of God, the body of Christ, or even God himself. The Godlike image is best seen in the Ebstorf map, where the head, hands, and feet of Christ are represented at the four cardinal directions, with the map itself standing for the body of Christ (figs. 18.2 and 18.3).29

Another illustration of a similar metaphor is seen in the many diagrammatic views of the tripartite globe represented as an orb held in the left hand of a sovereign, Christ (as *Salvator mundi*), or God the Father. Usually the threefold division is drawn in perspective so as to conform to the shape of the globe, as in plate 10. The representation of the orb as a symbol of imperial or royal power was derived from Roman times where it appears on many coins of the late Roman period.30 A simple version of the globe also sometimes appears under Christ’s feet in representations of the Last Judgment, as in plate 11. Less schematic but still decorative and symbolic representations are found in the much-reproduced world map in Jean Mansel, *La fleur des histoires*, which clearly represents a spherical earth divided among the three sons of Noah (plate 12).31

RELATIONSHIP OF MAPPAEMUNDI TO OTHER MEDIEVAL MAPS

With an obvious exception in the curious maps of Opicinus de Canistris and the transitional maps discussed later,32 most medieval mappaemundi share no obvious formal or functional similarities with other maps of the period such as the portolan charts and the regional, topographical, or cadastral maps. The geographical content of the first portolan charts in the late thirteenth century bears no apparent relationship to that of the mappaemundi of the time.33 It is difficult to agree with Beazley that “the absurdities of Dark Age map-making are precursors of the first accurate charts and modern atlases”34 unless the term “precursor” is simply used chronologically. Indeed, the fact that the Carte Pisane (to which Beazley was referring) and the Hereford map are products of the same age exemplifies how two cartographic genres can exist side by side. These two maps appear to have been compiled in quite different environments, assuming entirely different functions and structured in different ways. The former is of mercantile origin, the second monastic.


33. The portolan charts do not appear to have had any visible influence on other maps before the thirteenth century, thus joining other strong evidence that controverts the hypothesis of Charles H. Hapgood, *Maps of the Ancient Sea Kings: Evidence of Advanced Civilization in the Ice Age,* rev. ed. (New York: E. P. Dutton, 1979), and other writers that the origin of portolan charts extends back to preclassical times.

In the later Middle Ages, three distinct methods of compiling maps existed side by side. The portolan chart seems to have been constructed incrementally (from the inside out, as it were), relying on the natural closures provided by the basins of the Mediterranean Sea and being bounded only by the natural shape of the vellum on which it was drawn. The mappaemundi appear to have been compiled with the assumption that there was a finite amount of information to be fitted into a predetermined bounding shape, be it a rectangle, circle, oval, or other geometrically definable figure. This space is often partitioned schematically into segments. A third system assumed a regular net of parallels and meridians into which geographical information could be placed. Although described in an astronomical, astrological, and geometric context in the Middle Ages long before the reception of Ptolemy’s Geography into the West, rectangular and spherical coordinate systems for terrestrial mapping were not fully accepted until the fifteenth century. These three cartographic systems existed in largely separate traditions until the portolan charts began to influence the later mappaemundi in the early fourteenth century and the Ptolemaic manuscripts of the Geography overturned Western notions of mapmaking in the fifteenth.

Such was the practical value of the portolan charts, however, that by the fourteenth century their influence was being revealed in the mappaemundi. Although the usually circular form of the map was retained, therefore, accurate outlines of the Mediterranean Sea and other areas traditionally found on the portolan charts, together with their characteristic rhumb lines, are frequently found on mappaemundi from the fourteenth century. In the fifteenth, even graphic scales were sometimes added.

There was a closer and earlier affinity between the mappaemundi and the regional maps and itineraries. Regional maps were also compiled by authors in the monastic tradition, and the larger-scale maps were no doubt used as source material for the smaller, their style and content often being similar. In some cases the extent of the regional maps was so large, as in the “Jerome” map of Asia, that they have been mistaken for fragments of world maps.35 The use of pilgrim and trade-route itineraries, some of which dated from Roman times, was also a common practice in compiling the mappaemundi. For example, Crone has made a careful analysis of the use of these sources in the Hereford map.36

PROBLEMS IN THE STUDY OF MAPPAE MUNDI

As in other aspects of the history of cartography, scholars wishing to study medieval mappaemundi have found major difficulties. These include the incompleteness of the record, the difficulty of compiling general works summarizing the widely scattered literature from many fields, and the large capital cost of preparing published catalogs and facsimile atlases from which comparisons could be made. The need for these tools was recognized as the value of mappaemundi as cartographic, historical, and artistic documents came to be fully realized. This was not until the middle of the nineteenth century, but since then there have been several landmark texts that have improved the situation.

Skelton believed that the wastage or loss of maps up to the sixteenth century was more severe than that for any other type of historical document.37 Although we may prefer to be less categorical, there is direct literary evidence that many medieval maps have not come down to us. Some of these would have been large and considered important at the time. The list of major mappaemundi in appendix 18.2 provides many examples. We also know by inference from later versions of such world maps as those of Orosius, Isidore, and Macrobius that the key prototypes in the early medieval period are missing. For the later period, the few inventories of monastic libraries that have been published are excellent sources of references to mappaemundi that apparently existed as separate items.38 The frequency of these allusions suggests that many more large mappaemundi were lost than have come down to us. This underlines the need to admit to the imperfect or provisional nature of the conclusions drawn from such an incomplete sample.39

The first general study of mappaemundi was that of Manuel Francisco de Barros e Sousa, second viscount of Santarém (1791–1856). Although Santarém had drawn attention to those of his predecessors who had shown more than passing interest in the subject, such as William Playfair (1759–1823) and Placido Zarla (1769–1834), it was Santarém himself who first attempted a general synthesis of the subject. His work, accompanied by a magnificent facsimile atlas of 117 mappaemundi, of which only 21 had previously been published, is still a useful summary.40 Major contemporaries of Santarém

38. [Leo Bagrow], “Old Inventories of Maps,” Imago Mundi 5 (1948): 18–20, and additions in later volumes of Akademie der Wissenschaften, Vienna, Mittelalterliche Bibliotheks­­­catalo­ge Öster­re­ichs (Vienna, 1915–71), and Akademie der Wissenschaften, München, Mittelalterliche Bibliotheks­­­catalo­ge Deutsch­­land­s und der Schweiz (München, 1918–62); see also Schulz, “Moralized Geography,” 449–50 (note 23).
39. Skelton, Maps, 26 (note 37).
40. Manuel Francisco de Barros e Sousa, Viscount of Santarém, Essai sur l’histoire de la cosmographie et de la cartographie pendant
(in some cases his rivals) who made significant contributions to the general history of medieval world maps included Edme-François Jomard (1777–1862), Joachim Lelewel (1786–1861), and Marie Armand Pascal d’Avezac-Macaya (1799–1875). The contribution of Jomard, the head of the map department of the Bibliothèque Impériale, was a rival facsimile atlas that contained thirty medieval world maps.41 Lelewel’s work, again accompanied by a small facsimile atlas, stressed the Arabic and not the Western contribution to the genre, clearly an unusual slant for the period. It was the subject of a detailed review by Santarém.42 D’Avezac-Macaya, although he helped Santarém with his facsimile atlas, for which he is acknowledged, is better known for his work on individual maps and the history of projections.43 However, nothing rivaling the importance of Santarém’s study and atlas appeared until the six-volume survey of mappaemundi by Konrad Miller (1866–1944).44 This thorough and careful work was extremely well received and was rapidly accepted as the standard text, as is shown by reviews.45

While Miller’s volumes were being published, Charles Raymond Beazley (1858–1951) was producing his three-volume history of geographical travel and exploration in the Middle Ages.46 Beazley did not always appreciate the full meaning of the mappaemundi, but he was well aware of the importance of maps in revealing the geographical spirit of the age. He thoroughly described almost all the major world maps of the period in a series of chapters and appendixes, arranged chronologically, and his work—along with Miller’s—still provides a wealth of detail not available elsewhere.

On balance, Beazley’s three-volume work was more a contribution to the history of geographical exploration than to the history of geographical thought. It was the historians of science who developed the framework for the history of medieval cosmographical concepts. Pierre Duhem’s multivolume survey still remains a standard source for the subject,47 despite more recent claims that his approach suffers from “precursorism.”48 Other historians of science and technology, including the founder of the modern field of that study in Europe and America, George Sarton, made detailed if scattered contributions to the subject in Introduction to the History of Science, as did the team of historians working for the seven-volume History of Technology under the leadership of Charles Singer.49 The influence of the Harvard historian of science Charles Haskins must also be specifically mentioned:50 his student John K. Wright’s doctoral dissertation led to his Geographical Lore, a masterly work with several chapters on the cartography of the period and an excellent bibliography.51 Among the most original contributions to the study of the late period of medieval cartography, however, was Dana Bennett Durand’s monograph on the Vienna-Klosterneuburg map corpus, based on his doctoral dissertation submitted to Harvard’s history department under the supervision of Sarton. Durand demonstrated the previously unrecognized existence of a group of maps in the fifteenth century that was partly independent of both the Ptolemaic and the medieval traditions of regional and world maps and that appeared to form a transitional link between medieval and Renaissance cartography. He also provided a useful summary on the cultural context of these maps.52


44. Miller, Mappae mundi (note 9). Miller’s sequel to this work, Mappae Arabicae, 6 vols. (Stuttgart, 1926–31), was less successful, as will be discussed in the Asian volume of this History (volume 2).


46. Beazley, Dawn of Modern Geography (note 17).


51. Wright, Geographical Lore (note 18).

By far the most useful reference work for the comparison of medieval
mappaemundi yet to appear is the sixteen-volume facsimile atlas initiated and financed by
Prince Youssouf Kamal but compiled by Frederik Caspar Wieder (1874–1943). Although confined to maps
illustrating the exploration and discovery of Africa, it contains almost all major medieval maps that include
Africa, reproduced photographically, making it the single most valuable source of illustrations of these
maps. The work has two main drawbacks: first, it lacks specific descriptions of the maps reproduced, except
where they relate to the discovery of Africa, and second, the distribution of the work was limited to one hundred
copies.

In addition to the many accounts and chapters in general works on the history of maps of varying completeness
and accuracy, there have also been some outstanding encyclopedia articles on the subject. The most
valuable recent general book-length treatment of the historiography, context, form, and allegorical content of
mappaemundi is the doctoral dissertation of Jörg-Geerd Arentzen. This work also has a particularly valuable
general bibliography.

Systematic comparative work on mappaemundi depends on a general census. Some catalogs of maps in
national libraries and listings of maps (including mappaemundi) held in particular countries, such as the one
for Italy by Uzielli and Amat di San Filippo and the one for Germany by Ruge, had been published by 1916, but
the idea for a general listing of medieval maps was not proposed until 1949, by Marcel Destombes at the
Sixteenth International Geographical Congress in Lisbon, and a Commission on Early Maps was formed to
prepare a four-volume catalog of medieval maps, as follows: 1. mappaemundi; 2. nautical charts; 3. regional
maps, including Ptolemy; and 4. printed maps. Volume 4 appeared in preliminary form in 1952, and the rev-
ised and enlarged version awaits publication. Volume 1, covering the manuscript mappaemundi, appeared in
1964. Work for the other volumes has not yet been undertaken.

CLASSIFICATION SYSTEMS

These works contain several attempts at the classification of mappaemundi, summarized in table 18.1. A satis-
factory classification would be useful to the scholar wishing to bring order to the diverse images of the mappa-
emundi by drawing attention to differences in form and origin and by providing a satisfactory vocabulary for
describing the maps. For mappaemundi the availability of the International Geographical Union’s census
makes this task much easier. The utility of the classification can be tested by checking the number of entries
in the catalog failing to fit the categories provided. Previously developed systems of classification are now re-
viewed, and the system proposed is presented in table 18.2. It requires considerable care to classify a large number
of scattered artifacts into empirically satisfactory categories. While Santarém may be credited with the idea of
publishing a large facsimile atlas of medieval mappaemundi, making comparison possible for the first time, he
settled for a simple chronological ordering rather than a classification of the maps according to their sources.
Nor did Konrad Miller propose a systematic classification, his book being subdivided rather by the emphasis he wished to place on certain single maps or maps by a single author. Thus, for example, Beatus, the

55. Although the following is only a small sample, such general accounts include W. W. Jervis, The World in Maps: A Study in Map
Evolution (London: George Philip, 1936), 68–86; George H. T. Kimberly, Geography in the Middle Ages (London: Methuen, 1938), 181–
204; Lloyd A. Brown, The Story of Maps (Boston: Little, Brown, 1949; reprinted New York: Dover, 1979), 81–112; Gerald R. Crone, Maps
and Their Makers: An Introduction to the History of Cartography, 5th ed. (Folkestone, Kent: Dawson; Hamden, Conn.: Archon Books,
1978), 5–9, 19–33; Joachim G. Lethäuser, Mappae mundi: Die geistige Eroberung der Welt (Berlin: Safari-Verlag, 1958), chaps. 2 and 3;
C. A. Watts, 1964), 41–73; S. M. Ziauddin Alavi, Geography in the Middle Ages (Delhi: Sterling, 1966); Cortesão, History of Portuguese
Cartography, 1:150–215 (note 34). Encyclopedia articles include those by various authors in Paulys Realencyclopädie der klassischen Alter-
tumswissenschaft, ed. August Pauly, Georg Wissowa, et al. (Stuttgart: J. B. Metzler, 1894–); Otto Hartig, “Geography in the Church,” in
pedia italiana di scienze, lettere ed arti, originally 36 vols. ([Rome]: Istituto Giovanni Treccani, 1929–39), 9:232; Ernest George Raven-
and Vincent Cassidy, “Geography and Cartography, Western Europe,” in Dictionary of the Middle Ages, ed. Joseph R. Strayer (New
56. Arentzen, Imago Mundi Cartographica (note 32).
39; (1911): 35–166; suppl. (1916).
version is by Tony Campbell of the British Library.
59. Destombes, Mappemondes (note 31).
60. Santarém, Essai (note 40).
Table 18.1 Comparison of the Main Features of Classifications of *Mappaemundi*

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<td>I Roman</td>
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<td>III Hemispheric</td>
<td>II Crates</td>
<td>C Greek</td>
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<td>II Intermediate</td>
<td>III Combination</td>
<td>B Fourth continent</td>
<td>Quadripartite</td>
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*Transitional*  

*Present work.  
*Designations follow those of the original authors.

Table 18.2 Proposed Classification of *Mappaemundi*

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<th>Quadripartite</th>
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<td>Macrobius</td>
<td>Tripartite/zonal</td>
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<td>Martianus Capella</td>
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<td>T-O reverse</td>
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<td>Y-O with Sea of Azov</td>
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<td>V-in-square and T-in-square</td>
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<td>Nonschematic</td>
<td>Orosius</td>
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<td>Orosius-Isidore</td>
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<td>Higden</td>
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<td></td>
</tr>
</tbody>
</table>

*Note: See also appendix 18.1.*

small T-O maps, the Hereford map, and the Ebstorf map all have volumes to themselves.  
Beazley made no attempt at classification, writing a straightforward chronological narrative.  
The first rational attempt was made by Théophile Simar in 1912. He proposed a simple threefold classification based on the main sources of the maps, as was later fully explained by John K. Wright.  
Simar distinguished two main types, Roman and late Greek, and a third intermediate category containing characteristic features of both. Michael Andrews offered his classification in 1926, the result of systematic examination of some six hundred *mappaemundi*. In its general lines it was based on that of Simar, but Andrews subdivided the three main families into divisions, genera, and species. Another classification, by Richard Uhden, used the same main categories but divided them into subgroups based on key examples. However, Uhden made no reference

to the earlier work of Simar or Andrews and does not seem to have been acquainted with either. 64

The Andrews classification was adopted by the International Geographical Union’s Commission on Early Maps (Destombes) with one important modification: a fourth category, D, was made from Andrews’s “oeccumenical simple” division. The basis for this change was that these maps, which exhibited far more geographical information than the schematic tripartite variety (T-O maps) needed a category to themselves. While this was an understandable modification, the system of numbering and lettering the subgroups in the four main categories is unclear and not fully explained in the volume. 65

Jörg-Geerd Arentzen has pointed out that there are really only two fundamentally different types of mappaemundi: those based on the Greek view of the entire terrestrial hemisphere (the world maps) and those depicting a smaller cultural area, the inhabited tripartite world. These two types of images from different cultural origins exist side by side and are not viewed as being opposed to each other. 66 He believes that the intermediate type traditionally formed by the Beatus maps and the zonal maps integrating a T-O pattern in the Northern Hemisphere should be included in the “world map” category. For the early Middle Ages, there is no question that this simplification has merit. But as the medieval period wore on these two traditional types of map became less distinct, and the profound later modifications to them should be recognized in any classification.

The system developed for this chapter, summarized at the beginning of appendix 18.1, thus identifies four main categories: tripartite, zonal, quadripartite, and transitional (figs. 18.4–18.7). Figures 18.8 and 18.9 show the absolute and relative numbers of maps in each category from the eighth to the fifteenth centuries.

Tripartite
Since all the maps in Andrews’s oeccumenical category are broadly tripartite, this term has been adopted. Within this category, schematic and nonschematic types are recognized. The latter are by far the more complicated and carry a greater density of geographical information, and accordingly they have been renamed “nonschematic” rather than using Andrews’s misleading term “simple.” 67 Several subgroups within this category have also been recognized based on their predominant source, whether Orosius, Cosmas, or Higden, for example. 68

The tripartite category presented here thus includes those maps that represent the inhabited world of late Roman times with three continents. Each category can be divided further into classes according to whether they are clearly diagrammatic or whether, while preserving the general positions of the three continents, they are nonschematic in nature.

In these T-O mappaemundi, the parts of the T are represented by the three major waterways believed by medieval scholars to divide the three parts of the earth: Tanais (the river Don) dividing Europe and Asia; the Nile dividing Africa and Asia; and the Mediterranean Sea dividing Europe and Africa. 69 In most cases the four cardinal directions are provided in Latin: Septentrion (septemtriones—the seven plow-oxen from the stars of the Great Bear or Little Bear); Meridies (for the position of the sun at midday); Oriens (from the direction of the rising sun); and Occidens (from the direction of the setting sun).

Zonal
This category of maps corresponds broadly to Andrews’s term “hemispheric.” The grounds for changing his terminology are that some tripartite maps belonging to the first category also represent part of the Southern Hemisphere. This general class of maps is characterized by orientation to the north or south and the representation of latitudinal zones or climata.

Quadripartite
Intermediate between the tripartite and the zonal categories of mappaemundi is a third category, here named “quadripartite” (corresponding broadly to Andrews’s “intermediate”), which contains maps bearing the characteristics of each. Although these are not numerous, they are sufficiently distinctive to warrant a separate category.

Transitional
One shortcoming in all previous classifications is their inability to accommodate what is recognized here as a profound change in mappaemundi that took place in the fourteenth and fifteenth centuries. The late maps included in this category differ fundamentally from the Macrobian or Sallustian models of the late Roman world.

64. Uhden, “Herkunft und Systematik” (note 7).
65. Destombes, Mappemondes (note 31). For example, the annotation “AZ” on pages 30, 31, and 48 is not explained, nor is the meaning of A1, A2, and A3 in the explanation of symbols on page 29.
69. The biblical division of the world among the three sons of Noah is described in Genesis 10. Gervase of Tilbury points out that, as the firstborn, it is appropriate that Shem have the most land; see Gervase of Tilbury, Otia imperialia 2.2; one edition is Otia imperialia, ed. Felix Liebrecht (Hanover: C. Rümpler, 1856).
FIG. 18.4. THE TRIPARTITE TYPE OF MAPPAMUNDI. Also known as the T-O category, this type can be further subdivided into schematic (as shown in this diagram) or nonschematic, in which the general tripartite pattern is preserved but considerable embellishments of content are added.

FIG. 18.6. THE QUADRIPARTITE TYPE OF MAPPAMUNDI. This category includes characteristics of both the tripartite and zonal types, consisting of a tripartite model in the Northern Hemisphere and, in the Southern Hemisphere, a fourth continent, either uninhabited or inhabited by the Antipodeans.

FIG. 18.5. THE ZONAL TYPE OF MAPPAMUNDI. The north- or south-oriented maps showing the parallel zones of the Greek climata form the second main category of mappamundi. They consist of a central uninhabited hot equatorial zone flanked by two inhabited temperate zones, and cold uninhabited zones in the polar areas.

FIG. 18.7. THE TRANSITIONAL TYPE OF MAPPAMUNDI. These maps differ sufficiently from the previous three main types to warrant their own category. Dating from the fourteenth and fifteenth centuries, they show the influence of the portolan charts, particularly in the Mediterranean, and later, the world views of Ptolemy as the Geography was integrated into Western cartographic thought.
and anticipate in many ways the Renaissance. They have as their basis the configuration of the Mediterranean commonly found in portolan charts and rely in some degree on contemporary exploration, especially the Portuguese voyages to the Atlantic islands and along the west coast of Africa. The various regional or historical traditions, such as that of the Catalan chartmakers or the Ptolemaic influence, can provide the basis for further subdivision.

Main Periods of Mappaemundi

It has long been recognized that the Middle Ages were not an undifferentiated millennium of ignorance and disorder between two periods of enlightened civilization. Not only were engineering, architecture, and mechanics greatly advanced during this period, but the humanistic legacy of Greek and Roman civilization was in evidence in every century. There are, however, fundamental differences among the maps that make it possible for the historian of cartography to recognize four major sub-periods for mappaemundi, the last three of which were marked by their own renaissances. As with all historical periods, these interlock and overlap rather than meeting neatly at common boundaries. The first period—from the beginning of the fifth century to the end of the seventh, corresponding approximately to the patristic period of the fathers of the church from Lactantius (ca. 240–320) to Gregory the Great (ca. 540–604)—saw three fundamental cartographic traditions, here named after the authors who popularized them: Macrobius (ca. 395–436), Orosius (ca. 383–post 417), and Isidore (ca. 560–636). These three types of maps were to continue to have great influence in the rest of the Middle Ages, coexisting in derived forms until the Renaissance. In the second period, from the beginning of the eighth century to the beginning of the twelfth, the accelerated production of books and manuscripts for schools in cathedral and monastery heralded what Bagrow called “the gold age of Church cartography.” The third period, from the beginning of the twelfth century to the end of the thirteenth, saw the influx of dozens of Arabic and Greek classics into western Europe, especially the Almagest of Ptolemy; Haskins called it “the renaissance of the twelfth century.” Finally, from the beginning of the fourteenth century to the middle of the fifteenth, we can identify a transitional period between the Middle Ages and the Renaissance, with world maps that have the characteristics of both.

Macrobius to Isidore: The Late Greco-Roman and Patristic Period (ca. 400 to ca. 700)

After the administrative division of the Roman Empire in the fourth century and following the establishment of Constantinople as the eastern capital, the secular influence of the Greco-Roman civilization went into decline, and the church enjoyed formal recognition and a steady growth of its power as a state authority. The maps of this first period were shaped by two opposing streams of thought: the Greco-Roman philosophical tradition and the teachings of the church fathers. The pagan geographical writings of the late Latin authors Macrobius, Martianus Capella, and Solinus were among the most influential in the Western world and had their basis in the works of Pliny and Pomponius Mela as well as in a theoretical Greek tradition handed down from Pythagorean times to Posidonius. Both Macrobius and Martianus Capella were to transmit parts of this tradition to the later Middle Ages. Solinus, on the other hand, copied Pliny and Pomponius Mela (without the slightest acknowledgment) in his Collection of Remarkable Facts and earned for himself the nickname “Pliny’s ape.” Nevertheless, the Collection provided a ready compendium of much of the geographical mythology that is found on mappaemundi up to the fifteenth century and was the subject of numerous printed editions. Although it was immensely popular, the Collection provides a striking example of how classical science deteriorated in the Middle Ages through constant borrowing and plagiarism.

The attitude of the early church fathers to the pagan desire for knowledge was mixed. The church had no specific rulings on matters geographic or cosmographic and at worst regarded them as irrelevant to the Christian life. Lactantius (early fourth century) declared that scientific pursuits were unprofitable, and Saint Jerome asked, “What can Christians gain from science?” On the other hand, Saint Jerome (340–420), who is known to have been fascinated by and devoted to pagan learning, is traditionally considered to have compiled maps of Palestine and Asia, yet these are known only from late (twelfth-century) recensions. Certainly he was aware of the way in which maps could express information concisely, because he refers to “those who draw a region of the world on a small tablet.”

70. Bagrow, History of Cartography, 42 (note 55).
71. Haskins, Renaissance of the Twelfth Century (note 50).
74. “Sicut ii qui in brevi tabella terrarum situs pingunt . . . ” St. Jerome, Epistola 60, pt. 7 (336).
Macrobius

The type of mappamundi known as the Macrobian, or zonal map, is derived from the cosmographic section of Macrobius’s early fifth-century commentary on Cicero’s Dream of Scipio (51 B.C.). This in turn derived its cosmography from Posidonius (ca. 135 to ca. 51–50 B.C.), Serapion of Antiocheia (second or first century B.C.), Crates of Mallos (ca. 168 B.C.), Eratosthenes (ca. 275–194 B.C.), and—ultimately—from a Pythagorean concept. The earliest stage in this sequence about which anything is known starts with Crates, who made a large globe with four inhabited quarters separated by two belts of ocean that divided the hemispheres into north, south, east, and west. Two of these continents constituted the known hemisphere, separated by an ocean river, Alveus Oceani, thought to flow just below the surface of the sea. This hemisphere was divided into five climatic zones (six if the central zone is considered to be divided by the ocean river) following parallels of latitude. The width of each zone conforms to precise measurements prescribed by Macrobius (fig. 18.10). The two polar zones were held to be frigid and uninhabitable, and the equatorial zone, zona perusta, un­crossable because of its heat. It was the temperate zones between these two extremes that were habitable. The southern temperate zone, according to the original Greek concept, was inhabited by the Antipodeans. Over 150 mappaemundi drawn according to the Macrobian schema are found in manuscripts of the Commentary on the Dream of Scipio from the ninth century to the fifteenth, and throughout several other works such as the Liber floridus of Lambert of Saint-Omer (ca. 1120) and the De philosophia of William of Conches (ca. 1130).

Often associated with Macrobius is the fifth-century encyclopedist Martianus Capella (fl. 410–39), who continued to popularize the zonal map in his Marriage of Philolody and Mercury. This was an allegorical treatise on the seven liberal arts, the trivium of grammar, dialectic, and rhetoric and the quadrivium of geometry, arithmetic, astronomy, and music. Martianus’s cosmographical writings were to be directly used in the Liber floridus.

Orosius

The second major source used for mappamundi of this period is the text of Paulus Orosius’s History against the Pagans. The outstanding difference between Orosius’s text and those of Macrobius and Martianus Capella is that it was directed against pagan writings. Orosius’s initial encouragement seems to have come from Saint Augustine (354–430), to whom the book was dedicated.

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75. See above, pp. 162–63 and fig. 10.2.
Orosius nowhere mentions a map in his text, but Bately reports a theory that in compiling his history he may have used a *mappamundi* in addition to the more expected textual sources.\(^8^0\) She goes on to show, however, that there is no evidence (in his text) to support the idea that the use of a *mappamundi* was inevitably required.\(^8^1\)

Orosius’s text was widely used during all of the Middle Ages. In Cortesão’s words, “practically every author after Orosius who wrote on geography and history, from St. Isidore to Roger Bacon and Dante, based his work on that of Orosius, drew more or less freely on it, or borrowed entirely from it.”\(^8^2\) Maps that are thought to bear at least some influence of the Orosian writings include the Albi map (eighth century), the Cotton “Anglo-Saxon map” (tenth century), the world map of Henry of Mainz (twelfth century), two Matthew Paris maps (thirteenth century), and the Hereford *mappamundi* (thirteenth century). However, the ambiguous nature of the primary evidence should always be borne in mind.

In the absence of any map known to have been drawn by Orosius himself, it is not possible to decide whether maps bearing the influence of the Orosian writings were based on a single map tradition from the time of Orosius or whether several independent map traditions were based on later versions of the text. In addition, many other maps can be said to owe part of their origin to Orosius, though also modified by other authors, notably Isidore of Seville. In view of such problems, the stemma of the sources of the Orosian tradition clearly needs a detailed separate study.

**Isidore**

The third and best-known group of *mappamundi* deriving from this period are the schematic tripartite diagrams of the world known as the T-O maps. Their name derives from the insertion of a capital T within an O, and the name was apparently coined in *La sfera*: “The drawing shows a “T” within an “O” as the earth was divided in three parts.”\(^8^3\)

Two major works of Isidore provide most of the maps in the schematic T-O category. Isidore of Seville (ca. 560–636) was one of the foremost encyclopedists and historians in the early Middle Ages. In about 600 he succeeded his brother as bishop of Seville, and through wide reading in both Roman and Christian sources he amassed an unparalleled fund of knowledge. This he distilled into some thirty titles, although his *Etymologiarum sive originum libri XX* (between 622 and 633) and the *De natura rerum* (between 612 and 615) are probably the most important. For his geographical and cosmographical knowledge, Isidore relied heavily on the popular writings of Roman authors and the early Christian fathers, particularly Ambrose, Augustine, Boethius, Cassiodorus, Lucretius, Lucan, Macrobius, Orosius, Pliny the Elder, Sallust, Servius, and Solinus. Isidore apparently knew no Greek, but this did not prevent his continuing the tradition of inserting Greek words and phrases in Latin texts that had been handed down through generations of compilers.\(^8^4\)

In its broad sense, and in its derivations in later centuries, the Isidore schema is found in over 660 examples listed by Destombes. Its popularity in the Middle Ages is further illustrated by its appearance in several printed editions of the *Etymologies*. The original seventh-century Isidorian T-O no longer survives, but we may assume that it would have been a simple tripartite diagram. A second type of Isidorian map appears in the eighth century in which the Meotides Paludes (classical Palus Maeotis), or Sea of Azov, has been added. Since both versions are found in fifteenth-century printed editions of Isidore’s *Etymologies*, we may assume that both continued as parallel traditions in the intervening period.

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A further development, dating from at least the thirteenth century, was the addition of a representation of paradise and its four rivers in a rectangle.

An intermediate type between the Isidorian tripartite world with the representation of the Sea of Azov and the Beatus maps (discussed below) contains the tripartite diagram joined by a fourth continent that is sometimes shown as inhabited, sometimes not. This fourth continent is either in the Southern Hemisphere or tacked on strangely at a tangent to the circle representing the traditional known world, without apparent regard for geographical position (fig. 18.13). The earliest known form of this type of mappamundi (fig. 18.14) was thought by Miller to be a late seventh- or early eighth-century vestige in a palimpsest with, otherwise, ninth-century contents. Miller based his inference on the differences in lettering on the map, claiming that the rustic capitals are much earlier than the other hands. If this is correct, this is the earliest medieval mappamundi known and would occupy a key transitional place between the Roman and medieval traditions.86

Despite the renewed interest in natural science in this second subperiod, the mappaemundi of this time tend to be secondary versions of the Greco-Roman sources transmitted largely through the works of Macrobius, Orosius, and Isidore. It is, however, the first period in the entire history of European cartography to yield a reasonable sample of artifacts. Over 175 mappaemundi dating from the eighth through the eleventh century are known to have survived. They are largely in historical and geographical texts, copies of the Psalter, and the Commentary by Beatus of Liebana. Moreover, library catalogs of the period contain frequent mentions of mappaemundi as apparently separate items. Among texts by individual authors, three works by the Venerable Bede

Fig. 18.11. ISIDORIAN T-O MAP. The simplest version of Isidore of Seville’s original type of schematic mappamundi is here reproduced from the fifteenth-century printed version. Diameter of the original: 6.4 cm. From Isidore of Seville, Etymologiae sive originum libri XX (Augsburg: Günther Zainer, 1472). Courtesy of The Newberry Library, Chicago.

Fig. 18.12. ISIDORIAN T-O MAP WITH THE SEA OF AZOV. A more elaborate version of Isidore’s original schema (fig. 18.11.), this includes the addition of the Meotides Paludes, the Sea of Azov. Diameter of the original: 11.1 cm. From Isidore of Seville, Etymologiae (Cologne, 1478). By permission of The Huntington Library, San Marino, California (HEH 89025).

Bede to Lambert of Saint-Omer (ca. 700 to ca. 1100)

Despite the renewed interest in natural science in this second subperiod, the mappaemundi of this time tend to be secondary versions of the Greco-Roman sources transmitted largely through the works of Macrobius, Orosius, and Isidore. It is, however, the first period in the entire history of European cartography to yield a reasonable sample of artifacts. Over 175 mappaemundi dating from the eighth through the eleventh century are known to have survived. They are largely in historical and geographical texts, copies of the Psalter, and the Commentary by Beatus of Liebana. Moreover, library catalogs of the period contain frequent mentions of mappaemundi as apparently separate items. Among texts by individual authors, three works by the Venerable Bede

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85. Isidore of Seville, Etymologies; see Etymologiae sive originum libri XX (Augsburg: Günther Zainer, 1472) and several other incunable editions. See Rodney W. Shirley, The Mapping of the World: Early Printed World Maps 1472–1700 (London: Holland Press, 1983), 1, who does not, however, describe or reproduce the second version with the Sea of Azov.
86. Stiftsbibliothek St. Gallen, Codex 237. Miller, Mappaemundi, 6.57–58 (note 9), dates it to the end of the seventh century, Destombes, Mappemondes, 30, map 1.6 (note 31), dates it to the eighth century, and Kamal, Monumenta cartographica (note 53), dates it to the ninth century. But as Ker states on page 370 of his review of Mappemondes (note 2), “MSS are not dated in the 8th century without reference to Codices Latini Antiquiores: if they are not in CLA it is best to think again.” This map is not in CLA. The map clearly needs further detailed study, but following Miller, we have tentatively placed it on the stemma in figure 18.15 at the end of the seventh century.
The maps in the surviving manuscripts of the Commentary on the Apocalypse of Saint John by the Benedictine abbot Beatus of Liebana (fl. 776–86) provide perhaps the only spark of innovation. Two main types of maps are found in the Beatus Commentary. Best known are the large, usually rectangular, maps (of which fourteen survive) that can be traced back to the now lost prototype of 776–86. They form a well-defined group (672/73–735) contain mappaemundi (of which fifteen examples are extant). Nor is the period devoid of references to monumental maps that perhaps demonstrate a degree of infusion of geographical interest into everyday life: for example, Pope Zacharias (pope 741–52) is known to have had a world map painted on the wall of the Lateran palace, and Charlemagne possessed three silver tables described in the Vita Karoli Magni: one of Constantinople, one of Rome, and a third, a "description of the whole world," which has been reconstructed and interpreted by Estey and others as a celestial map.

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and fall into their own transitional category in appendix 18.1. Their graphic style can be described as “Mozarabic,” that is to say, showing the Arabic influence in Spain, with bright, opaque colors and arabesque illumination. They are all oriented to the east, with paradise enclosed in a square vignette with the four rivers flowing from it (plate 13). Around the edge is the ocean sea containing decorative representations of fishes in an unmistakable Islamic style. Their main characteristic however, is the representation of a fourth continent in addition to the traditional tripartite world. The context of the map is evangelistic, following the subject of the work in which they appear: the apostles were to go into every corner of the earth, including the fourth continent, which Beatus considered to be inhabited. Various legends are found written on the representations of this continent, to inform the viewer that: “outside the three parts of the world there is a fourth part, the farthest from the world, beyond the ocean, which is unknown to us on account of the heat of the sun. We are told that the Antipodeans, around whom revolve many fables, live within its confines.”

The second type of map found in the manuscripts of the Commentary are small Isidorian maps that also show a fourth continent. Their occurrence in the same manuscripts as the large Beatus maps has led Menéndez-Pidal to postulate that the latter were derived from the former. A general stemma for the large maps is provided in figure 18.15.

The Liber floridus by Lambert, canon of Saint-Omer, marks the end of this second period of mappaemundi. The original illustrated manuscript of 1120 is still preserved in Ghent and is a text in the Isidorian tradition of great encyclopedias. Despite the breadth of knowledge it contains, there is nothing startlingly new. Lambert’s sources are as might be expected. He usually cites them by name: Pliny, Macrobius, Martianus Capella, the Latin fathers, Isidore, and Bede.

HENRY OF MAINZ TO RICHARD OF HALDINGHAM (CA. 1100–1300)

Whatever effect the Crusades (1096–1270) may have had on medieval Europe in general, they had little direct effect on the content of the mappaemundi. Lach was able to write “the Crusades themselves changed almost nothing in Europe’s pictorial image of Asia,” and the same can be said for other continents. There was a great dissemination of knowledge about the Holy Land and the routes of pilgrimage to it, however, that reached most segments of the population and was reflected in cartography, such as in the regional and itinerary maps of Matthew Paris.

At about the same time, the influx of new knowledge into western Europe between 1100 and 1200, some through Italy and Sicily but most through the Muslim authors in Spain, was facilitated by dozens of translations of Arabic and Greek classics, particularly in philosophy, mathematics, astronomy, and the physical and natural sciences. Ignorance of the Greek language by most scholars in western Europe, with some important exceptions, effectively closed the early and High Middle Ages to the best classical work. For cartography, this meant that Ptolemy’s Almagest was unavailable to the non-Greek reader between the second and twelfth centuries, and his Geography between the second and the fifteenth.

Table 18.3 summarizes the dates of the main translations of texts of interest to cosmography and cartography. Although the early translations were literal and the choice of works to be translated hardly systematic, they were convenient and popular and eventually stimulated original thinking. The main legacy of the “renaissance of the twelfth century” lay in the expounding of the principles of empirical science. Such scholars in the following century as Roger Bacon (ca. 1214–94), John Duns Scotus (ca. 1265–1306), and William of Ockham (ca. 1290 to ca. 1349) were all Franciscans, and their work was a natural outgrowth of the philosophy of this movement with its intense curiosity about the natural world. Founded in 1209, the Franciscan order nurtured many distinguished experimental scientists and travelers whose interests frequently turned to cosmography and geography, including the compilation of mappaemundi, in a way that was mirrored several centuries later by the Jesuits. John of Plano Carpini, a companion and disciple of Saint Francis of Assisi, undertook the first of the missionary journeys to Asia (1245–47) as an envoy of Pope Innocent IV. The stated aims of the journeys were to discover the history and customs of the Mongols, convert the Grand Khan, and seek an alliance with him against their common enemy, the Muslims.
Another Franciscan friar, William of Rubruck (ca. 1200 to after 1256) was sent on the same mission by Louis IX, and the detailed report of his observations was later used by Roger Bacon. Unfortunately, no maps survive in these reports.  

For practical navigation, the major achievement was by Ramón Lull (ca. 1233–1315), a Majorcan Franciscan, who wrote about the science of navigation based on his own direct experience at sea. He was also the first to describe the nautical chart. But it was in the contribution of Roger Bacon that the Franciscan aptitude for cartography was most evident, as we see in his discussion of projections and coordinate systems in the *Opus majus* (1268).  

The burgeoning of knowledge and cosmopolitan awareness in eleventh-century Europe led naturally to the development of several kinds of permanent institu-
The University of Salerno (tenth century) is the earliest institution of higher learning, both practical and theoretical. The University of Salerno (tenth century) is the earliest such institution: it specialized in medicine. Bologna, Paris, and Oxford were the twelfth-century ancestors of the modern universities in the sense of academic guilds, deriving their name not from the idea of universal knowledge but from the banding together of a universal group of professors and students. Of the four subjects taught in the quadrivium in medieval universities—arithmetic, astronomy, geometry, and music—the activity of cartography related directly to three. The place of man in the terrestrial, celestial, and spiritual world was a central concern for medieval philosophers, and such geographical issues as the nature, shape, and size of the earth were of perennial interest.

The universities of Oxford and Paris were particularly strong centers of a cosmographical and geographical culture that reached its climax in Europe in the thirteenth century. Sacrobosco (also known as John of Holywood or Halifax; d. 1256), though born in England and possibly educated at Oxford, was admitted as a member of the University of Paris in 1221. He is best known for his work *De sphaera*, which probably appeared in the 1220s or 1230s. It was a textbook for beginners in cosmography, fully illustrated with world maps and diagrams, and thanks to its clarity and brevity it enjoyed widespread use in multiple versions and printed editions until the seventeenth century, continuing to be used long after the Copernican theory had been accepted (fig. 18.16). It almost certainly predated the *De sphaera* of Robert Grosseteste (ca. 1175–1253), first chancellor of Oxford University and bishop of Lincoln.

The English geographical culture in the thirteenth century is also revealed in the unusual circumstance that four important thirteenth-century *mappaemundi*—the Vercelli, “Duchy of Cornwall,” Ebstorf, and Hereford maps—either are English or appear to have strong English connections. The Vercelli map (84 × 70–72 cm) (fig. 18.17), is the smallest of the three. It now resides in the Archivio Capitolare in Vercelli and has been dated by Carlo Capello to between 1191 and 1218. Its inspiration may well have been English. Capello believes that the map was carried to Vercelli by cardinal Guala-Bicchieri on his return from England about 1218–19 as papal legate to Henry III. He also argues that the figure on the map of a king in Mauretania named “Philip” is intended to represent Philip II of France (1180–1223) and not Philip III (1270–85) (fig. 18.18).

### Table 18.3 Dates of Translation of the Main Greek and Arabic Manuscripts of Cartographic Interest into Latin

<table>
<thead>
<tr>
<th>Author</th>
<th>Dates</th>
<th>Work</th>
<th>Latin Translator</th>
<th>Place and Date of Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al-Khwarizmi</td>
<td>9th century</td>
<td>Astronomical tables</td>
<td>Adelard of Bath</td>
<td>ca. 1126</td>
</tr>
<tr>
<td>Aristotle</td>
<td>384–322 B.C.</td>
<td><em>De caelo et mundo</em></td>
<td>Gerard of Cremona</td>
<td>Toledo, 12th century</td>
</tr>
<tr>
<td>Avempace</td>
<td>1126–98</td>
<td><em>De caelo et mundo</em></td>
<td>Michael Scot</td>
<td>Early 13th century</td>
</tr>
<tr>
<td>Euclid</td>
<td>ca. 330–260 B.C.</td>
<td><em>Elements</em></td>
<td>Adelard of Bath</td>
<td>Early 12th century</td>
</tr>
<tr>
<td>Ptolemy</td>
<td>ca. 90–168</td>
<td><em>Almagest</em></td>
<td>Gerard of Cremona</td>
<td>Toledo, 1175</td>
</tr>
<tr>
<td>Ptolemy</td>
<td>ca. 90–168</td>
<td><em>Geography</em></td>
<td>Jacobus Angelus</td>
<td>Florence, 1406–7</td>
</tr>
<tr>
<td>Ptolemy</td>
<td>ca. 90–168</td>
<td><em>Planisphaerium</em></td>
<td>Hermann of Carinthia</td>
<td>Toulouse, 1143</td>
</tr>
<tr>
<td>Michael Scot</td>
<td>Early 13th century</td>
<td><em>Elements</em></td>
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<td>Michael Scot</td>
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<td>Michael Scot</td>
<td>Early 13th century</td>
<td><em>Elements</em></td>
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</tr>
</tbody>
</table>


99. The concept of the seven liberal arts gained its popularity largely from the *De nuptiis Philologiae et Mercurii* of Martianus Capella (see note 78), and the division into the trivium (grammar, rhetoric, and dialectic) and the more advanced quadrivium (music, arithmetic, geometry, and astronomy) dates from the time of Alcuin (735–804). The quadrivium provided the outline for the natural sciences that was filled out by the experimental studies of the twelfth-century Renaissance. See Rashdall, Universities, 34–36 (note 98).

100. See Wright, Geographical Lore (note 18).


102. The major English figures of this period are listed in Charles Singer, “Daniel of Morley: An English Philosopher of the XIIth Century,” Isis 3 (1920): 263–69. Along with the lack of important surviving *mappaemundi* from the European continent, there is a parallel lack of regional maps to compare with the Matthew Paris and Gough maps of Great Britain.

On stylistic grounds, he similarly places the map earlier rather than later in the thirteenth century and draws particular attention to the fact that it is not centered on Jerusalem as were maps later in the century.

A parchment fragment of a *mappamundi* has recently been discovered among the records of the Duchy of Cornwall. Carbon dating at Oxford University has established that its most likely date is between 1150 and 1220. The fragment measures 61 centimeters high by 53 centimeters wide. The original circular map measured approximately 1.57 meters in diameter. The surviving segment of the map, depicting part of Africa, suggests an original form similar to the Vercelli, Hereford, and Ebstorf maps. Some details strongly resemble elements in these maps. For example, the fragment contains a gazetteer that alludes to the traditional classical surveyors, information that is incorporated into the Hereford map. In addition, the marginal text is similar to that found on the Hereford map. Several of the monstrous races are clearly shown in their traditional location. Forming a border along the bottom edge of the fragment is a series of finely executed line drawings of figures apparently depicting stages of life; each figure delivers a cautionary message. They include a woman at vespers, an old man bent with age, a figure in purgatory holding a bowl of fire, and an angel (plate 14).

The Ebstorf map—while its English connections are tenuous at best—has been linked to Gervase of Tilbury (ca. 1160–1235?) (fig. 18.19). Gervase was a teacher of canon law in Bologna who may possibly be identified with the provost of the abbey of Ebstorf who died in 1235. In his historical work *Otia imperialia* (1211), he refers to a “world map,” and his text has been recognized as the latest known source of information from which the author of the Ebstorf map might have drawn.

Discovered in the Benedictine abbey of Ebstorf in 1830 and made public in an article in a Hanover newspaper in 1832, the Ebstorf map was moved in 1834 to the Museum of the Historical Society of Lower Saxony in Hanover, where it remained until 1888. It was then taken to Berlin for restoration, at which point it was separated into thirty vellum sheets and photographed for the edition by Sommerbrodt. This remains the only full-sized photographic reproduction (unfortunately not in color). It was returned to Hanover, where it was destroyed in an air raid in 1943. Since the original no longer exists, the accuracy of the existing facsimiles is crucial. Even as early as 1896, Miller had pointed out the problems associated with the Sommerbrodt photographic edition, which was touched up in the faded areas. Miller’s own edition was a hand-drawn copy reproduced in color and thus was also subjective in its interpretation.

The controversy surrounding the authorship and dating of the map has been well summarized by Arentzen. The date of 1284 in arabic numerals on the map appears to have been added in a later hand, and the earliest date for its appearance is probably 1234, after the death of

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104. I am indebted to Graham Haslam, archivist of the Duchy of Cornwall, for providing this paragraph and the transparency for plate 14. We look forward to the full study of the map that Dr. Haslam is planning to publish.


FIG. 18.17. THE VERCELLI MAP. One of two large thirteenth-century mappaemundi to have survived (the other being the Hereford map), this too is probably of English origin. It is thought to have been brought to Italy about 1219 by a papal legate to Henry III.

Johannes Marcus, dean of the cathedral of Hildesheim, who may have ordered the map to be drawn. With dimensions of 3.58 by 3.56 meters, the Ebstorfer map is the largest mappamundi to have been recorded. Although its main intended use was no doubt to demonstrate the historical events in the Christian life—for example, the burial places of Mark, Bartholomew, Philip, and Thomas are shown—the author also had some more directly practical use in mind, as he himself made clear. In the upper right-hand corner of the map, he writes: “it can be seen that [this work] is of no small utility to its readers, giving directions for travelers, and the things on the way that most pleasantly delight the eye.”

We also find an allusion to the traditional cartographic proclamation of Julius Caesar: “How Julius Caesar first constructed [a mappamundi], for the breadth of the whole earth, legates having been sent, collecting the regions, provinces, islands, cities, quicksands, marshes, plains, mountains, and rivers as if to be seen on one page” (author’s translations).

It is the well-known Hereford map that represents the culmination of the Orosian type (fig. 18.20). The map contains a clear and direct reference to its origin: “Orosius’s description of the ornesta of the world, as displayed within.” Partly as a result of its sheer size (1.65 x 1.35 m), it contains more information than any other surviving pre-fifteenth-century mappamundi. In addition to Orosius and the Bible, its sources definitely include Isidore, Augustine, Jerome, Pliny, Strabo, and the Antonine itinerary. There is also a reference—unusual indeed for any medieval world map—to its authorship, in a note in the bottom left-hand corner:

Let all who have this history, or shall hear or read or see it, pray to Jesus in His Divinity, to have pity on Richard of Haldingham and Lafford, who has made and planned it, to whom joy in heaven be granted.

Around the map’s border on the left side, we read that the world began to be measured by Julius Caesar. In the lower left corner we find a drawing of the emperor Augustus handing out his edict (see fig. 12.4). Pliny alludes to a large world map of Vipsanius Agrippa displayed in Rome at the time of the emperor Augustus (ca. A.D. 14), which may have resulted from the survey of the provinces ascribed by tradition to Julius Caesar.


110. “Que scilicet non parvam prestat legentibus utilitatem, vi­nantibus directionem rerumque viarum gravitate speculacionis directio­num.” Transcription from Walter Rosien, Die Ebstorfer Weltkarte (Hanover: Niedersächsisches Amt für Landesplanung und Statistik, 1952), 80.

111. Also in the lower right corner, before the quotation in note 105: “Quam Julius Caesar missis legatis per totius orbis amplitudinem primus instituit; regiones, provincias, insulas, civitates, syrtes, paludes, equora, montes, flumina quasi sub unius pagine visione coadunavit.” Rosien, Ebstorfer Weltkarte, 80 (note 110).


114. Tuz ki cest estoire ont, Ou oyornt ou lirront ou veront, Priest a ihesu en deyte, De Richard de Haldingham e de Lafford eyt pite, Ki lat fet e compasse, Ki ioeie en cel li seit done.

115. The text of the edict, “Exiit edictum ab Augusto Cesare ut describeretur huniversus orbis” (Luke 2: 1) is above the Caesar’s head and not completely shown in figure 12.4. Transcription from Royal Geographical Society facsimile (note 112). This follows the Vulgate: Biblia sacra juxta vulgatam Clementinam (Rome: Typis Societatis S. Joannis Evang., 1956). The modern translation reads: “In those days a decree was issued by the emperor Augustus for a registration to be made throughout the Roman world.” The usual meaning of the word describeretur involves not simply registration but a survey, leading perhaps to a confusion by the author of the Hereford map between the two events (and the two Caesars).

116. See above, p. 203, and Beazley, Dawn of Modern Geography, 1:382 (note 17).
FIG. 18.19. THE EBSTORF MAP. This thirteenth-century mappamundi (destroyed in World War II) represents the world as the body of Christ. Christ's head is situated next to Paradise (for a detail, see fig. 18.2), the feet in the west, and the hands gathering in the north and south (for a detail, see fig. 18.3). Jerusalem, the navel of the world, is at the center.

Size of the original: 3.56 × 3.58 m. From Walter Rosien, Die Ebstorfer Weltkarte (Hanover: Niedersächsisches Amt für Landesplanung und Statistik, 1952). By permission of the Niedersächsisches Institut für Landeskunde und Landesentwicklung an der Universität Göttingen.
FIG. 18.20. THE HEREFORD MAP, CA. 1290. This famous map in Hereford Cathedral represents the culmination of the type based on the history of Paulus Orosius (fourth century). Its compiler, Richard de Bello, also drew on the works of Strabo, Pliny, Augustine, Jerome, the Antonine itinerary, and Isidore. See also figure 11.2.

Size of the original: 1.65 × 1.35 m.; the diameter is 1.32 m. From a negative of the original by permission of the Royal Geographical Society, London.
One of the issues surrounding the map relates to its authorship. Most authorities agree that these verses point to Richard of Haldingham, who has been identified as one Richard de Bello, prebend of Sleaford (Lafford) in the diocese of Lincoln in 1277. However, a Richard de Bello was also apparently prebend of Norton in the diocese of Hereford in 1305 and did not die until 1326. Some scholars, among them Denholm-Young and Em­ den, have thus argued that to span such a long career, there may have been two Richard de Bello.117 Yates has recently summarized the issue, leaning to the spec­ ulative conclusion that there was only one Richard de Bello and that he made the Hereford map. Yates also points out that further physical analysis of the map, especially of its pigments and calligraphy, might well reveal the period of time over which additions were made to it and thus increase the precision with which its contents might be dated.118

The close connection in content between the Hereford map and the early twelfth-century map by Henry of Mainz has been described by several authors.119 The authorship of this map and of the manuscript of the Imago Mundi in which it appears has been the source of some confusion. While there is now general agreement that the basic text of the Imago Mundi is by Honorius of Autun,120 the identity of the editor and the dedicatee, both named “Henry,” is more in question. The editor is identified as Henry of Mainz from the list of contents: “this Henry who edited this book was a canon in the Church of Saint Mary in Mainz,”121 and the compiler of the map is assumed to be this same Henry of Mainz. The Henry to whom the book is dedicated is a source of more controversy, but recent research points to Eng­ lish connections.122

English mappaemundi of the fourteenth century are represented by the maps in the Polychronicon, one of the most popular Latin histories of the fourteenth and fifteenth centuries, edited by the Benedictine monk Ranulf Higden (ca. 1299–1363). The world map, derived as usual from a variety of Roman sources, is found in the first book, and some twenty-one extant examples can be traced to the 1342 London manuscript of the Polychronicon for which stemmata have been provided by Miller with modifications by Skelton (fig. 18.21).123

Higden’s maps, while having similar geographical content, differ widely in the shape of their frameworks. Three categories can be recognized: oval, circular, and mandorla.124 Jerusalem and Rome are always prominent, but rarely in the center.

The large oval map in the British Library is thought to be closest to the original lost prototype, despite the claims of Galbraith, who believes that the Huntington (San Marino) copy of the Polychronicon is the author’s working copy in his own handwriting (plate 15).125 The circular Higden maps are thought to be simplifications of the earlier oval maps, and they certainly appear in generally later manuscripts, as can be seen from the chronological table in appendix 18.2. Finally, the almond-shaped mandorla maps (also known as vesica piscis, fish bladder) form the third group of Higden maps (fig. 18.22). They are generally later simplifications, and Skelton believes that the example in the National Library of Scotland (see appendix 18.2), with its truncated top and rounded point, represents a transition to the true almond shape.126

The oval shape of Higden’s maps and its simplification, the vesica piscis, is a particular characteristic of his, but not original. Skelton implies that a lost prototype (which may have been a large world map such as that referred to by Matthew Paris a century earlier) was probably circular and that the oval shape was an adaptation to the shape of the codex leaf. It is more likely, however,
that the oval shape was derived from the practice—described by Hugh of Saint Victor—of drawing maps in the supposed shape of Noah’s ark.\textsuperscript{127}

In this period of the twelfth and thirteenth centuries, then, though an attempt was made at a more exact understanding of the natural world, this tendency toward realism was only barely seen in the \textit{mappaemundi}. For the most part the maps continued to reflect a mixture of much earlier Roman sources as well as the stock-in-trade of Macrobius and Isidore. At the same time, there are glimpses of the new concepts and techniques that

\textsuperscript{127} Skelton, in \textit{Mappemondes}, ed. Destombes, 150–51 (note 31).

On Hugh of Saint Victor, see p. 334 below.
were to transform the mappae mundi of the fourteenth and fifteenth centuries into a cross between the maps of the medieval and modern worlds.

PIETRO VESCONTE TO FRA MAURO: THE TRANSITIONAL PERIOD FROM 1300 TO 1460

In the late Middle Ages, several trends can be noticed in the mappae mundi that lend a Renaissance character to maps of the period, though the basic frameworks of representation are medieval. The nature of the mappae mundi made between the times of Vesconte and of Fra Mauro is so different from that of the earlier maps that they warrant separate treatment, a view also reflected in the classification offered here in appendix 18.1. The transition was of course not abrupt: we have already seen that the experimental philosophers of the twelfth and thirteenth centuries heralded the thinking of the fifteenth and sixteenth centuries, and the tenacity of such characteristically medieval authors as Isidore and Sacrobosco is shown by their popularity well into the Renaissance.128 In some parts of Europe, the medieval period seems (in cartographic terms) to have extended far beyond its normal chronological bounds: for example, a Russian broadside world map, drawn in the first half of the seventeenth century directly from medieval sources, continued to appear in print until the nineteenth century.129

The transition is marked by a convergence of three conceptual frameworks of world maps represented by the traditional, confined mappae mundi, the expanding portolan chart, and the Ptolemaic coordinate system. There was also a trend toward the emergence of the map as an independent artifact rather than as a mere addition to a text. This had originated in earlier periods but gathered momentum during the Renaissance, as maps and atlases were published for profit in their own right. This emerging identity of the map is reflected in the work of Pietro Vesconte, the first professional cartographer in western Europe to routinely sign and date his works. Although he was chiefly a compiler of nautical charts, world maps made by him are found in the manuscripts of Marino Sanudo’s Liber secretorum fidelium crucis super Terrae Sanctae recuperatione et conservatione, 1306–21, a book written as a means of arousing interest in a crusade.130

The Vesconte mappaemundi, together with the contemporary examples found in the chronicle compiled by Franciscan Minorite friar Fra Paolino, clearly show the influence of the portolan charts in three major characteristics (plate 16). First, the outline of the Mediterranean Sea is derived directly from such charts. Second, a network of rhumb lines is also provided, even across wide expanses of land where they could be of little use.

Such lines were later to become a hallmark of precision on world maps ostensibly made for navigation, but that in fact had no practical use. Third, graphic scales were inserted on later mappae mundi, as in the Genoese world map of 1457 (fig. 18.23) or the map of Andreas Walisperger, 1448.

The geographical expansion of the traditional bounds of the portolan chart is well illustrated by the famous Catalan atlas [1375], which is perhaps the finest example of a mappamundi in its final transitional state (plate 17).


More is known about the manufacture of this atlas than most, thanks to the request in 1381 of an envoy of Charles VI of France (Guillaume de Courcy) to Pedro IV of Aragon (1336–87) for a copy of the latest available world map. The completed work has remained in the French royal library (now the Bibliothèque Nationale in Paris) ever since. Charles’s request may also illustrate the high regard in which the Catalan cartographers were held at the time, particularly Cresques Abraham (1325–1387) and his son Jefuda Cresques.131

The Catalan atlas is actually a multisheet “mapamundi” and is so titled. It consists of twelve leaves mounted on boards to fold like a screen. Although the eastern section shows a circular edge, indicating its medieval roots, the compiler’s main interest is evidently in the eastern and western extension of the Mediterranean. This forms a rectangular piece taken out of the traditional circular medieval world map. Other medieval vestiges include the approximately central position of Jerusalem and the west-east river in North Africa. The Mediterranean and Black seas reflect a standard portolan chart configuration.

But it is the wealth of information on central Asia, gleaned from the travel narratives of the thirteenth century, that makes the Catalan atlas the object of particular interest. It is the first map that bears the unequivocal influence of the travels of Nicolò, Maffeo, and Marco Polo (1260–69, 1271–95), although it appeared more than three-quarters of a century after their return to Venice. Although Marco Polo was a keen observer and recorder, and the first to give Europe a reasonably accurate description of East Asia, there is no evidence—if we ignore the probably apocryphal maps relating to northeastern Asia—that he drew any maps recording his experience.132 Although Marco Polo did not allude specifically to maps in his narrative, there are three passages that merely mention the charts of mariners in the Indian Ocean without providing further detail. However, he did provide some compass bearings in the text that, along with other geographical information in the narrative, have been used by later scholars to reconstruct a map.133 It is difficult to find his influence on the maps of Vesconte and Sanudo, although the earlier travels of Carpini and William of Rubruck were well known to the latter.134

Apart from its influence on the Catalan atlas, it appears that the narrative of Marco Polo had very little effect on world cartography of the time—certainly much less than the novelty of its geographical information would lead us to expect. There is some evidence that a map illustrating Marco Polo’s discoveries was drawn on the wall of the Sala dello Scudo (now the Sala delle Due Mappe) in the ducal palace in Venice. In 1426 Don Pedro of Portugal received a map from the Signoria that may have been a copy of such a map; it, or one like it, certainly existed in the mid-fifteenth century, for in 1459 the Senate ordered that such a map be repainted on the wall. Unfortunately, it was destroyed by fire in 1483.135

It is in the map made by Fra Mauro in 1459 that the greatest influence of the Marco Polo narratives is seen before the printed editions of them began to be disseminated (plate 18). This map stands at the culmination of the age of medieval cartography, although Bagrow may have exaggerated when he called it “the summit of Church cartography”136 for it is far more secular in nature than, for example, the Ebstorf map. It is transitional in the sense that it included information derived from portolan charts, from Ptolemy’s Geography, and from the new discoveries in Asia. Fra Mauro, working from the Camaldulian monastery on the island of Murano, was already an experienced cartographer. Detailed records relating to his mapmaking activities show that he made a map of a district in Istria as early as 1443, and in 1448–48 he was apparently at work on a mapamundi. Neither map has survived. The world map, now preserved in the Biblioteca Marciana in Venice, is a copy of a map commissioned by Afonso V, king of Portugal, and finished in April 1459 with the help of his assistant Andrea Bianco. The extant copy was made at the request of the Signoria, it is assumed in the same year, perhaps from notes that Fra Mauro and Bianco


had made. In its circular framework it is clearly medieval, and the southern orientation shows some Arabic influence, but the Mediterranean coasts are modeled on portolan charts and there is an allusion to its debt to the Ptolemaic tradition. 137

The influence of Marco Polo's travels on the content of the later Renaissance maps was profound. Information about the Indian Ocean gleaned from his voyage of the later Renaissance maps was profound. Information about the Indian Ocean gleaned from his voyage from Zaiton to Hormuz via Java, Sumatra, Ceylon, and India was incorporated into the maps of Henricus Martellus Germanus, the globe of Martin Behaim, and early sixteenth-century printed maps such as the Ruyssch map of 1507. Madagascar too appears on these maps much as Marco Polo reported it: about one thousand miles south of Socotra and four thousand miles in circuit.

Another major influence on the mappamundi of this transitional period was from the Geography of Claudius Ptolemy. After its translation into Latin by Jacobus Angelus about 1406–7, the popularity of this work increased steadily throughout the fifteenth century, as reflected in the frequency of printed editions from 1475 onward. An early world map showing such influence—displaying, for example, the closed Indian Ocean of Ptolemy—is the Pirrus de Noha map accompanying a manuscript of Pomponius Mela about 1414 (see plate 19 and fig. 18.79). 138

To understand the Ptolemaic influence, it is necessary first to be aware of a school of science under the leadership of the mathematician and astronomer Johannes de Gmunden at the University of Vienna and the prelate Georg Müstinger at the Augustinian monastery of Klosterneuburg, now in suburban Vienna. 139 The school flourished from the early 1420s until 1442, when both scholars died. Its contributions to cartography were but a fraction of its legacy of scientific manuscripts, including astronomical treatises, star catalogs, and tables of planetary motions, eclipses, and conjunctions, as well as general works on mathematics, including trigonometry. Most of these were recopied versions of earlier medieval works, but nevertheless Klosterneuburg constituted a seedbed of scientific innovation. In particular, the maps and coordinate tables associated with this school helped to fill in a period of relative cartographic obscurity between the Claudius Clavus map of about 1425 and the tabulae modernae of the later Ptolemaic manuscripts about 1450. The earliest maps, two rough plots of coordinates in the Vatican Library probably prepared by Conrad of Dyffenbach in 1426, were based on versions of the Toledo tables (a detail from the first of these maps is illustrated in fig. 18.24). 140 Between 1425 and 1430, Müstinger and his collaborators were working on a map genre that assimilated the Jerusalem-centered medieval world map with elements from Ptolemy and the portolan charts, which when reconstructed are similar in their general geographical configuration to the circular Vesconte-Sanudo maps which have already been described.

Although only coordinate tables survive for the earliest versions of these circular world maps of the Vienna-Klosterneuburg school, Durand reconstructed maps from the tables, most of which are to be found in a 522-page codex in the Bayerische Staatsbibliothek. 141 There are, however, two surviving original maps that Durand believes are based on this genre: the Walsperger map of 1448 and the Zeitz map of about 1470. 142 To these may be added the fragment of the world map acquired by the James Ford Bell Collection in 1960. 143

This evidence suggests that fifteenth-century cartographers were clearly impressed with the Ptolemaic model and took pains to demonstrate that, although they did not agree with all of Ptolemy’s information or method of using coordinates, the tradition was to be revered. Fra Mauro felt it necessary to apologize for not following the parallels, meridians, and degrees of the Geography on his world map of 1459, because he found them too confining to show discoveries (presumably in Asia) unknown to Ptolemy. Andreas Walsperger, in his mappamundi of 1448, stated that it was “made from the cosmography of Ptolemy proportionally according to longitude, latitude, and the divisions of climate.” He exiled the monstrous races found in Africa on earlier maps to Antarcctica. 144 Later in the century, Henricus Martellus Germanus developed the second Ptolemaic projection for his world maps and fitted the new discoveries into it, but his efforts belong to the Renaissance, along with the globe of Martin Behaim. 145

The maps of Giovanni Leardo, a Venetian cosmographer of the mid-fifteenth century, provide useful examples of a genre of late medieval mappamundi cen-

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138. Rome, Biblioteca Apostolica Vaticana, Archivio di San Pietro, H. 31. The original author of this map is unknown; Pirrus de Noha was simply a copyist. See Destombes, Mappemondes, 187–88 (note 31).
139. Durand, Vienna-Klosterneuburg, 52–60 (note 52).
145. Although Behaim’s globe, the Laon globe, and the Martellus planispheres are included in Destombes as pre-1500 world maps, they belong in the Renaissance period and will be dealt with in volume 3.
tered on Jerusalem on the eve of the age of exploration of the Western Hemisphere. Almost nothing is known of Leardo other than from his three surviving world maps (all signed and dated respectively 1442, 1448, and 1452), and the description of one now lost (also signed by Leardo and dated 1447). The three existing maps all have calendars that show the zodiac, the dates of Easter, and, for the largest two (1448 and 1452), the phases of the moon. The maps use similar signs despite their varied size, and the torrid and frigid zones are displayed prominently and colored appropriately (plate 20).146

Such maps were to give way to those that assimilated the new discoveries into the Ptolemaic framework, abandoning the convention of placing Jerusalem at the center of a circular map. Since the traditional frame no longer held the new discoveries in the fifteenth century (Andrea Bianco’s world map of 1436 literally breaches its circular border in East Asia), it became a practical impossibility to center the maps on Jerusalem. Several mid-fifteenth-century mappaemundi reflect this, including Andrea Bianco’s map, the Catalan world (Estense) map of about 1450, Walsperger’s map of 1448, the Borgia map on metal, the Genoese map of 1457, and Fra Mauro’s map of 1459.147

146. On Leardo and his maps, see P. Durazzo, Il planisfero di Giovanni Leardo (Mantua: Eredi Segna, 1885), and John Kirtland Wright, The Leardo Map of the World, 1452 or 1453, in the Collections of the American Geographical Society, American Geographical Society Library Series, no. 4 (New York, 1928), who does not, however, mention Durazzo and his clear transcription of the date “1452.” On the 1448 map preserved in Vicenza, see Teatro del cielo e della terra: Mappamondi, carte nautiche e atlanti della Biblioteca Civica Bertoliana dal XV al XVIII secolo: Catalogo della mostra (Vicenza: Biblioteca Civica Bertoliana, 1984), 16–17 and unnumbered plate.

147. Fra Mauro, on his map of the world, 1459, Venice, Biblioteca Nazionale Marciana, rationalizes his placing of Jerusalem away from the center of the map by stating that he has used the center of population. See the transcription of the legend by Gasparrini Leporace,
In this section we have tried to show that there were clear differences in the character of medieval world maps depending on the subperiod in which they were created; it is thus not possible to generalize accurately for the mappamundi of this thousand-year period. In the patristic period, from about 400 to 700, three basic cartographic traditions—the Macrobian, Orosian, and Isidorian—were established, and these do recur throughout the Middle Ages. In the second period, from about 700 to 1100, in which a reasonable sample of mappamundi first appears, little innovation is seen except in the maps of Beatus, despite the renewed interest in natural science. It is not until the third period, from about 1100 to 1300, with the influx and translation of numerous Arabic and Greek manuscripts, especially the Almagest, that scientific interest reawakens. The last period, from about 1300 to 1460, stands apart from the earlier tradition of mappamundi and acts as a transitional stage between the medieval and modern worlds of mapping. The three frameworks of maps—monastic, nautical, and Ptolemaic—which had for a while each enjoyed a separate and parallel development, came together in the fifteenth century and set the stage for the technical advances of the Renaissance.

Themes in the Study of Mappamundi

Contemporary evidence on the methods of construction of mappamundi is extremely scanty, the brief description by Hugh of Saint Victor being unusual. The artifacts themselves often speak eloquently about how they were made, but much more intensive scrutiny of the original artifacts needs to be done. The aim of this section is to treat thematically some of the points arising from the previous chronological survey. This will include a discussion of the framework, concepts of the shape of the earth, projections and coordinate systems, the production of mappamundi (inks and pigments, lettering, signs, and color), and the content and meaning of the maps as revealed in the factual aspects of their geography, the more fanciful legendary traditions, and their complex symbolism.

The Frame of the Mappamundi

We have already suggested that the medieval world maps were conceived within a preestablished frame of a limited selection of geometric shapes: circular, oval, rectangular, or mandorla, each shape having its own symbolic connotation. This is borne out by Hugh of Saint Victor’s description of how to draw a mappamundi in the shape of an ark, his instructions clearly being more related to the mystical functions of the map than to any geographical use. In the absence of a firsthand description of the compilation methods of maps of the size and complexity of the Hereford or Ebstorf maps it is difficult to imagine how places could be fitted into the outline. Since no graticule was apparently drawn, one must assume that once the border, the center, and the tripartite division were established the countries and other details were broadly sketched in and adjusted until they fitted the designer’s intentions. This assumption is supported by the unfinished state of paradise on the pair of oval world maps by Higden in the British Library. The uncolored part reveals a faint underlying sketch (fig. 18.25).

Close physical scrutiny of a large sample of the original documents might well yield further evidence about these frameworks in the same way that calligraphers are now finding detailed clues to the history of their craft by examining medieval manuscripts with such technical questions in mind. A parallel study for maps has yet to be systematically undertaken, although it must be admitted that the lack of large mappamundi is a major barrier to this approach. Had the Ebstorf map been examined with this in mind and the results properly documented before its destruction in 1943, some further important clues might have been revealed.

Concepts of the Shape of the Earth

In geography and cartography, the persistent influence of classical Greek learning in medieval times is shown

Mappamondo di Fra Mauro, 38 (note 137). The attribution to Andrea Bianco in Woodward, “Reality, Symbolism, Time, and Space,” 517 (note 17) is incorrect. It should also be pointed out, however, that several fifteenth-century maps were centered on Jerusalem, such as the world map in the Rudimentum novitiorum (1475), the world maps of Hanns Rüst and Hanns Sporer, or the three extant maps of Giovanni Leardo (1442, 1448, and 1452). But these were, without exception, based on much earlier models that had appeared when the practice of centering the map on Jerusalem was more usual.

148. See the description below by Hugh of Saint Victor, p. 334.
149. This topic is discussed in detail by Arentzen, Imago Mundi Cartographica, 29–37 (note 32). The structural shape of mappamundi has also been the subject of three articles by Osvaldo Baldacci: “Ecumenè ed emisferi circolari,” Bollettino della Società Geografica Italiana 102 (1965): 1–16; “Geoeccumeni quadrangolari,” Geografia 6 (1983): 80–86; and “L’ecumene a mandorla,” Geografia 6 (1983): 132–38. In the first article, Baldacci stresses the fundamental difference between the circular shape of the oikoumene and the implied sphericity of the zonal hemispheric system. In the second and third articles, he argues for the influence of Strabo and Marinus of Tyre on both the rectangular and mandorla shapes of medieval mappamundi, but since the ideas of Marinus were transmitted through Ptolemy’s Geography, which was not available to the West until the fifteenth century, the influence of Marinus at least is difficult to accept.

150. British Library, Royal MS. 14.C.ix, fols. 2v, 3r, and 3v.
151. The work of Michael Guglick, as reflected in Donald Jackson, The Story of Writing (New York: Taplinger, 1981), provides a particular example of this.
partly by the tenacity of the notion of the earth's sphericity, despite modern popular writers who have assumed that medieval (and even early Renaissance) man believed the earth was flat. This myth may have been perpetuated by some historians who have tended to emphasize the unusual beliefs of the period and even to accept these as the norm. For example, many general histories devote undue consideration to the concept of a flat, rectangular, four-cornered earth with a vaulted heaven from the sixth-century Christian Topography of Cosmas Indicopleustes. It is important to realize that Cosmas's text, now preserved only in two manuscripts, was not thought worthy of mention by medieval commentators, with the exception of Photius of Constantinople, who said not only that "the style is poor, and the arrangement hardly up to the ordinary standard" but also that "he may fairly be regarded as a fabulist rather than a trustworthy authority."

The relationship of the concept of the Antipodes to that of the earth's sphericity has been a source of confusion. The fathers of the church were embarrassed by a doctrine that implied the existence of a race not descended from the sons of Adam. But it was intellectually possible to believe that the earth was a sphere without subscribing to the idea of the Antipodes. It was about the latter that Virgil of Salzburg and Pope Zacharias confronted each other in the ninth century, not about the unusual beliefs of the period and even to accept these as the norm. For example, many general histories devote undue consideration to the concept of a flat, rectangular, four-cornered earth with a vaulted heaven from the sixth-century Christian Topography of Cosmas Indicopleustes. It is important to realize that Cosmas's text, now preserved only in two manuscripts, was not thought worthy of mention by medieval commentators, with the exception of Photius of Constantinople, who said not only that "the style is poor, and the arrangement hardly up to the ordinary standard" but also that "he may fairly be regarded as a fabulist rather than a trustworthy authority."

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action to these “pagan” works, Severianus and Lactantius were to take the opposite view, but the importance of their works, which have interested historians perhaps because of their controversial nature, has probably been exaggerated.159

The case of Isidore of Seville perhaps merits particular attention in view of the widespread influence of his writings, especially the Etymologies and De natura rerum. Isidore is clear about the sphericity of the universe: “The sphere of the heavens is rounded and its center is the earth, equally shut in from every side. This sphere, they say, has neither beginning nor end, for the reason that being rounded like a circle it is not easily perceived where it begins and where it ends.”160 While he uses the word globus several times in De natura rerum in connection with the moon or the planets,161 he neglects to comment directly on the sphericity of the earth itself except in the following passage: “The ocean, spread out on the peripheral regions of the globe, bathes almost all the confines of its orb”.162 What appears to be Isidore’s leaning toward a belief in a spherical earth is supported by the Epistula Sisebuti, an astronomical poem written as a letter to Isidore by Sisebut, king of the Goths, to whom Isidore had dedicated De natura rerum.163 In explaining an eclipse, Sisebut uses the word globus for the earth coming between the sun and the moon.164

Other passages in his texts have been used to support the idea that Isidore thought the world was flat. In one place, he described the earth as a wheel: “The circle of lands [orbis] is so called from its roundness, which is like that of a wheel, whence a small wheel is called orbiculus”.165 In another passage, he seems to have misunderstood the Greek concept of parallel zones from his reading of the Poeticon Astronomicon of Hyginus. He took too literally the statement that the lines separating the zones should be drawn as circles on a globe, and disregarded the possibility that these might look different when drawn on a flat surface. The zones thus appeared as five circles mechanically placed on a disk (fig. 18.26): “In describing the universe the philosophers mention five circles, which the Greeks call parallels, that is, zones, into which the circle of lands is divided. . . . Now let us imagine them after the manner of our right hand, so that the thumb may be called the Arctic Circle, uninhabitable because of cold; . . . the northern and southern circles, being adjacent to each other, are not inhabited, for the reason that they are situated far from the sun’s course.”166 Such an interpretation can hardly be taken as evidence of Isidore’s belief in a flat earth, however, when it reflects his inability to grasp the basic geometry of the Greek concept of the clima.

In another passage, Isidore seems to say that, when it rises, the sun is visible at the same time to people in both east and west: “The sun is similar for the Indians and the Bretons in the same moment that both see it rising. It does not seem smaller for the Orientals when it is setting; and the Occidentals, when it rises, do not find it any smaller than the Orientals.”167 Two interpretations are possible of the phrase “in the same moment that both see it rising.” It could mean that the rising sun is visible at the same time to people in both east and west, thus implying a flat earth. It could also be interpreted to mean that the size of the sun appears the same to those in the east and west at the time of its rising.

Despite Isidore’s apparent confusion about the shape of the earth revealed in these passages, the evidence appears to confirm that he thought the earth, like the universe, was a sphere. He was joined in this view by other influential Christian writers, some of whom explained the reasons thoroughly. For example, the Venerable Bede (672/73–735) was careful in his explanation: “The cause of the unequal length of the days is the globular shape of the earth, for it is not without reason that the


160. Brehaut, Isidore de Seville (note 84).

161. Isidore, Traité de la nature, ed. Fontaine, 223 (planets) and 231, 239, and 277 (moon) (note 84).

162. “Oceanus autem regione circumductionis sphaerae profusus, prope totius orbis adiuus fines.” Isidore, Traité de la nature, ed. Fontaine, 325 (note 84).

163. Isidore, Traité de la nature, ed. Fontaine, 151 (note 94).


166. “In definitione autem mundi circulos aiunt philosophi quinque, quos Graeci parallelolois, id est zonas uocant, in quibus diuiditur orbis terrae. . . . Sed fingamus eas in modum dexterae nostrae, ut pollex sit circulus arcticus, frigore inhabitabilis; . . . At contra septentrionalis et australis circuli sibi coniuncti idcirco non habitantur quia a cursu solis longe positi sunt.” Isidore, Traité de la nature, ed. Fontaine, 209–11 (note 84), author’s translation. This degeneration of the original clima concept was transmitted to the Muslim world, but with seven circles. See George Sarton, review of Ahmed Zeki Validi Togan, “Biruni’s Picture of the World,” Memoirs of the Archaeological Survey of India 53 [1941] in Isis 34 (1942): 31–32.

167. “Similis sol est et Indis et Britannis; eodem momento ab utrisque uidentur cum oritur, nec cum uergit in occasu minor apparat Orientalibus, nec Occidentalibus, cum oritur, inferior quam Orientalibus extimatur.” Isidore, Traité de la nature, ed. Fontaine, 231 (note 84), author’s translation.
Sacred Scriptures and secular letters speak of the shape of the earth as an orb, for it is a fact that the earth is placed in the center of the universe not only in latitude, as it were round like a shield, but also in every direction, like a playground ball, no matter which way it is turned. Saint Thomas Aquinas (ca. 1227–74) argued that the earth must be spherical because changes in the position of constellations occur as one moves over the earth’s surface.

Late medieval commentators generally agreed that the earth was a sphere. Aristotle’s elegant three-part demonstration of the sphericity of the earth and the astronomical works of Ptolemy—for which the concept was essential—were well known to the West after the twelfth century. The text of the Catalan atlas (1375) clearly states that the world is a sphere 180,000 stades in circumference. With the exception of a few polemical works against the idea—such as Zachariah Lilio’s Contrā Antipodēs—the medieval scholar would have agreed with Gautier de Metz that “a man could go around the world as a fly makes the tour of an apple” (fig. 18.27). The same theme is echoed in the writings of William of Conches, Hildegard of Bingen, Adam of Bremen, Lambert of Saint-Omer, Vincent of Beauvais, Albertus Magnus, Robert Grosseteste, Sacrobosco, Roger Bacon, and a score of others. Dante used the idea of a spherical earth to set his Divine Comedy, probably the most widely disseminated vernacular work of its type. Moreover, he apparently felt not the slightest need to justify his view. Even John Mandeville, whose Travels (ca. 1370) were immensely popular (albeit later ridiculed), explained that the earth was spherical and that the Antipodes could indeed exist.

![Fig. 18.26. Isidore’s View of the Earth’s Five Zones](image)

Isidore applied the Greek concept of zones not to a sphere but to a flat, circular earth, but this probably results from his misunderstanding of the nature of the concept and does not imply his ignorance of the earth’s sphericity.

![Fig. 18.27. Demonstration of the Earth’s Sphericity in the Thirteenth Century](image)

Gautier de Metz explained that if two travelers left from the same place in opposite directions they would meet at the other side of the earth.

Diameter of the original detail: 8.2 cm. From a printed edition of Image du monde (London: Caxton, 1481). By permission of The Huntington Library, San Marino, California.
Projections and Coordinate Systems

In the broadest sense, any transformation from one surface to another, and thus from a sphere to a plane, involves the process we call projection.  174 It could be argued, for example, that even the simple Macrobian diagrams with their parallel climata drawn on a circle were drawn on a projection crudely approximating an orthographic (equatorial aspect). The circular climata on the globe were thus portrayed with straight parallel boundaries on the flat map. It is possible to extend this argument to all mappaemundi and to point out, for example, that the world map of Matthew Paris and the “Jerome” map of Asia seem to have been constructed on “projections” approaching the azimuthal logarithmic, where the central part of the map—of most interest—is enlarged in scale. 175 Tobler has drawn our attention to a similar pattern of deformation on the Hereford map. 176

Interest in this aspect was also shown by d’Avezac-Macaya, who described the projection system apparently used by the seventh-century writer known as the “Ravenna cosmogapher” as the basis for his map. It is difficult to visualize this system, since it can be reconstructed only from the verbal description of the author, but d’Avezac-Macaya assumed that it was an oval map with twelve zones radiating from Ravenna. Each zone corresponded to the position of the sun overhead at hourly intervals during the day, from India in the morning to France (Brittany) in the evening, rather like a sundial superimposed on a world map. 177 Implied in this system is an azimuthal projection, although the center of the projection is still a point of discussion. 178

Deliberate systems of projection, however, that reveal a conscious knowledge on the part of their compilers of a transformation of coordinate positions, are not found in the Middle Ages until the time of Roger Bacon. In his Opus majus (1268), Bacon describes a map, which has not survived, that he appended to the work, which seems to demonstrate that he had a clear idea of the value of using a systematic coordinate system to transform and inventory the positions of places: “Since these climates and the famous cities in them cannot be clearly understood by means of mere words, our sense must be aided by a figure. In the first place, then, I shall give a drawing of this quarter with its climates, and I shall mark the famous cities in their localities by their distance from the equinoctial circle, which is called the latitude of the city or region; and by the distance from the west or east, which is called the longitude of the region.”  179 Then he goes on to describe a system of projection (which he calls a “device”) in which the positions of places may be known by their distance from the equator and central meridian. The parallels are equally spaced on the meridian quadrant 90° east or west of the central meridian (not on the central meridian itself; figure 18.28). This implies that the spacing of the parallels on the central meridian would decrease toward the pole. The meridians are equally spaced on the equator. From such a description it is clear that Bacon’s “device” was certainly not the orthographic projection that Cortesão reports. 180

Most modern maps are based not only on a specific projection but also on a system of mathematically constructed coordinates. However, since the primary function of mappaemundi was not locational (other than in the crudest topological sense), sophisticated coordinate systems are not to be expected. They were not, anyway, widely available in medieval Europe until the translation of Ptolemy’s Almagest into Latin in the twelfth century and the Geography in the fifteenth. These two texts may have provided medieval mapmakers with the crucial idea of an ordered space by the use of a pair of unique coordinates. On such a graph, information about the sky and the earth could be systematically inventoried. One of the earliest of these, dating from the first quarter of

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178. Other authorities center the map on other places, such as Constantinople, Rhodes, or Jerusalem. See Beazley, Dawn of Modern Geography, 1:390 (note 17).
179. Bacon, Opus Majus, 1:315 (note 97).
180. The description of Bacon’s projection has been partly reconstructed from the translation by Cortesão in his History of Portuguese Cartography, 1:194–98 (note 34).
the eleventh century, is a curious graph showing the passage of the sun and the planets through the zodiac (fig. 18.29). Here there is evidence of a clear notion of celestial longitude and latitude that would probably have been derived from Pliny's encyclopedia. It includes thirty parts of longitude and twelve parts of latitude within the zodiac.\(^1\)

**FIG. 18.29. AN ELEVENTH-CENTURY GRAPH.** One of several graphs from this period, the diagram shows the passage of the sun and planets around the zodiac.

The implications of graphing went beyond a mere inventory function. The graphic representations of time, speed, distance, and instantaneous velocity by Nicole Oresme (ca. 1320–1382), Giovanni de Casali, and other mathematicians were essential to the understanding of these concepts. In the words of a modern historian of mathematics: "The development of graphical representation forged a link between the intuitive concepts of continuously varying quantities arising from physical phenomena and the geometry of the Greeks."\(^2\) The connection between the graphing concept and cartography is seen in Oresme's use of the terms "longitude" and "latitude" for the independent and dependent variables plotted on a graph. Once these ideas were associated with algebraic symbolism, the seventeenth-century mathematicians René Descartes and Pierre de Fermat were able to formulate analytical geometry in the form familiar today.\(^3\)

Although both the *Almagest* and the *Geography* remained unknown to the Western medieval world before the twelfth century, the concept of longitude and latitude had nevertheless filtered into northwestern Europe by the early eleventh century, largely through contacts with Islamic scientists in Spain. For example, al-Zarkali (ca. 1029 to ca. 1087), a Spanish Muslim from Cordova, was the principal composer of the Toledo tables. These tables contain a long list of geographical coordinates based on the prime meridian of the Canaries. For the first time, the length of the Mediterranean was given correctly as 42° of longitude.\(^4\)

There had also been attempts to measure longitude in the eleventh and twelfth centuries. Petrus Alphonsus (1062–1110) gave an explanation of the relation between time and longitude in his *Dialogi cum Judaeo*. Walcher's observation of lunar eclipses on 19 October 1091, on 18 October 1092, and in 1107–12 demonstrated a clear understanding that longitude could be expressed as a difference in time between two places: a lunar eclipse in Italy was seen shortly before dawn, whereas in England it had been observed in the middle of the night.\(^5\) Later in the same century, Roger of Hereford reported that the eclipse of 12 September 1178 was observed simultaneously in Hereford, Marseilles, and Toledo and calculated the longitude of these places in relation to the meridian of Arin, the mythical center of the Islamic world.\(^6\)

As Durand has shown, neither the early techniques of graphic representation of coordinates in Oresme nor the ability to measure longitude as the difference in time between two places can be shown to have had a direct influence on medieval cartography. Coordinates, for example, were used exclusively to calculate the relative time differences of places required in astrology rather than to aid in locating them on a map or globe. But although there is no clear testimony of the use of geographical coordinates in Europe between Roger Bacon and the first Vienna-Klosterneuburg maps of about 1425, the principles must have remained latent. The lack of maps drawn on this principle in this period, therefore, may have had more to do with the availability of reliable positional data than with the existence of a method of plotting it.\(^7\)

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\(^4\) For the Toledo Tables were adjusted for the location of Marseilles in the twelfth century by Raymond of Marseilles (Paris, Bibliothèque Nationale, MS. Lat. 14704, fol. 119v). See also Haskins, *Mediaeval Science*, 96–98 (note 50).


\(^6\) See below, appendix 18.1.

\(^7\) Durand, *Vienna-Klosterneburg*, 94–105 (note 52). Wright, *Geographical Lore*, 246 (note 18), may have been too categorical in
The Production of Mappaemundi: Parchment, Inks, Pigments, Color, and Lettering

Mappaemundi were regarded as paintings in the early Middle Ages. Since their makers were map painters rather than cartographers in the modern sense of the word, the methods, tools, and materials used for these maps were those of the medieval artist in general. In particular, since the vast majority of these maps were produced for manuscript books, the techniques involved are indistinguishable from those used in manuscript illumination. Although yielding its place as a major art to architecture and sculpture in the course of the twelfth century, illumination was the focus for many major medieval artists and arguably constituted the greatest of the early medieval arts. 188

The manuscript book was not the only vehicle for mappaemundi. The images appear in a variety of forms and materials. They are seen in stained-glass windows, frescoes, and floor mosaics, in reredos and tympana decoration, as sculpture, and even carved in benches. 189 Most commonly, however, they are found in manuscript encyclopedias, Bibles, and psalters. Thus, the vast majority were drawn and painted on parchment with a variety of inks and pigments. 190

Records relating to the cost of mappaemundi or of the materials on which they are drawn are scanty. There is a mention in the account books of the monastery at Klosterneuburg of a series of payments for a “mappa.” Durand believes that the high cost of this map (thirty florins)—and the probable reference to making a case for it (payment of six talers for a locksmith)—suggests that it was large and elaborate. 191 Other sources of information, unfortunately now lost, were the account books of the monastery of San Michele di Murano, in which was found a notice concerning the copying and transmittal of the mappamundi (presumably for King Afonso V of Portugal) in the workshop of Fra Mauro, but without the details of the expenses. 192

The attitude of medieval artists toward imperfections seems to have often been casual, as regards either the parchment or the drawing of the maps. For example, on the “Jerome” map of Asia, a hole in the vellum (about 3 × 5 cm) had been patched and sewn with another small piece before the map was drawn. The patch itself was then used to represent Crete, its shape preordained by the defect in the material (fig. 18.30). On the verso of the same leaf, on which a map of Palestine is drawn, the edge of the patch becomes the Caucasus Mountains from which the Ganges, Indus, and Tigris rivers are shown to spring. 193

Several treatises on the materials and pigments used by medieval illuminators can help in reconstructing the methods used in the technical creation of the mappae-

...
Medieval Mappaemundi

FIG. 18.30. MAP ON VELLUM SHOWING REPAIR. The vellum of this twelfth-century map has been ingeniously repaired with a patch that then represents Crete. Length of the patch: 5.3 cm. From the “Jerome” map. By permission of the British Library, London (Add. MS. 10049, fol. 64r).

could be extremely long. Mappaemundi were thus quite as much written as drawn. Calligraphic styles follow those prevailing in the texts of the time and thus can provide at least a very rough guide to the origin and chronology of the maps. For instance, there are the national hands of the sixth to the eighth century (although very few maps survive from this period), the Carolingian minuscules of the eighth to the twelfth century, and the Gothic or black letter in its various forms of the twelfth to the fifteenth century. Also common on mappaemundi are the semiformal crossbred current styles known as littera bastarda, combinations of the cursive everyday secretarial hand and the more formal black letter.196

Lettering was not usually laid out on the mappaemundi in a systematic manner, nor was there usually an attempt to rule guidelines. In some cases the vellum had been routinely ruled up for text before the map was drawn and there is sometimes an attempt to follow the lines. This can be seen, for example, in one of the Ranulf Higden maps in the British Library, or in the Cotton “Anglo-Saxon” map, where the map was drawn on the verso of a page on which lines had been scored.197 The scored lines show through the page, and the artist obviously made a conscious attempt either to line up the lettering or to avoid them. In some reproductions of the Cotton map, such as those in Beazley or Miller, the lines can be seen, but it is important to realize what they are and that they have no substantive meaning.198 Such a point is a reminder of the importance of examining originals in order to avoid unfounded conclusions.

The inclusion of explanatory matter on the face of the map obviated the need for separate keys of signs. This topic has recently been explored by von den Brincken and by Delano Smith.199 The occurrence of what have been called “silent maps” lacking any lettering was exceptional among mappaemundi. Von den Brincken cites only one example, which she discusses at length, the fourteenth-century world map in the Livre dou trésor of Brunetto Latini. She suggests, intriguingly and plausibly, that it lacks lettering because Latini could have used an Arabic model on which the legends were in Arabic, a language he could not transcribe.200 In the later Middle Ages, explanations of the map painter’s intentions are sometimes found on the map itself, as in the case of the world map of Andreas Walsperger (1448). Walsperger explains his system of distinguishing between Christian and Islamic cities: “The earth is indeed white, the seas of a green color, the rivers blue, the mountains variegated, likewise the red spots are cities of the Christians, the black ones in truth are the cities of the infidels on land and sea.”201

197. The Higden map is British Library, Add. MS. 10104, fol. 8r. The Cotton map is British Library Cotton MS. Tiberius B.V., fol. 56v.
200. Von den Brincken, “Zeichen und Farbgebungen” (note 199). It should be pointed out that the date for the Latini map is thought on stylistic grounds to be later than the dates for the compilation of the work while Latini was in exile (1260-66), but it probably predates 1320.
The use of color is widely varied on the mappaemundi, but certain deep-seated conventions, such as blue or green for water and red for the Red Sea, are usually followed. Occasionally, unusual coloring is seen, like the bright Mozarabic colors of the Beatus maps or the gray sea and orange rivers of the Cotton “Anglo-Saxon” map (plate 22). A list based on von den Brincken, of thirty selected maps on which the color has remained intact and unfaded, is provided as table 18.4. Considerable variation is noted, except in such conventions as the use of red for the Red Sea.

Signs for towns and mountains on mappaemundi had to be designed to overcome the problem of representing something in plan. Mountains were shown by chains of curves or spikes, teeth, heaps, lobes, or plaited ornamentation (guilloche). Towns were differentiated by stylistic pictures of groups of buildings seen from the side. Their realism varied depending on the mapmaker’s familiarity with the place. The Arabic world maps are generally more abstract in their use of signs, using circles for cities.

**CONTENT AND MEANING**

The content of mappaemundi may be conveniently discussed under three headings: the historical and geographical facts; the marvels, legends, and traditions; and the symbolic content. Of these, as has already been pointed out in this chapter, the greatest emphasis in the literature has traditionally been on the first two categories, particularly—it often seems—in order to demonstrate the shortcomings of medieval learning, such as the errors in the location of places and features on the earth and the curiosities associated with medieval fable and legend. The third category, symbolic content, has received little attention until recently, but its importance in understanding the meaning and historical significance of the mappaemundi will be demonstrated here.

**Historical and Geographical Information**

The factual information on medieval world maps is a blending of historical events and geographical places, a projection of history onto a geographical framework. As with the medieval popular illustrations, in which a story is told by the simultaneous portrayal of various stages of the narrative within a single frame, a mappaemundi not only represents static geography but is also an aggregation of historical information the mapmaker considered important with regard to his audience, no attempt being made to separate or identify the two types of information. This dual problem of man’s status in the world and the universe—which Bertrand Russell has called “chronogeography”—was a prime question of the medieval philosophers.

The sources of historical and geographical information available to the makers of mappaemundi were both classical and biblical. The emphasis on the latter increased toward the end of the Middle Ages. Both traditions were rich in historical and geographical lore—the commemoration of famous events and places being sometimes inseparable. The biblical tradition in the mappaemundi is usually derived from the Old rather than the New Testament. In early Judaism the importance of the location of events was emphasized, but early Christianity showed little interest in such things, with certain important exceptions such as the journeys of Saint Paul. The teachings of Christ emphasized the spiritual and not the physical world. In addition, although the Bible is full of references to places of local interest, there are few allusions indeed to cosmography: the words “sphere,” “globe,” or “hemisphere” in the geographical sense are nowhere found in its pages.

In reaction to the classical geographers, the early fathers of the church were also anxious to stress that knowledge of the earth was of strictly secondary importance to the Christian, whose eyes should be on a higher spiritual plane. In outlining the characteristics of a true believer, Saint Augustine commented that “a man who has faith in you... though he may not know the track of the Great Bear, is altogether better than another who measures the sky and counts the stars and weights the elements.”

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206. John 4:19–24. In response to the question whether to build a shrine at Gerizim or Jerusalem, Christ’s answer was that one should be less concerned with location than with motivation.
207. The phrase in Ps. 83:11, “surface of the globe,” is now considered to have no geographical significance. See *The Anchor Bible* (New York: Doubleday, 1964–), vol. 17, Mitchell Dahood, trans., *Psalms II: 51–100*, 275 n. 11. In addition, the frequent references to “the round world” in the original (sixteenth-century) *Book of Common Prayer*, as in Ps. 89:12, 96:10, 98:8 (Psalms 88, 95, and 97 in the Bible) express circularity rather than sphericity, from the Latin of the Vulgate, *orbis terrae*. The only specific mention of a “map” (or at least a town view) that I have been able to find in the Bible is in Ezek. 4:1: “Man, take a tile [Vulgate: *laterem*] and set it before you. Draw a city on it, the city of Jerusalem.” It is also possible, as Menashe Har-El believes, that maps were in use for the extensive survey (register) dividing the tribes of Israel, found in Joshua 13–19, especially Josh. 18:5. See Menashe Har-El, “Orientation in Biblical Lands,” *Biblical Archaeologist* 44, no. 1 (1981): 19–20.
<table>
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</tr>
<tr>
<td>ca. 1109</td>
<td>Beatus-Silos</td>
<td>Blue</td>
<td>Red</td>
<td>Blue</td>
<td>Green and red arch clusters</td>
<td>Only legends</td>
</tr>
<tr>
<td>ca. 1110</td>
<td>Henry of Mainz</td>
<td>Green</td>
<td>Red</td>
<td>Violet</td>
<td>Red lobed chains</td>
<td>Double towers, ramparts</td>
</tr>
<tr>
<td>1119</td>
<td>Guido of Pisa</td>
<td>Blue</td>
<td>Red</td>
<td>Green</td>
<td>Double leaves, green inside</td>
<td>Legends only</td>
</tr>
<tr>
<td>13th</td>
<td>Psalter map</td>
<td>Green</td>
<td>Red</td>
<td>Blue</td>
<td>Natural-colored lobed chains</td>
<td>Ocher triangles</td>
</tr>
<tr>
<td>After 1342</td>
<td>Hidgen</td>
<td>Green</td>
<td>Red</td>
<td>Green</td>
<td>Green/red, green/black</td>
<td>Large vignettes</td>
</tr>
<tr>
<td>ca. 1430</td>
<td>Borgia map</td>
<td>---------------</td>
<td>No coloring</td>
<td>---------------</td>
<td>Rows of “teeth”</td>
<td>Triple towers</td>
</tr>
<tr>
<td>1448</td>
<td>Andreas Walsperger</td>
<td>Green</td>
<td>Red</td>
<td>Blue</td>
<td>Brown or green shapes</td>
<td>Red or black circles; individual buildings</td>
</tr>
<tr>
<td>1452</td>
<td>Giovanni Leardo</td>
<td>Blue</td>
<td>Red</td>
<td>Gray</td>
<td>Red/green three-tiered mountains</td>
<td>Building clusters</td>
</tr>
<tr>
<td>1457</td>
<td>Genoese map</td>
<td>Blue</td>
<td>Red</td>
<td>Gray</td>
<td>Green patches, gray/white hill drawings</td>
<td>Red, pink, and white tower clusters</td>
</tr>
<tr>
<td>1459</td>
<td>Fra Mauro</td>
<td>Blue</td>
<td>Blue</td>
<td>Blue</td>
<td>Green/blue hill drawings</td>
<td>Red, green, and blue tower clusters</td>
</tr>
</tbody>
</table>

In the absence of a grid of latitude and longitude, the main locational structure of the *mappaemundi* was provided by prominent hydrographic features. Three of these, the river Don, the Nile or the Red Sea, and the Mediterranean provided the boundaries within the tripartite world. Around the entire world was the encircling ocean, an enduring tradition since the time of Homer. Indenting the edge of the circular world are the prominent gulfs of the Red Sea and the Mediterranean; the Caspian Sea is also often shown as a small gulf in the northeast. The Gulf of Azov—the Palus Maeotis of classical times which becomes Methaphrastes Paludes on the *mappaemundi*—also sometimes appears as a small gulf of the surrounding ocean, as on the Corpus Christi College, Oxford, version of Higden’s map or the world map of Guido of Pisa (1119). This idea appears to have been derived from the passage in 2 Esdras prescribing that all the earth’s hydrography had to be connected in some way, a point taken up by Saint Basil.  

Although the four rivers of paradise—Tigris, Euphrates, Pishon, and Gihon—are usually shown on *mappaemundi* as fanning out from the location of paradise in a simple, stylized fashion, they were also represented as real rivers: the Tigris, Euphrates, Ganges, and Indus, as on the “Jerome” map of Palestine (fig. 18.31). The Nile is sometimes equated with the Gihon and shown as an extension of this river, as in a map found in a tenth-century manuscript of one of Isidore’s works (fig. 18.32). The persistence of the confusion over the correct location of the rivers of paradise is shown by Columbus, who, on hearing a report that his men in the caravel Correo had seen four rivers at the head of the Gulf of Paria on the third voyage in 1498, thought they were the rivers of paradise.  

Many fourteenth- and fifteenth-century *mappaemundi* contain a representation of the River of Gold, Strabo’s Pactolus and the Rio del Oro of the Middle Ages. The River of Gold was thought to be the flood reaches of the Niger above Timbuktu, and there were several attempts during the fourteenth century to develop a route to it from the coast of West Africa. It appears on the Catalan atlas, the Borgia map, the Catalan (Estense) map, and Fra Mauro’s map of 1459 (to cite only the better-known world maps), usually in the form of a bulging lake in the course of the river, into which four or five rivers flow from the western Mountains of the Moon.  

Information regarding human settlements on *mappaemundi* was also derived from a mixture of classical and biblical sources. The names of classical peoples, tribes, regions, and cities took their place with the names of the newly formed bordering nations in eastern and northern Europe. For example, the regions of the Slavs, Bulgaria, Norway, and Iceland all appear on the Cotton “Anglo-Saxon” map of the tenth century. The Henry of Mainz map includes Denmark and Russia. The Psalter map shows Hungary and Russia, and Bohemia, Poland, and Prussia appear first on the Ebstorf map and then on the Hereford map and on maps by Higden and Fra Paolino. Sweden first appears on the maps of Lambert of Saint-Omer, and Finland is found on the Vesconte and Fra Paolino world maps and on the printed world map in the *Rudimentum novitiorum*. Despite its publication date of 1475, this last work was derived from a much earlier source.  

Similarly, together with such classic regions as Gallia, Germania, Achaea, and Macedonia, the names of more recently organized provinces and states of commercial importance came to be inserted, as with the appearance of Genoa, Venice, and Bologna in Italy or Barcelona and Cádiz in Spain. Some cities had ceased to exist before the maps were drawn but their historical importance merited their mention, such as Troy in Asia Minor and Leptis Magna and Carthage in North Africa. Other cities were included in the maps because of their contemporary political importance, Rome and Constantinople among them.  

FIG. 18.31. THE RIVERS OF PARADISE. This detail from the twelfth-century "Jerome" map of Palestine shows the four rivers of paradise represented as real watercourses. The rivers are (top to bottom) the Ganges, Indus, Tigris, and Euphrates.

Size of the original detail: 15.7 × 15.7 cm. By permission of the British Library, London (Add. MS. 10049, fol. 64v).
Representations of monstrous races and historical legends on *mappaemundi* reflected the medieval craving for the bizarre and fantastic. In classical times, especially in Greece, such a demand had been expressed in the invention of mythical creatures with religious associations, such as centaurs, sirens, and satyrs. Nonreligious images were formed of monstrous races of men who inhabited progressively more remote areas as more of the earth became known. Many of these ideas derived from empirical observation—for example, the Amytyrae with protruding lower lips could well have been based on remote contact with the Ubangi tribe. The last two had apparently traveled to India, where most of the marvels were assumed to be found. With Alexander the Great's invasion of India in 326 B.C., a body of legend grew out of his travels that was revived in the Middle Ages in the form of the Alexander romances. Although the Greek geographer Strabo (64/63 B.C. to A.D. 21) disdained the reports of these marvels and monstrous races, being “seized with disgust for such worthless writings that contribute neither to adorn nor to improve life,” Pliny the Elder was less critical, and his writings had considerably more influence on medieval thought. His *Historia naturalis* (ca. A.D. 77) contained a vast collection of geographical lore culled from hundreds of sources. Much of Pliny’s encyclopedic work is of great descriptive value, but it was largely the bizarre that was transmitted to the Middle Ages. The *Collectanea rerum memorabilium* of Gaius Julius Solinus (third century A.D.), for example, emphasized the marvels and little else. Popular writers like Macrobius and Martianus Capella, although enlightened in several matters such as the zonal concept and the sphericity of the earth, also perpetuated the monster legends in later medieval times. All the great encyclopedias of the later Middle Ages contain references to *mappaemundi*.

The sources of the monstrous races go back at least to the fifth century B.C. to writers such as Herodotus, Ctesias of Cnidos (fl. 398 B.C.), and Megasthenes (ca. 303 B.C.). The last two had apparently traveled to India, where most of the marvels were assumed to be found. With Alexander the Great’s invasion of India in 326 B.C., a body of legend grew out of his travels that was revived in the Middle Ages in the form of the Alexander romances. Although the Greek geographer Strabo (64/63 B.C. to A.D. 21) disdained the reports of these marvels and monstrous races, being “seized with disgust for such worthless writings that contribute neither to adorn nor to improve life,” Pliny the Elder was less critical, and his writings had considerably more influence on medieval thought. His *Historia naturalis* (ca. A.D. 77) contained a vast collection of geographical lore culled from hundreds of sources. Much of Pliny’s encyclopedic work is of great descriptive value, but it was largely the bizarre that was transmitted to the Middle Ages. The *Collectanea rerum memorabilium* of Gaius Julius Solinus (third century A.D.), for example, emphasized the marvels and little else. Popular writers like Macrobius and Martianus Capella, although enlightened in several matters such as the zonal concept and the sphericity of the earth, also perpetuated the monster legends in later medieval times. All the great encyclopedias of the later Middle Ages contain references to *mappaemundi*.

216. Gen. 10.
218. Von den Brincken’s tables in “Mappa mundi und Chronographia” (note 23) allow the reader to trace all these place-names and others to the respective maps.
FIG. 18.33. DESCENDANTS OF NOAH. The families of Noah's three sons, "Sem," "Cham," and "Sefet" (i.e., Shem, Ham, and Japheth), are shown in this genealogical diagram from an eleventh-century manuscript of the *Commentary on the Apocalypse of Saint John* of Beatus of Liebana. The *mappaemundi*, top right (detail, fig. 18.52), is used to illustrate the division of the world between the three sons. Size of the original: 37 x 55.3 cm. Photograph from the Bibliothèque Nationale, Paris (MS. Lat. 8878, fols. 6v–7r).

### Table 18.5 List of the Main Semimythical Races Found on *Mappaemundi*

<table>
<thead>
<tr>
<th>Name</th>
<th>Characteristics</th>
<th>Location</th>
<th>Maps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amyctyrae</td>
<td>Protruding lower or upper lip</td>
<td>Scythia; Africa</td>
<td>Ebstorf Walsperger; Ebstorf</td>
</tr>
<tr>
<td>Anthropophagi</td>
<td>Man-eaters; drink from skulls</td>
<td>Antipodes</td>
<td>Beatus Walsperger</td>
</tr>
<tr>
<td>Antipodeans</td>
<td>Opposite-footed</td>
<td></td>
<td>Psalter Walsperger</td>
</tr>
<tr>
<td>Artibatirae</td>
<td>Walk on all fours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Astomi</td>
<td>Mouthless; apple smellers</td>
<td>Ganges</td>
<td>Walsperger</td>
</tr>
<tr>
<td>Blemmyae</td>
<td>Faces on chests; no necks; also known as Acephali</td>
<td>Libya (Africa)</td>
<td>Walsperger</td>
</tr>
<tr>
<td>Cyclopes</td>
<td>One-eyed; also known as Monoculi</td>
<td>Sicily; India</td>
<td>Walsperger</td>
</tr>
<tr>
<td>Cynocephali</td>
<td>Dog-headed</td>
<td>India</td>
<td>Borgia; Hereford; Ebstorf;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Walsperger; Psalter</td>
</tr>
<tr>
<td>Epiphagi</td>
<td>Eyes on shoulders (similar to Blemmyae)</td>
<td></td>
<td>Psalter Walsperger</td>
</tr>
<tr>
<td>Hippopodes</td>
<td>Horses' hooves</td>
<td>Africa</td>
<td>Psalter; Ebstorf</td>
</tr>
<tr>
<td>Maritimis</td>
<td>Hold bow and arrow (four eyes)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Martikhora</td>
<td>Four-legged beasts with men's heads</td>
<td>Africa</td>
<td>Beatus; Hereford; Psalter</td>
</tr>
<tr>
<td>Scropods</td>
<td>Shadow-footed (sometimes also called Monoculi, from the Greek, causing confusion with the Monoculi above)</td>
<td>India</td>
<td></td>
</tr>
<tr>
<td>Trogloodytes</td>
<td>Cave dwellers</td>
<td>Ethiopia</td>
<td>Walsperger; Psalter</td>
</tr>
</tbody>
</table>
monsters: Isidore, Rabanus Maurus, Honorius, Gautier de Metz, Gervase of Tilbury, Bartolomeus Anglicus, Brunetto Latini, Vincent of Beauvais, and Pierre d’Ailly. Inevitably, maps incorporated into these works also featured them, right into the fifteenth century. However, there was also the skeptical and perhaps nostalgic view, such as that expressed by François Rabelais (ca. 1495–1553): “I saw an incredible number of attentive men and women ... they held a mappamundi and spoke eloquently of prodigies ... of the pyramids and the Nile ... and of Troglodytes, of Himantopodes, of Blemmyae. ... of Cannibals. ... There I saw Herodotus, Pliny, Solinus ... and many other ancients ... all writing beautiful lies.”

The monstrous races posed a number of problems for the fathers of the church. If they existed—and there was general agreement that they did—were they human? And if they were human, were they descended from Adam and Noah, possessing souls that could be saved? Several biblical passages stated that the gospel must be preached to all nations of men, which was taken to include the monsters. Hence, the main target of the medieval missionaries were the Cynocephali—the dog-headed peoples sometimes associated with Islam—whose conversion would have created a dramatic demonstration of the power of the gospel. These creatures are thus found on the didactic mappamundi. The Borgia map, for instance, contains a representation of the dog-headed Saracen, under the rubric: “Ebinichibel is a Saracen Ethiopian king with his dog-headed people” (fig. 18.34).

The placing of the monstrous races on the world map varied according to the three main types of mappamundi. In tripartite maps, the races were usually crowded into a band in the southernmost part of Africa, no particular attempt being made to link the position of these peoples with climatic or other physical factors. This represents a location derived from Pliny. An additional advantage, in the eyes of medieval ecclesiastics, would have been their being shown as far as possible from the civilized center of the Earth—Jerusalem—but, as the Ebstorf map so vividly shows, still within the reach of the left arm of Christ.

In the zonal maps, the Antipodes have to be taken as the guide to the location of the monstrous races, since usually very few descriptions—verbal or graphic—are given on the maps themselves. In contrast, those maps that show a fourth continent, especially the Beatus type of map, which aimed to illustrate the mission of the church in the conversion of all peoples of the world, contain the earliest extant representations of the monstrous races, together with detailed rubrics.

The fear of races and spiritual forces outside Christianity gave rise to two other legends that appear so frequently on mappamundi that they merit individual explanation. These are the legends of the mythical Christian king Prester John and the suggested existence of nations associated with the names Gog and Magog. Gog, and his subjects Magog, appear in Ezekiel and in Revelation, where they are described as the forces of the Antichrist who will be loosed at the Day of Judgment to overrun the civilized earth. Alexander the Great is said to have built a wall, with a great brass gate in the Caucasus Mountains, in order to contain them. On the mappamundi, Gog and Magog were personified as two...
giants situated somewhere in the northern or northeastern part of Asia. Sometimes they were shown contained by Alexander’s wall, often mistaken for a representation of the Great Wall of China (fig. 18.35).\(^{229}\)

The Prester John legend, which Cortesão has called “the greatest hoax in the history of geography,”\(^{230}\) concerns the existence of a mythical Christian king. Prester John, it was hoped, would act as a rearguard ally of the Christians in their struggles with the Islamic empire.\(^{231}\)

According to Cortesão the story did not appear on any map until Carignano’s chart of about 1307, where the king is found in Ethiopia, albeit rather indistinctly. In the Vesconte and Sanudo world maps of about 1320, Prester John is shown in India. On several maps thereafter until well into the sixteenth century, the king is featured in India, China, and several parts of Africa, usually as a throned monarch holding a staff surmounted with a cross. As successive expeditions failed to find him, the choice of possible locations was progressively narrowed, and his image appeared to migrate accordingly (fig. 18.36).


\(^{231}\) The story of Prester John started in Rome in the early twelfth century. It was given credence by a forged letter of 1163 purporting to be from the mysterious priest-king John in India to Emmanuel of Constantinople and Frederick Barbarossa, describing the wealth and power of his kingdom. Pope Alexander III replied to this letter in 1177, asking if Prester John would pledge his support to reconquer Jerusalem for Christendom. The original letter (which is known to us in a hundred manuscripts and many fifteenth- and sixteenth-century printed editions) was to influence several attempts to find and make political contact with this mythical king. The efforts of Prince Henry the Navigator were particularly noteworthy in this regard; he sent his chamberlain, Antão Gonçalves to explore the coast of West Africa in 1441 with the instruction that “he not only desired to have knowledge of that land, but also of the Indies, and of the land of Prester John, if he could.” See Cortesão, *History of Portuguese Cartography*, 1:264 (note 34).
Symbolism: History, Power, and Orientation

The function of medieval mappae mundi was largely exegetic, with symbolism and allegory playing major roles in their conception. This was acknowledged at the time. Hugh of Saint Victor (ca. 1097–1141) defined a symbol as “a collecting of visible forms for the demonstration of invisible things.”²³² It can be inferred from this that Hugh was assuming symbols to have graphic form, whereas modern writers of medieval history and literature tend to refer to symbolic imagery in a strictly verbal rather than a graphic sense. The modern medieval historian is also more concerned with the abstract, mystical meaning of symbolism—the cross as a symbol of the Passion, for example—than with the spatial symbolism relating to the shape of the cross as representing the four directions of the universe in which the influence of God is found: height, depth, length, and breath.²³³ There is, however, support for the notion that medieval man thought in concrete and literal ways in addition to the mystical and allegorical. Ladner has pointed out that Saint Gregory of Nyssa (fourth century) even extended the spatial imagery of the cross to the two-dimensional view: the four quarters of the world and the four cardinal directions, and even to the four-part division of Christ’s clothing after the Crucifixion.²³⁴

Many such visible forms representing spiritual concepts of the Christian church are evident in the mappaemundi. Sometimes the whole map is presented as a symbol of Christian truths. The central theme is the earth as a stage for a sequence of divinely planned historical events from the creation of the world, through its salvation by Jesus Christ in the Passion, to the Last Judgment. Such an interpretation bears out von den Brincken’s view that the maps are as much historical chronicles as geographical inventories.²³⁵

In such maps, the creation of the world is symbolized by the way the tripartite schema is used to divide the earth into the three continents as peopled by the sons of Noah. The three-part structure is thus a symbol of the historical beginning of man’s life on earth. With varying amounts of detail, the families of Shem, Ham, and Japheth are depicted on individual maps according to their biblical listing in Genesis, Shem’s family having the largest share (Asia) to reflect his primogeniture. The Semitic, Hamitic, and Japhetic peoples derive from this division.

But the T-O map can also be seen as a symbol of the Passion of Christ. It is probable, as Lanman suggests, that the T in the T-O schemata represented a cross, but of the tau variety (the crux commissa). This is particularly noticeable when the ends of the crossbar are angled or truncated, as in figure 18.37.²³⁶ When the body of Christ is superimposed on the map of the earth in an all-embracing dying gesture, as in the Ebstorf map, the map itself becomes a clear symbol of the salvation of the world. Even the twenty-four monstrous races are embraced by the arms of Christ, although symbolically they are by his left hand at the very extremity of the world.

![FIG. 18.37. T-O MAP WITH TAU CROSS. Such images reinforce the symbolization of the Passion of Christ that is inherent within the T-O schema, the T-O representing the tau cross (crux commissa). The map shown here is dated to the eleventh century. Diameter of the original: 16.2 cm. From a manuscript of Sallust, De bello Jugurthino. By permission of the Universitätsbibliothek Rostock, GDR (Codex Philol. 27, fol. 1v).](image-url)


²³³. Eph. 3:18.


²³⁵. See above, pp. 288–90.

The inclusion of “Christ in Glory” at the head of several mappaemundi demonstrates the third symbolic stage of Christian history, that of the Last Judgment. The figures of Christ or of God the Father may be surrounded by a mandorla, an aura of light used to symbolize holiness and common in Christian art from the fifth century until the Renaissance. The almond shape of Higden’s maps and of the Genoese world map of 1457 is thus probably no accident. It reflects the use of this widespread symbol to denote the entire world as the domain of Christ.237

A mappamundi could thus represent simultaneously the complete history of the Christian world: its creation, salvation, and final judgment. Such a powerful message would not have gone unnoticed by those who saw either the small maps in monastic texts or the great wall maps—no longer surviving but to which we possess many allusions—that hung in churches and palaces.238

A special example of the spatial significance of a religious symbol lies in the association of the cross with the four cardinal directions, most commonly seen in the cruciform plan of churches, with the apse and altar in the east. The symbolism of the number four in Christian literature has its roots in classical times, as is illustrated by a diagram from Bede’s De natura rerum. The relationship between the four cardinal directions, the four seasons, and the four climates demonstrated by Bede goes back to Aristotelian thought (fig. 18.38).239 In this, the close relation between man and the heavens, the root of astrology, was also shown by the correspondence of the four peripatetic elements—fire, water, air, and earth—with the four humors of the human body, itself a microcosm of the universe.240 Isidore presented a similar diagram of the elements and their relation to the cardinal directions and climates (fig. 18.39).241 Table 18.6 summarizes the relations between the cardinal directions and various classical and medieval attributes.

The most specific allusion to the importance of such symbolism is given by Hugh of Saint Victor. Hugh’s On the Mystical Noah’s Ark not only provides us with an all too rare account of the making of a mappamundi, but also shows how the symbolic meanings were deliberately incorporated:

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The perfect ark is circumscribed with an oblong circle, which touches each of its corners, and the space the circumference includes represents the earth. In this space, a world map is depicted in this fashion: the front of the ark faces the east, and the rear faces the west. . . . In the apex to the east formed between the circle and the head of the ark is paradise. . . . In the other apex, which juts out to the west, is the Last Judgment, with the chosen to the right and the reprobates to the left. In the northern corner of this apex is hell, where the damned are thrown with the apostate spirits. Around this above-mentioned circle is drawn one a little wider so that the zones may be effectively seen; the atmosphere is in this space. In this second space, the four parts of the earth and the four seasons are represented: spring to the east, summer to the south, autumn to the west, and winter to the north.242

FIG. 18.38. THE SYMBOLISM OF THE NUMBER FOUR.
From a ninth-century manuscript of Bede’s De natura rerum, this diagram indicates the relationships perceived in the Middle Ages to have existed between the four cardinal directions (and the three continents), the four seasons, the four elements, and the four material properties (hot, cold, wet, dry).

Size of the original detail: 24 cm square. By permission of the Bayerische Staatsbibliothek, Munich (Clm. 210, fol. 132v).

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237. For illustrations of the various forms of the aureole or nimbus, including the mandorla, see F. R. Webber, Church Symbolism (Cleveland: J. H. Jansen, 1927), 154.
238. For example, the allusion by Matthew Paris to three such maps on his “world” map in the Chronica majora (British Library, Cotton MS. Nero D.V., fol. 1v).
241. Isidore, Traité de la nature, ed. Fontaine, fig. 2, 202 ff. (note 84).
The significance of the number four went beyond the physical characteristics of the earth and heaven. By their evangelistic association with the four corners of the earth in the Book of Revelation, the authors of the four Gospels are often shown in the northeast, southeast, southwest, and northwest corners of the world as in the Leardo map of 1452 (fig. 18.40). Since the time of Irenaeus, bishop of Lyons (ca. 180 A.D.), each was associated with one of the four winged creatures in Revelation.243

Even the orientation of the mappamundi has a symbolic meaning. The term “orientation” itself comes from primitive societies’ preoccupation with the east as a primary means of ordering space. The prominence of the four cardinal directions on the mappamundi, together with appropriate symbolic wind heads, thus undoubtedly has a far deeper significance than simply showing the reader which way the map is to be read. The maps

“Adjecimus tamen quaedam, quae breviter commemorabimus. Hoc modo arca perfecta, circumducitur et circulus oblongus, qui ad singula cornua eam contingat, et spatium quod circumferentia ejus includit, est orbis terrae. In hoc spatio mappa mundi deingiurit uta caput arcae ad orientem convertatur, et finis ejus occidentem contingat, ut mirabili dispositione ab eodem principe decurrat situs locorum cum ordine temporum, et idem sit finis mundi, qui est finis saeculi. Conus autem ille circuli, qui in capite arcae prominet ad orientem, Paradisus est, quasi sinus Abrahae, ut postea apparebit majestate depicta. Conus alter, qui prominet ad occidentem, habet universalis resurrectionis judicium in dextra electos, in sinistra reprobos. In cujus coni angulo Aquilonari est infernus, quo damnandis cum apostasis spiritibus de-trudentur. Post haec supradicto circulo alter paulo laxior circumducitur, ut quasi zonam videantur efficere, et hoc spatio aer est. In quo spatio secundum quatuor partes mundi quatuor annis temporum disponuntur, ut ut ver sit ad orientem, ad austrum aestas, ad occidentem autumnus, ad aequinonem hiems.”

243. Irenaeus, Five Books of S. Irenaeus, Bishop of Lyons, against Heresies, trans. John Keble (Oxford: J. Parker, 1872), 125. See also James Strachan, Early Bible Illustrations: A Short Study Based on Some Fifteenth and Early Sixteenth Century Printed Texts (Cam-
are found oriented in all four directions, but east, north, and south are the most common, in that order. An eastern orientation is usually, but by no means exclusively, found on the tripartite mappaemundi, and it follows the late Roman Sallustian tradition adopted by the Christian world. The northern orientation is found on the other large group of mappaemundi that can be traced back to earlier classical Greek sources and whose geometry was centered on the earth’s axis and the climata. The southern orientation is probably derived from Arabic influence, since world maps of the Arabic culture were characteristically oriented to the south. There may be two reasons for this. First, the early people conquered by the Arabs were the Zoroastrians, for whom south was sacred. Second, since the early cultural centers were in this newly conquered territory, north of Mecca, the holy direction toward which all Muslims prayed became south.

The cardinal directions thus not only were an abstract means of orientation, but became mythical entities in their own right. As is well documented, the position of the sunrise, followed by that of the sunset, is the object of a deeply rooted human curiosity. It has been observed that the directions east and west tend to be named in early languages before north and south. Of the two, words for east commonly precede those for west. The importance of east in social and religious practice is also shown in the origin of the words of many languages for the cardinal directions. For example, “north” was described by its position to the “left” of east, and it thus became associated with sinister behavior, left-handedness, and evil. In Celtic languages, the words for “north” and “left” are closely related.

Mappaemundi also became symbols of royal and imperial power, thus reflecting the secular influences behind their creation. The orb and scepter were accepted regalia in representations of royalty, not only in ceremony and art but also on coins of the realm. Some of the earliest extant pictures of the tripartite and spherical earth are found on coins. The tradition of representing the earth as a sphere on Roman coins started in the first century B.C. with a gold medal bearing on its reverse three circles representing the tripartite world. This is particularly significant considering the paucity of other references to the knowledge of the sphericity of the earth in Roman times. This symbolic incorporation of the world map or globe as an item of regalia continued throughout the Middle Ages. It was extended to paintings of God reigning in glory, depicted holding an orb surmounted by a cross in, usually, the left hand.

Another symbolic theme in the mappaemundi is the representation of the earth as a scene of vain pursuits. The vanitas symbol, as art historians call it, has been...
FIG. 18.40. LEARDO WORLD MAP, 1452. The authors of the four Gospels are shown in the four corners of this map following their evangelical association with the four corners of the earth in the Book of Revelation.

Size of the original: 73 × 60 cm. By permission of the American Geographical Society Collection, University of Wisconsin, Milwaukee.
well documented for the post-Renaissance period, but its sources date from much earlier. The allegory of the goddess Fortuna with a wheel or standing on a globe is found on Roman coins. In the medieval period, Fortuna's wheel was combined with a world map on the twelfth-century floor mosaic now in the Museo Civico, Turin (fig. 18.41).

Here the central circle is an allegory of Fortuna's wheel, while the imagery around the edge is clearly intended to be cartographic. Henry III's decoration of the hall in Winchester castle included both a world map (1236) and a wheel of fortune (1239). A poem by Baudri de Bourgueil (ca. 1100) refers to a map-pamundi on the floor of the chamber of Adela, countess of Blois, probably also intended as a vanitas symbol. Nothing of this has survived, but the map was described in such detail by Baudri that it is unlikely it was a product of mere imagination: he even refers to a glass top placed on it to seal out the dust.  


253. Baudri de Bourgueil, Les oeuvres poétiques de Baudri de Bourgueil (1046–1130), ed. Phyllis Abrahams (Paris: Honoré Champion, 1926), lines 719–948 (pp. 215–21). Professor O. A. W. Dilke, from his reading of Baudri's ambiguous Latin, believes that the map was not a mosaic, as has been reported, but probably either a painting on marble or a painting or embroidery on silk over marble (personal communication). The glass top is described in lines 727–28: “Ne vero pulvis picturam laederet ullus, Tota fuit vitrea tecta superficie” (So that the dust would not damage the picture, its surface was completely covered with glass—Author's translation).
Mapamundi could also reflect the two main ways the individual was considered in the Middle Ages to be related to the universe. Both the microcosmic and the anthropocentric concepts were pervasive themes in medieval cosmological thought. According to the microcosmic theme, the human body was viewed as an epitome of the universe, in which the elements, humors, and organs of the body (the microcosm) were directly related to and controlled by the universe (the macrocosm). It was the central purpose of astrology to explain these connections.

Mapamundi were themselves graphic epitomes of the earth, and the physical relationships between the earth and the universe are well illustrated, for example, in the Isidorian diagrams. Other diagrams show the human body in a mandorla-shaped framework surrounded by graduations of the zodiac or the earth as one of four concentric circles representing the elements. Mapamundi thus belong to a much wider family of spatial representations and ideas found in architecture as well as in cartography. Byzantine churches were often laid out with their main doors facing east, and later in the Middle Ages, particularly in northern Europe, the buildings were so oriented that the congregation faced the altar in the east. A dome, representing the heavens above the four directions of the earth, was often built above the intersection of the transepts and nave. In this way the building expressed the same symbolic spatial concepts as the mapamundi, a microcosm of earth and heaven.

The second concept, the anthropocentric, placed the individual in the center of an abstract geometric system of cardinal directions or in relation to some prominent feature in the landscape, such as a river. This was a natural world view in those societies where livelihood depended largely on the immediate visible environment and in which the daily and seasonal positions of the sun, moon, and stars were strong orienting influences. During the Middle Ages, however, man was not at the center of the world. The idea of the City of Man, at least in medieval Europe, as opposed to Augustine’s City of God, was to await the European Renaissance. If anything was depicted at the center of the mapamundi, it was not the monastic centers where the maps were made but the symbolic biblical centers, such as Jerusalem or Mount Sinai, or classical centers such as the sacred isle of Delos or Rome. For the Christian, there was clear biblical justification for centering maps on Jerusalem. There was also a sensitive awareness of space in the Old Testament that gave location an integral role in the events of Jewish history. Adamnan, abbot of Iona, in his De locis sanctis, speaks of: “a very high column which stands in the center of the city. . . It is remarkable how this column . . . fails to cast a shadow at midday during the summer solstice, when the sun reaches the center of the heavens.

And so this column . . . proves Jerusalem to be at the center of the world . . . and its navel.”

Such an observation of the sun is impossible astronomically (unless the column was leaning ten degrees toward the south), Jerusalem being some ten degrees north of the Tropic of Cancer. However, the attempt to prove a traditional concept with a scientific observation reflects the newfound respectability of science. Such scientific precision was also found in the description of Bernard the Wise (ca. 870), who reported that the walls of the four main churches in Jerusalem enclosed an unroofed porch, over which four chains were strung from each church to join in a point over the center of the world.

Despite such beliefs, Jerusalem was not shown as the center of most medieval mapamundi. This is apparent in those maps not in the diagrammatic T-O category, such as the Beatus, Orosius, or Higden or important twelfth-century maps like that by Henry of Mainz (fig. 18.42). It is true that three particularly well known mapamundi—the Ebstorff, Hereford, and Psalter maps—are all precisely centered on Jerusalem, and it is this that has perhaps led historians and geographers to overgeneralize. It has also been wrongly assumed that, since the T in the schematic T-O maps represents the meeting of the Mediterranean with the Don–Black Sea–Aegean–Nile axis, the Holy Land is near enough that intersection for Jerusalem to be at the center of the map. But there are not only many examples of where intersection of the stem and the crossbar of the T is far above the center, but also many where Jerusalem is placed at some distance from this intersection.


256. “This city of Jerusalem I have set among the nations, with the other countries round about her” (Ezek. 5:5).


261. For example, Paris, Bibliothèque Nationale, MS. Lat. 7676 (Reg. 6067), fol. 161. Destombes, Mapamondes, 63 (28.13) and fig. Illb (note 31).
FIG. 18.42. THE TWELFTH-CENTURY WORLD MAP OF HENRY OF MAINZ. Representing a class of mappaemundi which did not place Jerusalem at the center, this map is thought to have influenced later maps of the same type. Derived from an ancient Greek tradition, the center is the Cyclades, the islands circling the sacred isle of Delos, shown in this detail.

Size of the original detail: ca. 8 × 11 cm. By permission of the Master and Fellows of Corpus Christi College, Cambridge (MS. 66, p. 2).

Thus, while there is a clear biblical justification for centering these maps on Jerusalem and an empirical reason for doing so (it did occur roughly in the middle of the then known world), the idea does not seem to have been taken as literally as was previously thought. One reason for not centering maps on Jerusalem derives from the original use not of a Christian model, but of a Greco-Roman one in the mappaemundi, which was perpetuated through the Orosian tradition. The strengthening of the idea of Jerusalem as the spiritual center, a natural outcome of the Crusades, may have been responsible for a noticeable shift in the structure of mappaemundi from 1100 to 1300, toward centering the maps on Jerusalem.

Although many pilgrimages to the Holy Land had taken place in early medieval times—owing to the efforts of Saint Helena, a number took place in the fourth century—it was only after the Crusades that widespread popular attention was focused on the central position of Jerusalem. The trend toward centralization is seen when we compare the world map of Henry of Mainz (ca. 1110) with the Hereford map (ca. 1290), at either end of this period. This characteristic has been used to date the Vercelli map (which is not centered on Jerusalem) early in the thirteenth century, in contrast to the later Hereford and Ebstorf maps (both of which are so centered). By the fourteenth and fifteenth centuries, the
practice of placing Jerusalem at the center became common, but this was by no means true for the entire medieval period, or even the most of it.\textsuperscript{262}

\section*{Conclusions}

Traditional histories of cartography contain a number of misconceptions concerning the \textit{mappaemundi}. The three most important of these are the assumption that geographical accuracy was the prime function of the \textit{mappaemundi} (and hence that their goal was poorly achieved); the assumption that Jerusalem was almost invariably placed at the center of the maps; and the notion that the \textit{mappaemundi} illustrated and confirmed the popularly held view of the earth as a flat disk in the Middle Ages.

Although Crone drew attention to what he considered to be the route-planning function of some world maps, such as the representation of pilgrimage routes on the Hereford map, no amount of twentieth-century historiographic ingenuity can counteract the overwhelming evidence that the function of the \textit{mappaemundi} was primarily didactic and moralizing and lay not in the communication of geographical facts. The history of cartography, like the history of science, is moving away from being primarily a search for precursors and is attempting to understand the developments in various periods on their own terms. In the light of this interpretive shift, it now seems strange to read the views of the older historians of geography, such as Charles Beazley, who simply refused to describe such unambiguously cartographic manifestations of medieval culture as the Hereford and Ebstorf maps on the grounds that they appeared as retrogressions to an ever improving literal geographical picture of the world. In Beazley’s view, the only purpose of maps was precisely that of providing an accurate representation of the distribution of places and events in an increasingly “correct” continental outline.

The importance of the symbolic content of the \textit{mappaemundi} has thus now been established. This symbolism is a blend of the historical and the geographical. The maps consist of historical aggregations or cumulative inventories of the major events in both the Christian and the secular legendary history of the world, particularly the former. The three major events in the Christian history of the world—its creation, salvation by Christ, and the Last Judgment—commonly are symbolically portrayed on the maps or by the maps themselves, as in the Ebstorf map, which is a clear representation of the world as the body of Christ. There are also many examples where details in religious and secular history that span a thousand years appear on a single map without any differentiation between historical and geographical information. They are projections of history on a geographical base.

It has also been shown that the practice of placing Jerusalem at the center of the \textit{mappaemundi} was by no means a universal convention throughout the Middle Ages but was largely confined to the post-Crusade period in the thirteenth and fourteenth centuries. Once interest was focused particularly on Jerusalem after the main period of the Crusades, there does appear to have been a trend in this direction until the end of the Middle Ages, when the assimilation of new geographical information and frameworks from Ptolemy's \textit{Geography}, the development of the portolan charts, and the Renaissance discoveries led to a redefinition of the outer borders of the world map and a displacement of the traditional center.

It is also commonly assumed that the best-known form of \textit{mappaemundi}, the T-O map, with its tripartite division of the inhabited world and the surrounding ocean river, was prima facie evidence for universal medieval belief in a flat earth, a misconception still perpetuated in some school history texts in the context of Columbus's discovery of the New World. On the contrary, it has been shown that the influential Isidore of Seville, despite the ambiguity in his writings, was probably quite aware of the earth’s sphericity, and a score of medieval church fathers, scholars, and philosophers in almost every century from the fifth to the fifteenth stated this categorically. Furthermore, by the fourteenth century, thinkers such as Roger Bacon not only knew the earth was spherical but described the need for map projections to satisfactorily transform the curvature of the earth to a flat plane.

The study of \textit{mappaemundi} is well served—in comparison with other types of medieval maps—by general checklists and facsimile atlases. Sadly lacking are the detailed studies of individual maps and groups of maps in their cultural context along the lines of the work done by Durand for the fifteenth-century Vienna-Klosterneuburg map corpus. Obvious priorities would include regional studies on the \textit{mappaemundi} associated with the geographical culture in thirteenth-century England or on the general role of the medieval Franciscans in the development of systematic cartography. There also is a need to develop the construction of stemmata to show the pedigree of maps of the eighth century and later. Stemmata for selected map types such as those included in this chapter (Beatus, Higden) may help to clarify influences and lines of descent, but much more detailed work needs to be undertaken in order to date and place the artifacts more accurately.

It is perhaps ironic that one of the most thorough studies of a single medieval world map—the Vinland

\textsuperscript{262} This point is also made by Wright, \textit{Geographical Lore}, 259 (note 18). The concept of placing Jerusalem at the center of the world seems to have been introduced in the seventh century but was not generally established until the twelfth or even the thirteenth.
map—dealt with an alleged forgery. The importance of the use of modern techniques of physical analysis of parchment, pigment, and ink on the medieval mappaemundi cannot be overstressed. Such analysis would provide some much-needed benchmarks in dating and locating the place of manufacture of key artifacts. A case in point is the obscure origin of T-O maps representing both a fourth continent and the Meotides Paludes, a type that may include the earliest surviving world map, variously dated from the seventh to the ninth century (Saint Gall Stiftsbibliothek Codex 237). A study of the relation between this map and the T-O diagrams found in many manuscripts of the Beatus Apocalypse of Saint John may offer important insights into the transmission of cartographic ideas in the mappaemundi of the seventh and eighth centuries. This topic, along with others suggested in this chapter, calls for an unusual blend of historical and geographical scholarship combined with an awareness of the importance of graphic artifacts in the study of medieval culture.

APPENDIX 18.1
REFERENCE GUIDE TO TYPES OF MAPPAE MUNDI

This appendix is a graphic reference guide to the main types of mappaemundi based on the classification outlined in table 18.2 above. It provides an illustration of each type and briefly describes its characteristics and context.

Schematic Tripartite
ISIDORE T-O TYPE

Over two hundred examples of this type are listed by Destombes.1 They are found in two major works of Isidore of Seville (Isidorus Hispalensis; ca. 560–636): Etymologiarum sive originum libri XX (between 622 and 633) and De natura rerum (between 612 and 615).

The maps may be purely diagrammatic, bearing few or no names. In other cases the names of the sons of Noah are added or there is text describing the number of countries in each of the three major zones. Other maps include geographical features, such as place-names or bodies of water. For example, some of the maps in Isidore’s De natura rerum represent the Gulf of Tunis (fig. 18.43).

SALLUST T-O TYPE

The versions of this map are found in approximately sixty manuscripts of the De bello Jugurthino of Gaius Sallustius Crispus (Sallust; 86–34 B.C.), of various dates from the ninth to the fourteenth century.2 Its popularity in the fifteenth century is attested by the appearance of some fifty-five printed editions between 1470 and 1500.

The Sallust maps usually are less diagrammatic than their counterparts in Isidore’s works. The Don and the Nile rivers are frequently curved at the ends to reflect more closely the supposed courses of these rivers, and the maps usually include pictures of fortified towns or churches symbolizing major cities. Orientation is usually to the east, but it may also be to the south or west, as in figures 18.44 and 18.45. In cases with southern orientation, Africa may take up half the circle, with Asia and Europe sharing the other half (fig. 18.46), a configuration also alluded to in some medieval romances, for example Aspremont (late twelfth century) or Sone de Nansay (late thirteenth century).3 The ends of the crossbar of the T may be truncated at an angle as in figure 18.47.

FIG. 18.43. ISIDORE T-O MAP. From a late ninth-century manuscript of Isidore’s De natura rerum. Diameter of the original: 12.5 cm. By permission of the Burgerbibliothek, Bern (Codex 417, fol. 88v).

FIG. 18.44. SALLUST T-O MAP, WEST ORIENTATION. From a manuscript of the *De bello Jugurthino* of Sallust. Diameter of the original: 6.8 cm. Photograph from the Bibliothèque Nationale, Paris (MS. Lat. 6253, fol. 52v).

FIG. 18.45. SALLUST T-O MAP, SOUTH ORIENTATION. From a thirteenth-century manuscript of the *De bello Jugurthino* of Sallust. Diameter of the original: 4.3 cm. Photograph from the Bibliothèque Nationale, Paris (MS Lat. 5751, fol. 18r).

FIG. 18.46. SALLUST T-O MAP, AFRICA AS THE LARGEST CONTINENT. From a twelfth-century manuscript of the *De bello Jugurthino* of Sallust. Diameter of the original: 4 cm. Photograph from the Bibliothèque Nationale, Paris (MS Lat. 5751, fol. 18r).

FIG. 18.47. SALLUST T-O MAP WITH TRUNCATED RIVERS. From a thirteenth-century manuscript of the *De bello Jugurthino* of Sallust. Diameter of the original: 16.5 cm. By permission of the Biblioteca Medicea Laurenziana, Florence (Plut. 16.18, fol. 63v).
GAUTIER DE METZ T-O TYPE

Gautier de Metz, about whom very little is known, is the supposed author of an encyclopedic poem called *L’image du monde* in more than six thousand verses in Lorraine dialect, dating about 1245. More than one hundred manuscripts survive of two recensions in verse and two in prose.\(^4\)

The two types of *mappaemundi* found in these manuscripts are derived from book 14 of the *Etymologies* of Isidore. The first is in the form of a circle oriented to the east with a simple north-south line dividing the circle into equal parts. The four cardinal directions are shown, with the words “Aise la grant” (Asia major). The second is a more complete T-O map similar to the Isidore version but in French and occasionally surrounded with the names of the winds (fig. 18.48).


MISCELLANEOUS AND UNKNOWN AUTHORS

Several modifications of the standard Isidore T-O characterize the maps in this category, which include the T-O maps of several authors, such as Lucan, Macrobius (excluding the zone maps, which form their own category), the Venerable Bede, Guido of Pisa, and William of Tripoli, whose works are not numerous enough to warrant separate categories.\(^5\) Modifications include the use of “Libya” for Africa, Y-shaped rivers (fig. 18.49), a truncated and notched T, the addition of two symmetrical rivers (fig. 18.50), a modified representation of the Nile (fig. 18.51), and the crossbar of the T a little higher than usual so that the areas of the three parts of the earth are approximately the same (fig. 18.52).

**REVERSE T-O MAP**

The names of Africa and Europe are here reversed on the traditional T-O diagram, interpreted by Destombes as scribal error.\(^6\) However, Stevens has shown that this class of maps forms a well-defined subgroup based on an intentional reversal.\(^7\) The rationale for the reverse T-O lies in the different viewpoints of the tripartite geometry. The traditional form certainly represents the three continents in their correct topological positions when viewed from above and oriented to the east. But if the tripartite division is projected onto the heavens, with the observer facing west and looking from the earth out, Asia will remain at the top but Africa and Europe will be reversed. In the case of the Hereford map, however, the transposition of the names Africa and Europe is clearly a scribal error: the remaining names and geographical details of these continents are not reversed (fig. 18.53).

**Y-O MAP WITH SEA OF AZOV**

These maps, which are usually found along with the conventional T-O map in manuscripts of the *Etymologies* of Isidore from the ninth century on, contain a representation of the Sea or Gulf of Azov and its surrounding marshes and lakes (or Meotides Paludes) as two arms of the river Don at an angle. In antiquity, the Sea of Azov was thought to have been much larger in extent than its present size of approximately 150 miles by 200 miles.\(^8\) Its appearance on many maps in this category underlines its importance as a geographical feature in dividing the three main continents. Modifications include the addition of the four rivers of paradise, one of which is sometimes connected with the Nile.\(^9\) Menéndez-Pidal believes both these versions are directly linked to the development of the Beatus maps in the ninth and tenth centuries (fig. 18.54).\(^10\)

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FIG. 18.49. MISCELLANEOUS T-O MAP, Y-O VARIANT. From a twelfth-century manuscript of Macrobius’s *Commentarium in somnium Scipionis*. Diameter of the original: 8.7 cm. Photograph from the Bibliothèque Nationale, Paris (MS. Lat. 16679, fol. 33v).

FIG. 18.50. MISCELLANEOUS T-O MAP, SYMMETRICAL RIVERS. From a thirteenth-century manuscript of Sallust. Diameter of the original: 10.5 cm. By permission of the Master and Fellows of Gonville and Caius College, Cambridge (MS. 719/748, fol. 37v).

FIG. 18.51. MISCELLANEOUS T-O MAP, MODIFIED RIVER NILE. From a twelfth-century manuscript of Bede’s *De natura rerum*. Diameter of the original: 8.1 cm. Photograph from the Bibliothèque Nationale, Paris (MS. Lat. 11130, fol. 82r).

FIG. 18.52. MISCELLANEOUS T-O MAP, HIGH CROSS-BAR. From an eleventh-century manuscript of the *Commentary on the Apocalypse of Saint John* of Beatus of Liebana. See also figure 18.33. Diameter of the original: 4.7 cm. Photograph from the Bibliothèque Nationale, Paris (MS. Lat. 8878, fol. 7r).
V-IN-SQUARE AND T-IN-SQUARE MAPS

These variations on the T-O schema appear in various works; they may include a V or a T in a square oriented either to the east or to the south (fig. 18.55). An excellent example of the T-in-square map is also found in a manuscript of De natura rerum of Bede, in which the elements and seasons are related to the four cardinal directions from Ptolemy’s astrological work, the Quadripartitum or Tetrabiblos (fig. 18.38).11

Nonschematic Tripartite

This group contains those maps that retain the general tripartite distribution of the three inhabited continents but are not rigidly drawn to the T-O schema. They are subdivided here according to the historical origin of their content.

OROSIAN

These maps are based directly on the Historia adversum paganos of Paulus Orosius.12 They usually emphasize the Mediterranean basin, and their coastlines are almost always generalized in undulating style. Maps belonging to this group include the Albi map (fig. 18.56),13 the Cotton “Anglo-Saxon” map (fig. 18.57),14 two Matthew Paris maps (fig. 18.58),15 the world map of Henry of Mainz (fig. 18.59),16 and the Hereford mappamundi (figs. 12.4, 18.20, and 18.60).17

OROSIAN-ISIDORIAN

These maps, although owing their ultimate origin to Orosius, have been modified by the influence of Isidore of Seville. When comparing, for example, the oval Isidore map in figure 18.61

14. Destombes, Mappemondes, map 24.6 (note 1).
16. Destombes, Mappemondes, map 25.3 (note 1).
17. Destombes, Mappemondes, 197–202 (note 1).
with the Hereford map (figs. 18.20 and 18.60), one can see a difference in lineage: Jerusalem is not at the center, paradise is not situated due east, and the graphic generalization is far more angular and schematic. The Taurus-Caucasus Mountains are heavily emphasized, forming a chain containing the Gog-Magog region of northeastern Asia. Similar in general conception is the 1119 mappamundi by Guido of Pisa (fig. 18.62), which, in addition to its Orosian and Isidorian heritage, contains information derived from the Antonine itinerary, the Ravenna cosmography, and the Notitia Urbis. 18

Also belonging to this group are the so-called Psalter map (fig. 18.63),19 the Wiesbaden fragment (fig. 18.64),20 the Vercelli map (fig. 18.17),21 and the Ebstorf map (fig. 18.65).22

COSMAS INDICOPLEUSTES

The illustrations to the Christian Topography of Cosmas Indicopleustes form a small, well-defined separate group of medieval world maps, the importance of which has tended to be exaggerated because of their curiously fundamentalist flavor, once thought to characterize the medieval period. They are Christian, exegetical, and didactic in nature, but are regarded as an extension of the Greco-Roman Byzantine tradition discussed in chapter 15 of this volume (figs. 15.2 and 18.66).

RANULF HIGDEN

The mappaemundi of Ranulf Higden are found in the first book of the Polychronicon.23 The large oval map in the British Library (fig. 18.67) is believed to be closest to the original lost prototype. The circular maps, which form the smallest group (fig. 18.68), are thought to be later simplifications of the oval maps. The almond-shaped mandorla maps (also later variants) form a third group (fig. 18.69).

20. Destombes, Mappemondes, 202–03 (note 1).
22. Destombes, Mappemondes, 194–97 (note 1).
23. R. A. Skelton, in Destombes, Mappemondes, 149–60 (note 1).
FIG. 18.58. MAPPAMUNDI BY MATTHEW PARIS. From the first part of a thirteenth-century manuscript of Matthew Paris's *Chronica majora*. Size of the original: 35.4 × 23.2 cm. By permission of the Master and Fellows of Corpus Christi College, Cambridge (MS. 26, p. 284).

FIG. 18.59. THE HENRY OF MAINZ WORLD MAP. From a twelfth-century manuscript of the *Imago Mundi* by Honorius of Autun. See also figure 18.42 for detail. Size of the original: 29.5 × 20.5 cm. By permission of the Master and Fellows of Corpus Christi College, Cambridge (MS. 66, p. 2).
FIG. 18.60. THE HEREFORD MAP, CA. 1290. See also figures 12.4 and 18.20. Diameter of the original: 1.32 m. By permission of the Royal Geographical Society, London.

FIG. 18.61. OROSIAN-ISIDORIAN MAPPAMUNDI. From an eleventh-century copy of Isidore's *Etymologies*. Diameter of the original: 26.5 cm. By permission of the Bayerische Staatsbibliothek, Munich (Clm. 10058, fol. 154v).

FIG. 18.62. MAPPAMUNDI BY GUIDO OF PISA, 1119. Diameter of the original: 13 cm. Copyright Bibliothèque Royale Albert 1er, Brussels (MS. 3897–3919 [cat. 3095], fol. 53v).

FIG. 18.63. THE PSALTER MAP, THIRTEENTH CENTURY. See also figure 18.35 for detail. Size of the original: 14.3 × 9.5 cm. By permission of the British Library, London (Add. MS. 28681, fol. 9r).
FIG. 18.64. THE WIESBADEN FRAGMENT.
Size of the original: 75 × 59 cm. By permission of the Hessisches Hauptstaatsarchiv, Wiesbaden (MS. A.60).

FIG. 18.65. THE EBSTORF MAP. See also figs. 18.2, 18.3, and 18.19.
Size of the original: 3.56 × 3.58 m. From Walter Rosien, Die Ebstorfer Weltkarte (Hanover: Niedersächsisches Amt für Landesplanung und Statistik, 1952). By permission of the Niedersächsisches Institut für Landeskunde und Landesentwicklung an der Universität Göttingen.

FIG. 18.66. COSMAS INDICOPLEUSTES’ MAP FROM THE CHRISTIAN TOPOGRAPHY.
See also figure 15.2.
Size of the original: 23.3 × 31.5 cm. Photograph from the Biblioteca Apostolica Vaticana, Rome (Vat. Gr. 699, fol. 40v).
FIG. 18.67. HIGDEN'S OVAL MAPPAMUNDI. From a fourteenth-century manuscript of Higden's *Polychronicon.* Size of the original: 46.5 × 34.2 cm. By permission of the British Library, London (Royal MS. 14.C.ix, fols. 1v–2r).

FIG. 18.68. HIGDEN'S CIRCULAR MAPPAMUNDI. From a manuscript of miscellanea dated 1466. Diameter of the original: 14 cm. By permission of the British Library, London (Harl. MS. 3673, fol. 84r).
Zonal

The maps in this category are circular representations of the known hemisphere, usually oriented to the north, containing five or seven climatic zones that follow parallels of latitude. There are three main types: one early medieval type derived directly from Macrobian sources; a second from the work of Martianus Capella; and a third, arising later in the medieval period, that shows the influence of the zonal concept transmitted through Ptolemy and the Arab world.

MACROBIAN

The Macrobian map is derived from the cosmographical section (chaps. 5–8 of book 2) in Macrobius's early fifth-century commentary on Cicero's Dream of Scipio (51 B.C.). Over 150 maps drawn according to the Macrobian schema are found in manuscripts of the Commentary on the Dream of Scipio from the ninth century to the fifteenth.25 These maps have five climatic zones. The Alveus Oceani (ocean river) divides the hemisphere into two equal parts, surrounded by the Mare Oceanum (ocean sea) (fig. 18.70). The Orcades (Orkney) islands are sometimes represented to the west. Reference is usually made to the circumference of the earth as measured by Eratosthenes (252,000 stades) and to the impossibility of crossing the central zone.

TYPE DERIVED FROM MARTIANUS CAPELLA

The maps in this category are primarily found in the several versions of the Liber floridus of Lambert of Saint-Omer (ca. 1050–1125?), beginning with the Ghent manuscript of 1120 (fig. 18.71).26 They are derived from the work of Martianus Capella (fl. 410–439), The Marriage of Philology and Mercury, a fifth-century encyclopedia of the seven liberal arts.27 Similar maps are also found in the De philosophia mundi (ca. 1130?) of William of Conches (ca. 1080 to ca. 1154) (fig. 18.72).28

The Martianus Capella maps also contain the equatorial ocean but are of a quite different style than the Macrobian maps. The ecliptic is usually shown, with the twelve signs of the zodiac, and the generalization of the coastlines is rounded in nature. The maps are characteristically oriented to the east (although some are oriented to the north) and have a large amount of text in the southern continent. The zones may or may not be explicitly shown. Regularly shaped islands are usually found in the ocean surrounding the northern continent.

LATER MAPS BY ALPHONSOUS AND D’AILLY

Petrus Alphonsus (1062–1110) was a learned Spanish astronomer and geographer whose map appears in the Dialogi cum Judaeo. Pierre D’Ailly (1350–1420) was a French cardinal whose Imago Mundi (ca. 1410) appeared in several manuscript versions and a printed edition of 1480 or 1483. In some ways, the book forms a bridge between the medieval and Renaissance
periods in that it transmitted directly to Columbus Roger Bacon’s idea that the sailing distance westward from Portugal to India was only half the corresponding land distance eastward from Portugal to India.  

These maps show the influence of the zonal concept transmitted through Ptolemy and modified by the Arabic geographers. Prominent is the mythical town of Aryn (Arin, Arym, etc.), the Islamic center of the earth, lying on the central meridian bisecting the inhabited world. No central ocean is portrayed. Two versions, by Petrus Alphonsus and Pierre d'Ailly, may be identified. The Alphonse version is oriented south and contains three town symbols representing “Aren civitas” in the southern part (fig. 18.73). In the maps by d’Ailly, the three continents are named in the northern part, the meridian of Aryn is prominently marked, and the map is oriented to the north.

FIG. 18.73. ZONAL MAPPAMUNDI BY PETRUS ALPHONSESUS. From an early fifteenth-century manuscript of his *Dialogi duodecim cum Moyse Judaeo*. Diameter of the original: 9 cm. By permission of the Bodleian Library, Oxford (Laud. Misc. 356, fol. 120r).

FIG. 18.74. TRIPARTITE/ZONAL MAPPAMUNDI. From a fourteenth-century manuscript of the *Opera* of Sallust. Size of the original: 13 cm square. By permission of the Biblioteca Nazionale Marciana, Venice (Lat. Z.432, [MS. 1656], fol. 40r).

FIG. 18.75. QUADRIPARTITE MAPPAMUNDI: BEATUS TYPE. From a twelfth-century manuscript of the *Commentary on the Apocalypse of Saint John*. See also plate 13. Size of the original: 32 × 43 cm. By permission of the British Library, London (Add. MS. 11695, fols. 39v–40r).

FIG. 18.76. VESCONTE'S MAPPAMUNDI. From a fourteenth-century manuscript of the *Liber secretorum fidelium crucis* of Marino Sanudo. See also plate 16. Diameter of the original: 35 cm. By permission of the British Library, London (Add. MS. 27376*, fols. 187v–188r).
FIG. 18.77. THE CATALAN ATLAS, [1375]. See also plate 17.

Size of the originals: $65 \times 50$ cm. Photographs from the Bibliothèque Nationale, Paris (MS. Esp. 30).
Quadripartite

These maps share characteristics of both the tripartite and the zonal categories. The first type includes maps that are based on a clear T-O schema in the inhabited world with zones or a fourth continent added in the southern part. A second category may also be recognized in which the maps are derived from the now lost eighth-century mappamundi of Beatus.

TRIPARTITE/ZONAL TYPE

These maps follow the tripartite structure in the northern half, but the southern half either is left blank or contains climata. A central ocean river may or may not be present, and some portray the signs of the zodiac around the circumference (fig. 18.74).

These maps are usually found in manuscripts of the works of Sallust or Isidore. The Saint Gall map (fig. 18.14) is thought by Miller to be the earliest mappamundi known.30 Von den Brincken describes a curious hybrid in the Chronicle of John of Wallingford that contains a Y-shaped division of the continents in the Northern Hemisphere superimposed over seven zones, and a textual description in the Southern Hemisphere.31

BEATUS TYPE

The fourteen extant large Beatus maps are all thought to stem from one lost eighth-century prototype of Beatus of Liebana in his Commentary on the Apocalypse of Saint John.32 The map illustrates the mandate of the apostles to travel in all parts of the earth to preach the gospel (fig. 18.75). A stemma indicating the relationship of the illustrated manuscripts is provided as figure 18.15. The smaller maps found in the Beatus codices can be traced to Isidorian models.

Transitional Type

Many later mappamundi clearly show the influence first of the portolan chart in the fourteenth century and then of the Ptolemaic world map in the fifteenth, forming a separate transitional category between the medieval and Renaissance periods.

PORTOLAN CHART INFLUENCE

The first influence of the portolan chart is seen in the mappamundi of Fra Paolino and Pietro Vesconte in the 1320s.

32. Destombes, Mappemondes, 40–42 and 79–84 (note 1).
Both Catalan and Italian traditions of chart-makers are reflected in maps of this category, which include the world map in the Medici atlas, the map of Albertin de Virga,\(^{34}\) the Topkapi Library fragment, the Catalan atlas of 1375 (fig. 18.77), the maps of Buondelmonti 1420, and Andrea Bianco 1436, the maps of Giovanni Leardo (pl. 20 and fig. 18.40), the Catalan (Estense) map, the Borgia map, the Genoese map of 1437 (fig. 18.23), and the map by Fra Mauro (plate 18).

The maps of this type are often circular, with a well-delineated Mediterranean and Black Sea area directly derived from the portolan charts. The accuracy falls off dramatically outside the Mediterranean basin. The cartographic signs and generalization are similar in style to those of the portolan charts, as is the network of rhumb lines radiating from the center of the map. Biblical sources predominate, especially for the land areas toward the edges of the map. The explorations in Asia of the thirteenth century and the Portuguese expansion down the coast of West Africa of the fifteenth century are reflected in many of the later maps.

### PTOLEMAIC INFLUENCE

The maps are either circular or rectangular and reflect the influence of Ptolemy’s *Geography* (closed Indian Ocean, Mediterranean Sea twenty degrees too long, Mountains of the Moon, etc.), which appeared after the introduction and translation of this work to western Europe in the early fifteenth century. Some belong to a subgroup of maps called the Vienna-Klosterneburg map corpus, the world maps of which were compiled with the help of coordinates (fig. 18.78). Other examples include the Pirrus de Noha map of about 1414 (plate 19 and fig. 18.79), the fragment in the James Ford Bell Library, and the world map by Andreas Walsperger of 1448.


\(^{34}\) Destombes, *Mappemondes*, 205–7 (note 1).
### Appendix 18.2 Chronological List of Major Medieval Mappaemundi, A.D. 300–1460

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**Eighth Century**

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| ca. 750      | Pope Zacharias   | † | 3:151 | 9 |}
<p>| ca. 730      | Merovingian map  | Albi, Bibliothèque Municipale, MS. 29 (old 23), fols. 57v | 3:57 | 10 | 3.1:500 22.1 |
| ca. 950–60   | Beatus (M)*      | New York, Pierpont Morgan Library, MS. M644, fols. 33v–34 | 1:12 | 3.1:563 17.1 |
| 10th century | Beatus (U)       | Urgel, Archivo Diocesano, Codex 4 | 1:18 | 17.2 |
| 970          | Beatus (V)       | Valladolid, Biblioteca Universitaria, MS. 1789, fols. 36v–37 | 1:14 | 3.2:640 17.3 |
| 970          | Beatus b         | † | 1:16 | 3.2:641 17.5 |
| 975          | Beatus (G)       | Gerona, Museo de la Catedral, MS. 10 | 1:15 | 17.6 |
| ca. 1050     | Beatus (S)       | Paris, Bibliothèque Nationale, MS. Lat. 8878 (S. Lat. 1075), fol. 45 | 1:12 | 3.3:744 17.8 |
| ca. 1086     | Beatus (O)       | Burgo de Osma, Archivo de la Catedral, MS. 1, fols. 35v–36 | 1:15 | 3.3:766 17.9 |
| ca. 1109     | Beatus (D)       | London, British Library, Add. MS. 11695, fols. 39v–40 | 1:17 | 3.3:752 17.10 |
| ca. 1100–    | Beatus (Tu)      | Turin, Biblioteca Nazionale Universitaria, MS. III.1 (old D.V.39) fols. 38v–39 | 3.3:745 17.11 |
| 1150        |                  | Lisbon, Arquivo Nacional da Torre do Tombo, Codex 160 |          |            |</p>
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<td>[In poem of Baudri de Bourgueil: see above, p. 339]†</td>
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<td>Muri†</td>
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<td>Weihenstephan†§</td>
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\textsuperscript{b}Miller

\textsuperscript{c}Uhden

\textsuperscript{d}Kamal

\textsuperscript{e}Destombes
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**FOURTEENTH CENTURY**

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<td>Ambrogio Lorenzetti</td>
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<td>Stuttgart, Württembergische Landesbibliothek, Theol. Fol. 100 fol. 3v</td>
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### FIFTEENTH CENTURY

| 1405         | Author unknown   | Bourges†§ |
| 15th century | Medici atlas     | Florence, Biblioteca Medicea Laurenziana, Gad. Rel. 9 |
| 1410–12      | Author unknown   | Library of Amplionus von Rotinck†§ |
| ca. 1411–15  | Albertin de Virga | Location unknown |
| 1414?        | Pirrus de Noha   | Rome, Biblioteca Apostolica Vaticana, Archivio di San Pietro H.31, fol. 8r |
| 1416         | Authors unknown  | Duc de Berry (3 maps)† |
| 1417         | Pomponius Mela   | Reims, Bibliothèque de la Ville, MS. 1321, fol. 13 |
| ca. 1430     | Borgia map       | Rome, Biblioteca Apostolica Vaticana, Borgiano XVI (galerie) |
| 15th century | Anonymous Venetian | Rome, Biblioteca Apostolica Vaticana, Borgiano V |
| 15th century | Catalan (Estense)| Modena, Biblioteca Estense, C.G.A. 1 |
| 15th century | Author unknown   | Minneapolis, University of Minnesota, James Ford Bell Collection |
| 15th century | Bartholomaeus Anglicus | Wolfenbüttel, Herzog August Bibliothek, Codex Helmstedt 422 (cat. 477) |

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<td>Millerb</td>
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<td>15th century Jan van Eyck</td>
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<td>1436 Andrea Bianco</td>
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<td>1440? Vinland map</td>
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<td>1448 Andreas Walsperger</td>
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<td>1442 Giovanni Leardo</td>
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<td>1448–49 Fra Mauro</td>
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APPENDIX 18.2—continued

Note: Small T-O maps by Macrobius, Sallust, and others have been omitted from this list.
†Not extant.
*This column is ordered by the century to which the content of the map refers.
Youssouf Kamal, Monumenta cartographica Africae et Aegypti 5 vols. in 16 parts (Cairo, 1926–51).
This map of Asia is strictly speaking a regional map but contains so much of the world that it is included here. The other “Jerome” map on the verso is a regional map of Palestine and is not included here.
Letters refer to manuscript designations in the Beatus stemma in figure 18.17. Only the large Beatus maps are included here.
The large map in Madrid, Archivo Histórico Nacional, MS. 1240 is missing.
This map is interpreted by some to be a celestial map. See above, p. 303.

Letter designation refers to copies in the stemma in figure 18.21.
The authenticity of the Vinland map has been the source of much controversy, which still continues. The content of the map was thoroughly studied by Skelton in R. A. Skelton, Thomas E. Marston, and George D. Painter, The Vinland Map and the Tartar Relation (New Haven: Yale University Press, 1965), 107–239; he concluded that the map was drawn in the second quarter of the fifteenth century (p. 230) and was “the oldest surviving map of American lands” (p. 232). The publication stimulated several studies of both its content and physical form, summarized in Helen Wallis et al., “The Strange Case of the Vinland Map: A Symposium,” Geographical Journal 140 (1974): 183–214. The testing of the ink by Walter McCrone Associates suggested a date of about 1920 and appeared to close the issue, but recent proton beam analysis by Thomas A. Cahill and his colleagues at the Crocketer Nuclear Laboratory, University of California—Davis casts doubt on the McCrone analysis and has revived the controversy. Their findings will be published in a forthcoming issue of Analytical Chemistry.
BIBLIOGRAPHY
CHAPTER 18 MEDIEVAL MAPPAEMUNDI


