

# 18 · Medieval *Mappaemundi*

DAVID WOODWARD

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.<sup>1</sup> 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 *mappaemundi* 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.<sup>2</sup>

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.

1. Sixten Ringbom, "Some Pictorial Conventions for the Recounting of Thoughts and Experiences in Late Medieval Art," in *Medieval Iconography and Narrative: A Symposium*, ed. Flemming G. Andersen et al. (Odense: Odense University Press, 1980), 38–69, esp. 38.

2. Uwe Ruberg, "Mappae Mundi des Mittelalters im Zusammenwirken von Text und Bild," in *Text und Bild: Aspekte des Zusammenwirkens zweier Künste in Mittelalter und früher Neuzeit*, ed. Christel Meier and Uwe Ruberg (Wiesbaden: Ludwig Reichert, 1980), 550–92, esp. 558–60. Some hold that the texts are more interesting than the maps, but this would clearly depend on the individual circumstances. See Neil Ker, review of *Mappemondes A.D. 1200–1500: Catalogue préparé par la Commission des Cartes Anciennes de l'Union Géographique Internationale*, ed. Marcel Destombes, in *Book Collector* 14 (1965): 369–73, esp. 370.

mentioned that he found a *mappamundi* to be a useful source of information.<sup>3</sup> 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.<sup>4</sup>

#### TERMS

The term *mappamundi* (plural *mappaemundi*) is from the Latin *mappa* (a tablecloth or napkin) and *mundus* (world).<sup>5</sup> Since their geometric construction was by no means consistent, *mappaemundi* 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 locational. 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 *mapamundi* or *mappamondi* and *carta da navigare* or *charte da navichare* were all used interchangeably.<sup>6</sup> 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*.<sup>7</sup> 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.”<sup>8</sup> 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.”<sup>9</sup> *Imago mundi* usually indicated a theoretical treatment of cosmography rather than a graphic description.<sup>10</sup>

It is unwise to assume that *mappamundi* necessarily meant a graphic depiction of the world.<sup>11</sup> 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.<sup>12</sup> A manuscript in the British Library entitled “Mappa mundi sive orbis descriptio” is also purely a textual account.<sup>13</sup> Peter of Beauvais was the author of a French verse “*mappe-monde*” for Philip of Dreux, bishop of Beauvais (fl. 1175–1217).<sup>14</sup> This use of the term was still common

3. Jacobus de Vitriaco, *Libri duo, quorum prior orientalis, sive Hierosolymitanae: Alter, occidentalis historiae nomine inscribitur* (Douai, 1597; republished Farnborough: Gregg, 1971), 215; John Block Friedman, *The Monstrous Races in Medieval Art and Thought* (Cambridge: Harvard University Press, 1981), 42.

4. Paolino Veneto, Vat. Lat. 1960, fol. 13, Biblioteca Apostolica Vaticana. The translation is from Juergen Schulz, “Jacopo de’ Barbari’s View of Venice: Map Making, City Views, and Moralized Geography before the Year 1500,” *Art Bulletin* 60 (1978): 425–74, quotation on 452.

5. According to Thomas Phillipps, “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.

6. R. A. Skelton, “A Contract for World Maps at Barcelona, 1399–1400,” *Imago Mundi* 22 (1968): 107–13.

7. Richard Uhden, “Zur Herkunft und Systematik der mittelalterlichen Weltkarten,” *Geographische Zeitschrift* 37 (1931): 321–40, esp. 322.

8. “Charta vel mappa explicata, in qua orbis seu mundi descriptio continetur.” Charles Du Fresne Du Cange, “Mappa mundi,” in *Glossarium mediae et infimae latinatis conditum a Carolo Du Fresne, domino Du Cange, cum supplementis integris D. P. Carpenterii*, 7 vols. (Paris: Firmin Didot, 1840–50), author’s translation.

9. “Mappa dicitur forma. Inde mappa mundi id est forma mundi.” Konrad Miller, *Mappaemundi: Die ältesten Weltkarten*, 6 vols. (Stuttgart: J. Roth, 1895–98), 5:8. For volume titles, see bibliography, p. 369.

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).

12. Churchill Babington and J. R. Lumby, eds., *Polychronicon Ranulphi Higden, Together with the English Translation of John Trevisa and of an Unknown Writer of the Fifteenth Century* (London: Longman, 1865–86).

13. London, British Library, Harl. MS. 3373.

14. The Peter of Beauvais poem is described by Charles Victor Langlois, *La vie en France au Moyen Age, de la fin du XII<sup>e</sup> au milieu du XIV<sup>e</sup> siècle*, 4 vols. (Paris: Hachette, 1926–28), vol. 3, *La connaissance de la nature et du monde*, 122–34.

into the eighteenth century: thus an eighteenth-century manuscript version of the thirteenth-century Spanish geography, the *Semeiança del mundo*, was entitled *Mapa mundi*.<sup>15</sup> 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*.<sup>16</sup>

#### 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 monstrosities of *Hereford* and *Ebstorf* should suffice."<sup>17</sup> 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.<sup>18</sup> 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 two "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).<sup>19</sup> 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."<sup>20</sup>

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.<sup>21</sup>

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.<sup>22</sup> 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.<sup>23</sup> Von den

15. William E. Bull and Harry F. Williams, *Semeiança del Mundo: A Medieval Description of the World* (Berkeley and Los Angeles: University of California Press, 1959), 1.

16. Gervase of Canterbury, *The Historical Works of Gervase of Canterbury*, ed. William Stubbs, Rolls Series 21 (London: Longman, 1879–80), 417–18.

17. Charles Raymond Beazley, *The Dawn of Modern Geography: A History of Exploration and Geographical Science from the Conversion of the Roman Empire to A.D. 900*, 3 vols. (London: J. Murray, 1897–1906), 3:528. This view had also been expressed long before. For example, the Abbé Lebeuf in 1743 included in his description of a fourteenth-century world map in a manuscript of the *Chronicles of Saint-Denis* (published in 1751): "it had such inexact proportions that it could only show how imperfect geography had been in fourteenth-century France." See "Notice d'un manuscrit des Chroniques de Saint Denis, le plus ancien que l'on connoisse," *Histoire de l'Académie Royale des Inscriptions et Belles-Lettres* 16 (1751): 175–85, quotation on 185, author's translation. For a development of this theme, see David Woodward, "Reality, Symbolism, Time, and Space in Medieval World Maps," *Annals of the Association of American Geographers* 75 (1985): 510–21.

18. John Kirtland Wright, *The Geographical Lore of the Time of the Crusades: A Study in the History of Medieval Science and Tradition in Western Europe*, American Geographical Society Research Series no. 15 (New York: American Geographical Society, 1925; republished with additions, New York: Dover Publications, 1965), 248. The study of *mappaemundi* had not normally been the province of cartographers up to this time. For example, Arthur Hinks was able to express in 1925 "his indebtedness to Mr. Andrews for much instruction in a subject he had hitherto regarded as outside his own province, which was limited to maps based on latitude and longitude." See Michael Corbet Andrews, "The Study and Classification of Medieval Mappae Mundi," *Archaeologia* 75 (1925–26): 61–76, quotation on 75.

19. London, British Library, Add. MS. 10049, fol. 64r.

20. "Si pagina pateretur, hec totalis insula longior esse deberet." London, British Library, Royal MS. 14.C.VII(a), fol. 5v. See Richard Vaughan, *Matthew Paris* (Cambridge: University Press, 1958), 243.

21. Gerald R. Crone, "New Light on the Hereford Map," *Geographical Journal* 131 (1965): 447–62; Woodward, "Reality, Symbolism, Time, and Space," 513–14 (note 17).

22. W. L. Bevan and H. W. Phillott, *Medieval Geography: An Essay in Illustration of the Hereford Mappa Mundi* (London: E. Stanford, 1873).

23. Anna-Dorothee von den Brincken, "Mappa mundi und Chronographia," *Deutsches Archiv für die Erforschung des Mittelalters* 24 (1968): 118–86; and her more general summary "Zur Universalkartographie des Mittelalters," in *Methoden in Wissenschaft und Kunst des Mittelalters*, ed. Albert Zimmermann, *Miscellanea Mediaevalia* 7 (Berlin: Walter de Gruyter, 1970), 249–78. See also her "Europa in der Kartographie des Mittelalters," *Archiv für Kulturgeschichte* 55 (1973): 289–304. Juergen Schulz has adapted this idea to city views of the Renaissance in his "Jacopo de' Barbari's View of Venice: Map Making, City Views, and Moralized Geography before the Year 1500," *Art Bulletin* 60 (1978): 425–74. This article is far more than an essay on de' Barbari's view, and it contains important general material on the *mappaemundi*, medieval surveying, and cartography.

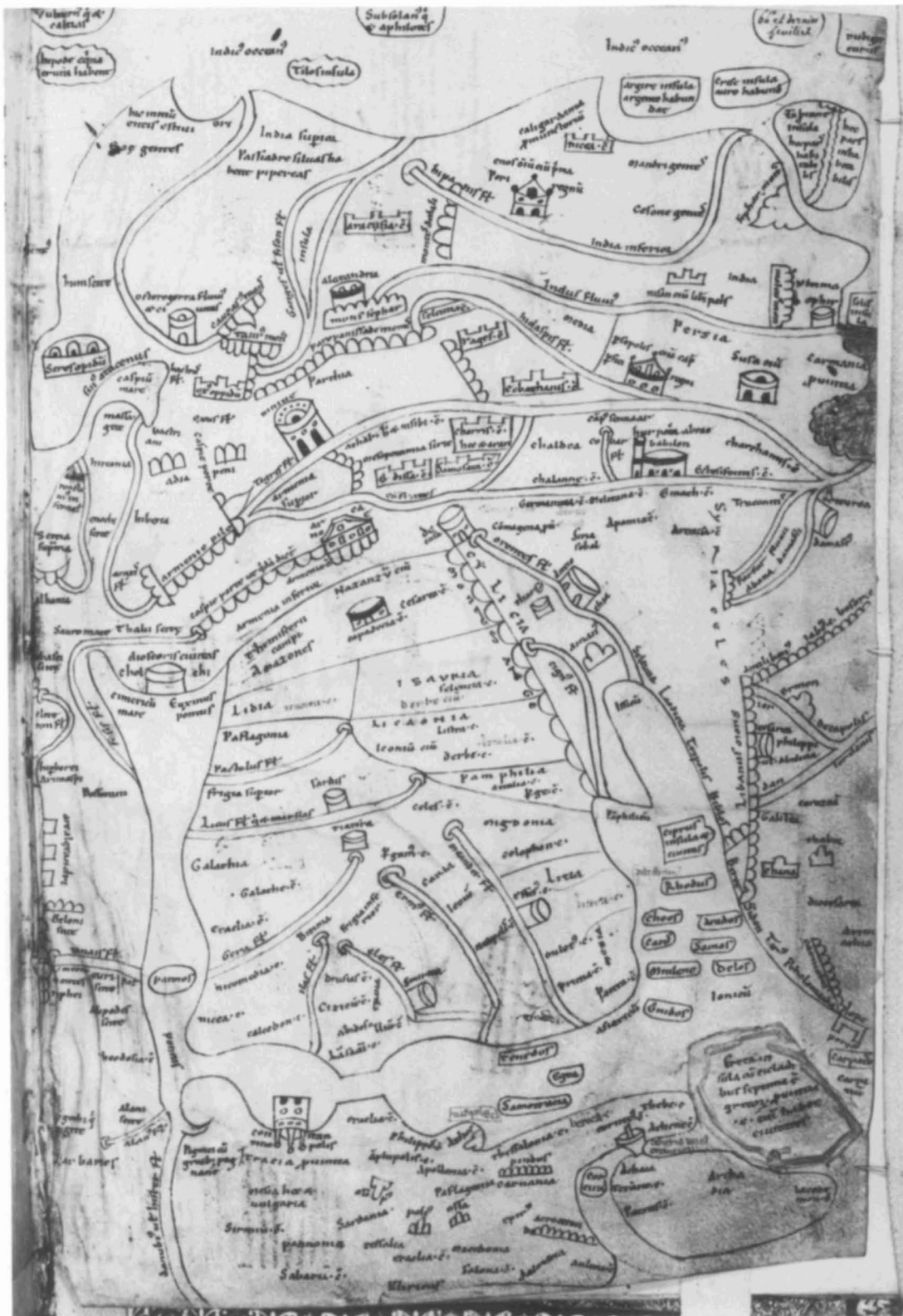


FIG. 18.1. "JEROME" MAP OF ASIA. This twelfth-century manuscript map illustrating the writings of Saint Jerome (fourth/fifth century) exaggerates its principal area of interest, Asia Minor, to be almost as large as the rest of Asia. Such variations in metrical scale were common in *mappaemundi*.

Size of the original: 35.6 × 22.9 cm. By permission of the British Library, London (Add. MS. 10049, fol. 64r).

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 Pergamon—together with several secular places of particular interest at the time, such as Kiev, Novgorod, Samarkand, and Georgia.<sup>24</sup> 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.<sup>25</sup>

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.<sup>26</sup>

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.<sup>27</sup>

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."<sup>28</sup>

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).<sup>29</sup>

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.<sup>30</sup> 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).<sup>31</sup>

24. Von den Brincken, "Mappa mundi und Chronographia," 160–67 (note 23).

25. For examples of studies of individual regions on the *mappaemundi*, see Peter St. Koledarov, "Nai-Ranni Spomenavanniya na Bilgaritye virkhu Starinnitye Karty" (The earliest reference to the Bulgarians on ancient maps), *Izvestija na Instituta za Istorija* 20 (1968): 219–54; Kyösti Julku, "Suomen tulo maailmankartalle" (Appearance of Finland on medieval world maps), *Faravid* 1 (1977): 7–41.

26. On narrative painting, to which the *mappaemundi* seem to be analogous, see Ringbom, "Pictorial Conventions" (note 1); Otto Pächt, *The Rise of Pictorial Narrative in Twelfth-Century England* (Oxford: Clarendon Press, 1962); and Henrietta Antonia Groenewegen-Frankfort, *Arrest and Movement: An Essay on Space and Time in the Representational Art of the Ancient Near East* (Chicago: University of Chicago Press, 1951). The theme is developed in Woodward, "Reality, Symbolism, Time, and Space" (note 17).

27. Eumenius *Oratio pro instaurandis scholis* 20, 21; see 9(4) in *XII [Duodecim] Panegyrici Latini*, ed. R. A. B. Mynors (Oxford: Clarendon Press, 1964). Crone, "New Light," 453 (note 21) reports that the map referred to by Eumenius may have survived as late as the seventeenth century, when it was possibly described by C. M. Grivaud, "Sur les antiquités d'Autun (I)," *Annales des Voyages, de la Géographie et de l'Histoire* 12 (1810): 129–66. See also Gaston Boissier, "Les rhéteurs gaulois du IV<sup>e</sup> siècle," *Journal des Savants* (1884): 1–18; Beazley, *Dawn of Modern Geography*, 2:379 (note 17), and Dilke (above, p. 209) for this and other classical references to maps in public places.

28. Hugh of Saint Victor, *De tribus maximis circumstantiis gestorum*. See transcription by von den Brincken, "Mappa mundi und Chronographia," 124 (note 23), or her "Universalkartographie," 253 (note 23), and the translation by Schulz, "Moralized Geography," 447 (note 23).

29. For a thorough summary of the symbolism of the *mappaemundi* in the French medieval romances, see Jill Tattersall, "Sphere or Disc? Allusions to the Shape of the Earth in Some Twelfth-Century and Thirteenth-Century Vernacular French Works," *Modern Language Review* 76 (1981): 31–46, esp. 41–44. On the symbolism of the Ebstorf map, see Ruberg, "Mappae Mundi," 563–85 (note 2); Schulz, "Moralized Geography," 449 (note 23).

30. Miller, *Mappaemundi*, 3:129–31 (note 9).

31. Brussels, Bibliothèque Royale, MS. 9231. See Marcel Desbordes, ed., *Mappemondes A.D. 1200–1500: Catalogue préparé par*



FIG. 18.2. CHRIST'S HEAD IN THE EBSTORF MAP. The thirteenth-century *mappaemundi* known as the Ebstorf map represents the world as the body of Christ. In this detail, Christ's head is shown at the top of the map—the east—next to Paradise. For an illustration of the entire map, see figure 18.19.

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. 18.3. CHRIST'S LEFT HAND IN THE EBSTORF MAP. In the Ebstorf map, Christ's arms span north and south. In this detail, his left hand gathers in even the monstrous races. For an illustration of the entire map, see figure 18.19.

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.

#### RELATIONSHIP OF MAPPAEMUNDI TO OTHER MEDIÉVAL MAPS

With an obvious exception in the curious maps of Opicinus de Canistris and the transitional maps discussed later,<sup>32</sup> 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.<sup>33</sup> 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”<sup>34</sup> 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.

la Commission des Cartes Anciennes de l'Union Géographique Internationale (Amsterdam: N. Israel, 1964), 179.

32. The maps of Opicinus de Canistris (1296–ca. 1350) are an unusual hybrid between *mappaemundi* and the portolan charts of the Mediterranean, sharing the symbolic attributes of the former with the coastal accuracy of the latter. They were introduced by Richard Georg Salomon in his *Opicinus de Canistris: Weltbild und Bekenntnisse eines Avignonesischen Klerikers des 14. Jahrhunderts*, Studies of the Warburg Institute, vols. 1A and 1B (text and plates) (London: Warburg Institute, 1936), and followed up in his “A Newly Discovered Manuscript of Opicinus de Canistris,” *Journal of the Warburg and Courtauld Institutes* 16 (1953): 45–57, pls. 12 and 13, and his “Aftermath to Opicinus de Canistris,” *Journal of the Warburg and Courtauld Institutes* 25 (1962): 137–46 and pls. 26d and 27. More recently, Jörg-Geerd Arentzen has focused attention on the maps in his *Imago Mundi Cartographica: Studien zur Bildlichkeit mittelalterlicher Welt- und Ökumenekarten unter besonderer Berücksichtigung des Zusammenwirkens von Text und Bild*, Münstersche Mittelalter-Schriften 53 (Munich: Wilhelm Fink, 1984).

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.

34. Beazley, *Dawn of Modern Geography*, 1:18 (note 17). Armando Cortesão, *History of Portuguese Cartography*, 2 vols. (Coimbra: Junta de Investigações do Ultramar-Lisboa, 1969–71), 1:151, also follows Beazley on this.

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 pre-determined 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.<sup>35</sup> 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.<sup>36</sup>

#### PROBLEMS IN THE STUDY OF MAPPAEMUNDI

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.<sup>37</sup> 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.<sup>38</sup> 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.<sup>39</sup>

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 Zurla (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.<sup>40</sup> Major contemporaries of Santarém

35. Crone, "New Light," 453 (note 21).

36. Crone, "New Light," 451–55 (note 21).

37. R. A. Skelton, *Maps: A Historical Survey of Their Study and Collecting* (Chicago: University of Chicago Press, 1972), 26.

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, Munich, *Mittelalterliche Bibliothekscataloge Deutschlands und der Schweiz* (Munich, 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.<sup>41</sup> 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.<sup>42</sup> 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.<sup>43</sup> However, nothing rivaling the importance of Santarém’s study and atlas appeared until the six-volume survey of *mappaemundi* by Konrad Miller (1866–1944).<sup>44</sup> This thorough and careful work was extremely well received and was rapidly accepted as the standard text, as is shown by reviews.<sup>45</sup>

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.<sup>46</sup> 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,<sup>47</sup> despite more recent claims that his approach suffers from “precursorism.”<sup>48</sup> 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.<sup>49</sup> The influence of the Harvard historian of science Charles Haskins must also be specifically mentioned:<sup>50</sup> 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.<sup>51</sup> 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.<sup>52</sup>

---

*le Moyen-Age et sur les progrès de la géographie après les grandes découvertes du XV<sup>e</sup> siècle*, 3 vols. (Paris: Maulde et Renou, 1849–52), and *Atlas composé de mappemondes, de portulans et de cartes hydrographiques et historiques depuis le VI<sup>e</sup> jusqu’au XVII<sup>e</sup> siècle* (Paris, 1849; Facsimile reprint, Amsterdam: R. Muller, 1985).

41. Edme-François Jomard, *Les monuments de la géographie; ou, Recueil d’anciennes cartes européennes et orientales* (Paris: Duprat, etc., 1842–62).

42. Joachim Lelewel, *Géographie du Moyen Age*, 4 vols. and epilogue (Brussels: Pilliet, 1852–57; reprinted Amsterdam: Meridian, 1966). Santarém’s review was not published until 1914. See Cortesão, *History of Portuguese Cartography*, 1:38 (note 34).

43. Marie Armand Pascal d’Avezac-Macaya, “Note sur la mappemonde historiée de la cathédrale de Héréford, détermination de sa date et de ses sources,” *Bulletin de la Société de Géographie*, 5th ser., 2 (1861): 321–34; idem, “La mappemonde du VIII<sup>e</sup> siècle de St. Béat de Liébana: Une digression géographique à propos d’un beau manuscrit à figures de la Bibliothèque d’Altamira,” *Annales des Voyages, de la Géographie, de l’Histoire et de l’Archéologie* 2 (1870): 193–210; and idem, *Coup d’oeil historique sur la projection des cartes de géographie* (Paris: E. Martinet, 1863), first published as “Coup d’oeil historique sur la projection des cartes de géographie,” *Bulletin de la Société de Géographie*, 5th ser., 5 (1863): 257–361, 438–85.

44. Miller, *Mappaemundi* (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).

45. For example, those by Charles Raymond Beazley, “New Light on Some Mediæval Maps,” *Geographical Journal* 14 (1899): 620–29; 15 (1900): 130–41, 378–89; 16 (1900): 319–29.

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

47. Pierre Duhem, *Le système du monde: Histoire des doctrines cosmologiques de Platon à Copernic*, 10 vols. (Paris: Hermann, 1913–59).

48. David C. Lindberg, ed., *Science in the Middle Ages* (Chicago: University of Chicago Press, 1978), vii.

49. George Sarton, *Introduction to the History of Science*, 3 vols. (Baltimore: Williams and Wilkins, 1927–48), contains many notes relating to the history of medieval cartography. There is also a relevant section in Charles Singer et al., eds. *A History of Technology*, 7 vols. (Oxford: Clarendon Press, 1954–78), vol. 2, *The Mediterranean Civilizations and the Middle Ages, c. 700 B.C. to c. A.D. 1500*.

50. See Charles Homer Haskins, *Studies in the History of Mediaeval Science* (Cambridge: Harvard University Press, 1927), and his *Renaissance of the Twelfth Century* (New York: Meridian, 1957).

51. Wright, *Geographical Lore* (note 18).

52. Dana Bennett Durand, *The Vienna-Klosterneuburg Map Corpus of the Fifteenth Century: A Study in the Transition from Medieval to Modern Science* (Leiden: E. J. Brill, 1952).



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).<sup>53</sup> 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.<sup>54</sup>

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.<sup>55</sup> 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.<sup>56</sup>

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,<sup>57</sup> 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,<sup>58</sup> and the revised and enlarged version awaits publication. Volume 1, covering the manuscript *mappaemundi*, appeared in 1964. Work for the other volumes has not yet been undertaken.<sup>59</sup>

#### CLASSIFICATION SYSTEMS

These works contain several attempts at the classification of *mappaemundi*, summarized in table 18.1. A satisfactory classification would be useful to the scholar wishing to bring order to the diverse images of the *mappaemundi* 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. Pre-

viously developed systems of classification are now reviewed, 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.<sup>60</sup> 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

53. Youssouf Kamal, *Monumenta cartographica Africae et Aegypti*, 5 vols. in 16 pts. (Cairo, 1926–51). For full contents, see p. 40.

54. Norman J. W. Thrower, "Monumenta Cartographica Africae et Aegypti," *UCLA Librarian*, suppl. to vol. 16, no. 15 (31 May 1963): 121–26.

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. Kimble, *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. Leithäuser, *Mappae mundi: Die geistige Eroberung der Welt* (Berlin: Safari-Verlag, 1958), chaps. 2 and 3; Leo Bagrow, *History of Cartography*, rev. and enl. R. A. Skelton, trans. D. L. Paisley (Cambridge: Harvard University Press; London: 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 classischen Altertumswissenschaft*, ed. August Pauly, Georg Wissowa, et al. (Stuttgart: J. B. Metzler, 1894–); Otto Hartig, "Geography in the Church," in *The Catholic Encyclopedia*, 15 vols. (New York: Robert Appleton, [1907–12]), 6:447–53; Giuseppe Caraci, "Cartografia," in *Enciclopedia italiana di scienze, lettere ed arti*, originally 36 vols. ([Rome]: Istituto Giovanni Treccari, 1929–39), 9:232; Ernest George Ravenstein, "Map," in *Encyclopaedia Britannica*, 11th ed., 32 vols. (New York: Encyclopaedia Britannica, 1910–11), 17:629–63, esp. 633–46; and Vincent Cassidy, "Geography and Cartography, Western European," in *Dictionary of the Middle Ages*, ed. Joseph R. Strayer (New York: Charles Scribner's Sons, 1982–), 5: 395–99.

56. Arentzen, *Imago Mundi Cartographica* (note 32).

57. Gustavo Uzielli and Pietro Amat di San Filippo, *Mappamondi, carte nautiche, portolani ed altri monumenti cartografici specialmente italiani dei secoli XIII–XVII*, 2d ed., 2 vols., Studi Biografici e Bibliografici sulla Storia della Geografia in Italia (Rome: Società Geografica Italiana, 1882; reprinted Amsterdam: Meridian, 1967); Sophus Ruge, "Älteres kartographisches Material in deutschen Bibliotheken," *Nachrichten von der Königlichen Gesellschaft der Wissenschaften zu Göttingen*, Philologisch-Historische Klasse (1904): 1–69; (1906): 1–39; (1911): 35–166; suppl. (1916).

58. Marcel Destombes, ed., *Catalogue des cartes gravées au XV<sup>e</sup> siècle* (Paris: International Geographical Union, 1952). The enlarged 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*

Simar <sup>a</sup> (1912)	Andrews <sup>b</sup> (1926)	Uhden <sup>c</sup> (1931)	Destombes <sup>d</sup> (1964)	Arentzen <sup>e</sup> (1984)	Woodward <sup>f</sup> (1987)
A <sup>g</sup> Roman	I Oecumenical Tripartite Simple	I Roman	Oecumenical A Schematic D Geographical	Oecumenical maps	Tripartite Schematic Nonschematic
B Greek	III Hemispheric	II Crates	C Greek	World maps	Zonal
AB Combination	II Intermediate	III Combination	B Fourth continent		Quadripartite
Transitional					

<sup>a</sup>Théophile Simar, “La géographie de l’Afrique Centrale dans l’antiquité et au Moyen-Age,” *Revue Congolaise* 3 (1912–13): 1–23, 81–102, 145–69, 225–52, 289–310, 440–41.

<sup>b</sup>Michael Corbet Andrews, “The Study and Classification of Medieval Mappae Mundi,” *Archaeologia* 75 (1925–26): 61–76.

<sup>c</sup>Richard Uhden, “Zur Herkunft und Systematik der mittelalterlichen Weltkarten,” *Geographische Zeitschrift* 37 (1931): 321–40.

<sup>d</sup>Marcel Destombes, ed., *Mappemondes A.D. 1200–1500: Catalogue préparé par la Commission des Cartes Anciennes de l’Union Géographique Internationale* (Amsterdam: N. Israel, 1964).

<sup>e</sup>Jörg-Geerd Arentzen, *Imago Mundi Cartographica: Studien zur Bildlichkeit mittelalterlicher Welt- und Ökumenekarten unter besonderer Berücksichtigung des Zusammenwirkens von Text und Bild*, Münstersche Mittelalter-Schriften 53 (Munich: Wilhelm Fink, 1984), esp. 63–66.

<sup>f</sup>Present work.

<sup>g</sup>Designations follow those of the original authors.

TABLE 18.2 Proposed Classification of *Mappaemundi*

Tripartite	Zonal	Quadripartite	Transitional
<i>Schematic</i>	Macrobius	Tripartite/zonal	Portolan chart influence
T-O	Martianus Capella	Beatus	Ptolemaic influence
Isidore	Alphonse and d’Ailly		
Sallust			
Gautier de Metz			
Miscellaneous and unknown authors			
T-O reverse			
Y-O with Sea of Azov			
V-in-square and T-in-square			
<i>Nonschematic</i>			
Orosius			
Orosius-Isidore			
Cosmas			
Higden			

Note: See also appendix 18.1.

small T-O maps, the Hereford map, and the Ebstorf map all have volumes to themselves.<sup>61</sup> 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.<sup>62</sup> 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,<sup>63</sup> 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

61. Miller, *Mappaemundi* (note 9).

62. Théophile Simar, “La géographie de l’Afrique Centrale dans l’antiquité et au Moyen-Age,” *Revue Congolaise* 3 (1912–13): 1–23, 81–102, 145–69, 225–52, 289–310, 440–41. Wright, *Geographical Lore*, 389–90, n. 114 (note 18).

63. Andrews, “Classification of Mappae Mundi,” 61–76 (note 18).

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

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 "oecumenical 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.<sup>65</sup>

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.<sup>66</sup> 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 oecumenical 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."<sup>67</sup> Several subgroups within this category have also been recognized based on their predominant source, whether Orosius, Cosmas, or Higden, for example.<sup>68</sup> 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.<sup>69</sup> In most cases the four cardinal directions are provided in Latin: Septentrio (*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.

66. Arentzen, *Imago Mundi Cartographica*, 321 (note 32).

67. Andrews, "Classification of Mappae Mundi," 69 (note 18).

68. See John B. Conroy, "A Classification of Andrews' Oecumenical Simple Medieval World Map Species into Genera" (M.S. thesis, University of Wisconsin, Madison, 1975), who also strongly questioned Andrews's terminology (pp. 209–16) but deferred to it in his thesis.

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).

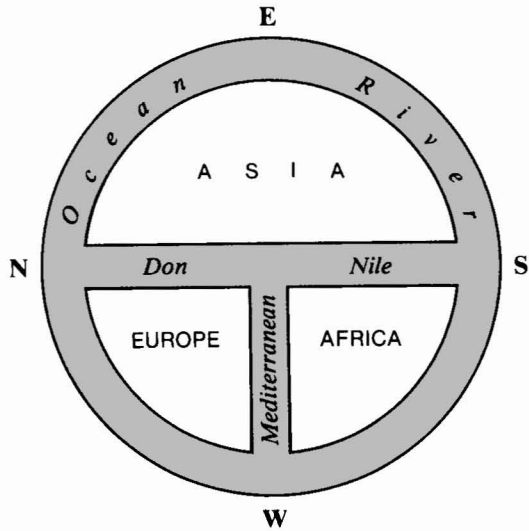


FIG. 18.4. THE TRIPARTITE TYPE OF MAPPAMUNDI. Also known as the T-O category, this type can be further subdivided into schematic (as shown in this diagram) or non-schematic, in which the general tripartite pattern is preserved but considerable embellishments of content are added.

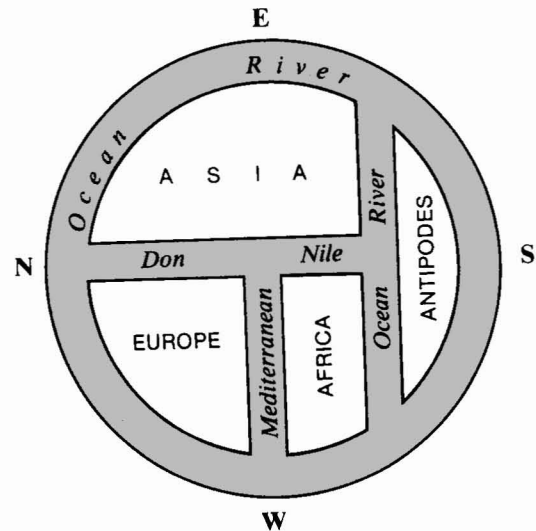


FIG. 18.6. THE QUADRIPARTITE TYPE OF MAPPAMUNDI. This category includes characteristics of both the tripartite and zonal types, consisting of a tripartite model in the Northern Hemisphere and, in the Southern Hemisphere, a fourth continent, either uninhabited or inhabited by the Antipodeans.

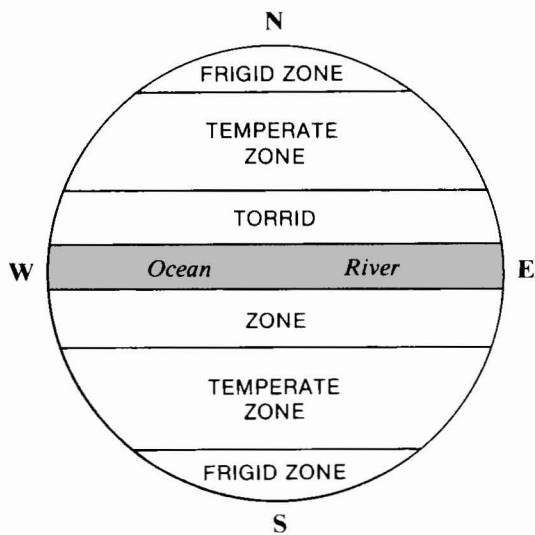


FIG. 18.5. THE ZONAL TYPE OF MAPPAMUNDI. The north- or south-oriented maps showing the parallel zones of the Greek *climata* form the second main category of *mappaemundi*. They consist of a central uninhabited hot equatorial zone flanked by two inhabited temperate zones, and cold uninhabited zones in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

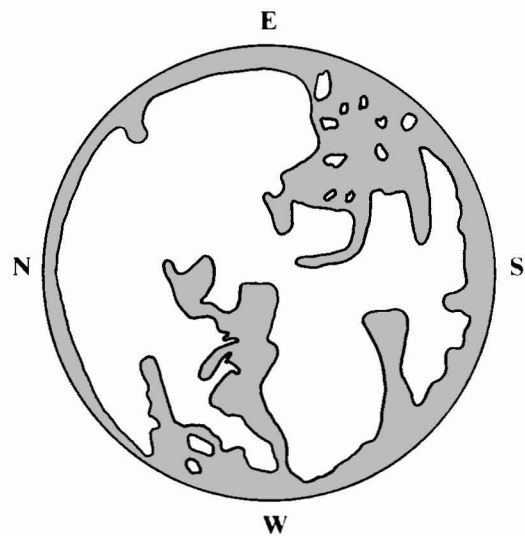
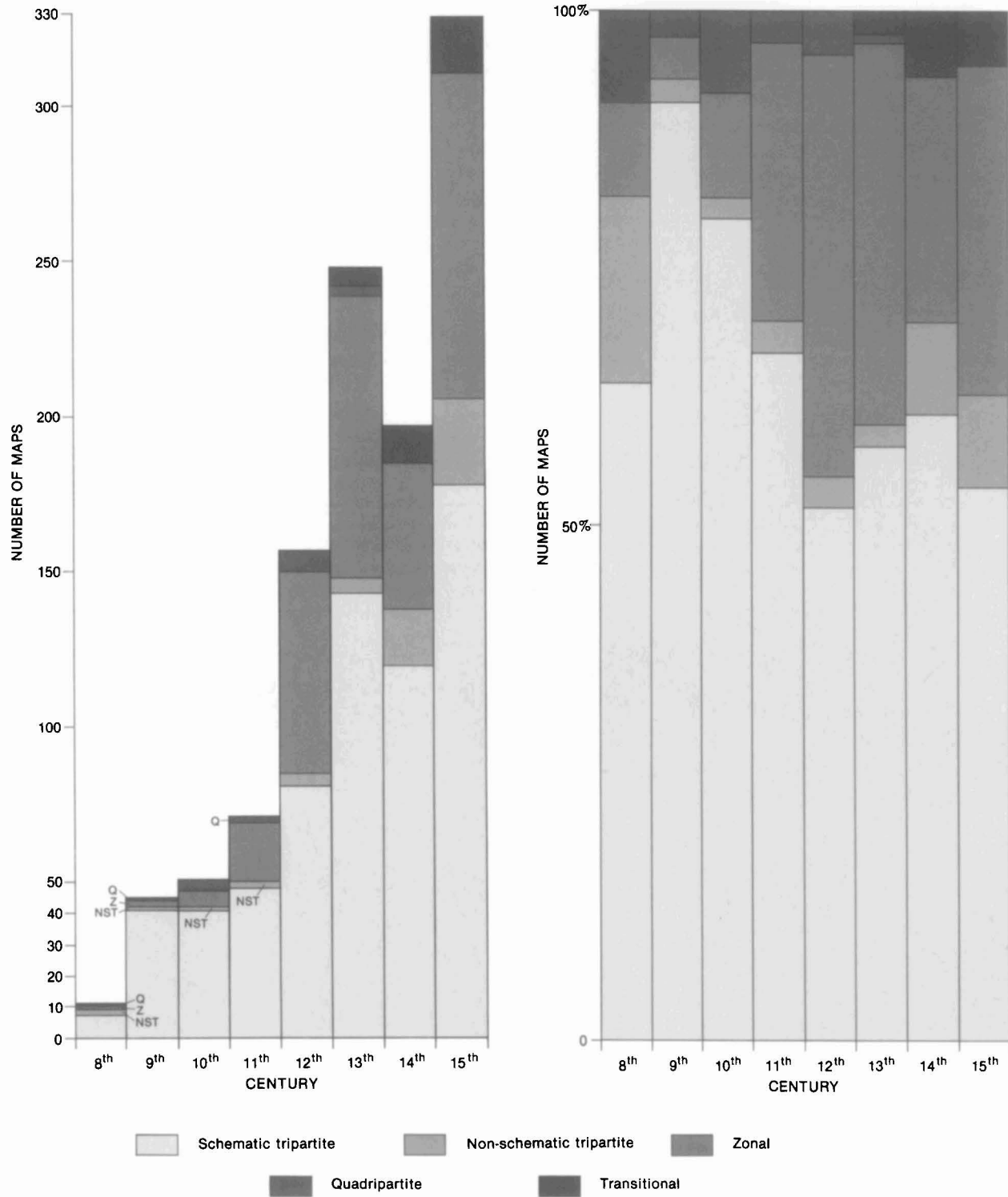


FIG. 18.7. THE TRANSITIONAL TYPE OF MAPPAMUNDI. These maps differ sufficiently from the previous three main types to warrant their own category. Dating from the fourteenth and fifteenth centuries, they show the influence of the portolan charts, particularly in the Mediterranean, and later, the world views of Ptolemy as the *Geography* was integrated into Western cartographic thought.



FIGS. 18.8. and 18.9. EXTANT MAPPAEMUNDI: ABSOLUTE AND RELATIVE NUMBERS BY CATEGORY FROM THE EIGHTH TO THE FIFTEENTH CENTURY. Based on the tables in Marcel Destombes, ed., *Mappemondes A.D.*

1200–1500: *Catalogue préparé par la Commission des Cartes Anciennes de l'Union Géographique Internationale* (Amsterdam: N. Israel, 1964), 21–23, with modifications.

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 cathedrals and monasteries in the “Carolingian renaissance” of the eighth century heralded what Bagrow called “the gold age of Church cartography.”<sup>70</sup> 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.”<sup>71</sup> 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.<sup>72</sup> 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 Damian asked, “What can Christians gain from science?”<sup>73</sup> 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.”<sup>74</sup>

70. Bagrow, *History of Cartography*, 42 (note 55).

71. Haskins, *Renaissance of the Twelfth Century* (note 50).

72. The standard edition of Solinus is Gaius Julius Solinus, *Collectanea rerum memorabilium*, ed. Theodor Mommsen (Berlin: Weidmann, 1895). See also William Harris Stahl, *Roman Science: Origins, Development, and Influence to the later Middle Ages* (Madison: University of Wisconsin Press, 1962), and Beazley, *Dawn of Modern Geography*, 1:248–73 (note 17).

73. Bagrow, *History of Cartography*, 41 (note 55).

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.<sup>75</sup> 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).<sup>76</sup> 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).<sup>77</sup>

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 Philology 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*.<sup>78</sup>

## Orosius

The second major source used for *mappaemundi* 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.<sup>79</sup>



FIG. 18.10. THE MACROBIAN MODEL OF MAPPA-MUNDI. Based on a variety of Greek authors, this world map shows the five zones or *climata* of the earth, in which the tropical zone is divided by the “ocean river.” The widths of the zones conform to precise measurements stated by Macrobius: 36, 30, 24 + 24, 30, 36 (in degrees from pole to pole). Diameter of the original: 14.3 cm. From a printed edition of Macrobius's *In somnium Scipionis expositio* (Brescia, 1485). By permission of The Huntington Library, San Marino, California (HEH 91528).

75. See above, pp. 162–63 and fig. 10.2.

76. Jacques Flamand, *Macrobie et le néo-Platonisme latin, à la fin du IV<sup>e</sup> siècle* (Leiden: E. J. Brill, 1977), 464–82.

77. William Harris Stahl, “Astronomy and Geography in Macrobius,” *Transactions and Proceedings of the American Philological Society* 35 (1942): 232–38, and his edition of Macrobius, *Commentary on the Dream of Scipio*, ed. and trans. William Harris Stahl (New York: Columbia University Press, 1952; second printing with supplementary bibliography, 1966).

78. William Harris Stahl, *The Quadrivium of Martianus Capella: Latin Traditions in the Mathematical Sciences, 50 B.C.–A.D. 1250* (New York: Columbia University Press, 1971), and Martianus Capella, *The Marriage of Philology and Mercury*, trans. William Harris Stahl and Richard Johnson with E. L. Burge (New York: Columbia University Press, 1977), vols. 1 and 2, respectively, of the series *Martianus Capella and the Seven Liberal Arts*. On Lambert of Saint-Omer, see *Lamberti S. Audomari Canonici liber floridus*, ed. Albert Derolez (Ghent: Story-Scientia, 1968), and Albert Derolez, ed., *Liber floridus colloquium* (Ghent: Story-Scientia, 1973).

79. Cortesão, *History of Portuguese Cartography*, 1:151–64 with a translation of certain geographical passages in appendix C, 241–42 (note 34). A modern translation of Paulus Orosius is found in *The Seven Books of History against the Pagans*, trans. Roy J. Deferrari (Washington, D.C.: Catholic University of America Press, 1964).

Orosius nowhere mentions a map in his text, but Bately reports a theory that in compiling his history he may have used a *mappaemundi* in addition to the more expected textual sources.<sup>80</sup> She goes on to show, however, that there is no evidence (in his text) to support the idea that the use of a *mappaemundi* was inevitably required.<sup>81</sup>

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."<sup>82</sup> 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 *mappaemundi* (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 *mappaemundi* 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."<sup>83</sup>

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 Chris-

tian 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.<sup>84</sup>

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

80. Janet M. Bately, "The Relationship between Geographical Information in the Old English Orosius and Latin Texts Other Than Orosius," in *Anglo-Saxon England*, ed. Peter Clemoes (Cambridge: Cambridge University Press, 1972–), 1:45–62, esp. 45–46.

81. Bately, "Orosius," 62 (note 80).

82. Cortesão, *History of Portuguese Cartography*, 1:156 (note 34).

83. "Un T dentro ad un O mostra il disegno—Chome in tre parte fu diviso il mondo." Leonardo di Stagio Dati, trans. Goro (Gregorio) Dati, *La sfera* 3.11 (ca. 1425). See *La sfera: Libri quattro in ottava rima*, ed. Enrico Narducci (Milan: G. Daelli, 1865; reprinted [Bologna]: A. Forni, 1975), where it is pointed out (p. vi) that a manuscript in the Biblioteca Nazionale, Florence attests to the translation from Latin into Italian by Leonardo's brother Goro. The transcription given here is according to Roberto Almagià, *Monumenta cartographica Vaticana*, 4 vols. (Rome: Biblioteca Apostolica Vaticana, 1944–55), vol. 1, *Planisferi, carte nautiche e affini dal secolo XIV al XVII esistenti nella Biblioteca Apostolica Vaticana*, 118.

84. Isidore of Seville, *Traité de la nature*, see *Traité de la nature*, ed. Jacques Fontaine, Bibliothèque de l'École des Hautes Etudes Hispaniques, fasc. 28 (Bordeaux: Féret, 1960). Ernest Brehaut, *An Encyclopedist of the Dark Ages: Isidore of Seville*, Studies in History, Economics and Public Law, vol. 48, no. 1 (New York: Columbia University Press, 1912). Clara LeGear, in *Mappemondes*, ed. Destombes, 54 (note 31), says that Isidore was well versed in Greek, Latin, and Hebrew, but Haskins and Stahl disagree. See Haskins, *Mediaeval Science*, 279 (note 50), and Stahl, *Roman Science*, 216 (note 72). See also Jacques Fontaine, *Isidore de Séville et la culture classique dans l'Espagne visigothique*, 2 vols. (Paris: Etudes Augustiniennes, 1959); Fritz Saxl, "Illustrated Mediaeval Encyclopaedias: 2. The Christian Transformation," in his *Lectures*, 2 vols. (London: Warburg Institute, 1957), 1:242–54; Wesley M. Stevens, "The Figure of the Earth in Isidore's 'De Natura Rerum,'" *Isis* 71 (1980): 268–77; and Ingeborg Stolzenberg, "Weltkarten in mittelalterlichen Handschriften der Staatsbibliothek Preussischer Kulturbesitz," in *Karten in Bibliotheken: Festgabe für Heinrich Kramm zur Vollendung seines 65. Lebensjahres*, ed. Lothar Zögner, Kartensammlung und Kartendokumentation 9 (Bonn-Bad Godesberg: Bundesforschungsanstalt für Landeskunde und Raumordnung, Selbstverlag, 1971), 17–32, esp. 20–21.



(figs. 18.11 and 18.12).<sup>85</sup> 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.<sup>86</sup>



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, *Etymologiarum sive originum libri XX* (Augsburg: Günther Zainer, 1472). Courtesy of The Newberry Library, Chicago.

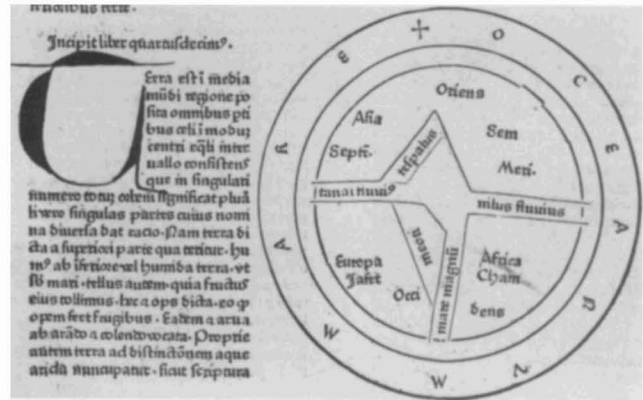


FIG. 18.12. ISIDORIAN T-O MAP WITH THE SEA OF AZOV. A more elaborate version of Isidore's original schema (fig. 18.11.), this includes the addition of the Meotides Paludes, the Sea of Azov.

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

85. Isidore of Seville, *Etymologies*; see *Etymologiarum sive originum libri XX* (Augsburg: Günther Zainer, 1472) and several other incunabular 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.



FIG. 18.13. ISIDORIAN T-O MAP WITH THE FOURTH CONTINENT. The distinguishing characteristic of this type is that a fourth continent in the style of the Beatus maps (see plate 13) is added to either variant of Isidore's schematic T-O map. In this example, India is shown in an unusual western location. Diameter of the original: 11 cm. By permission of the Stiftsbibliothek, Einsiedeln (Codex Eins. 263 [973], fol. 182r).



FIG. 18.14. MAPPAMUNDI FROM ISIDORE. According to Miller, the main part of this map dates from the late seventh or early eighth century, with additions in later hands. He therefore believes it represents the oldest known extant *mappaemundi*. Diameter of the original: 13.5 cm. From a ninth-century codex of Isidore's *Etymologies*. By permission of the Stiftsbibliothek, Saint Gall (Codex 237, fol. 1r).

(672/73–735) contain *mappaemundi* (of which fifteen examples are extant).<sup>87</sup> 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,<sup>88</sup> 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.<sup>89</sup>

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.<sup>90</sup> 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

87. Destombes, *Mappemondes*, 35–36 (note 31). See also T. R. Eckenrode, “Venerable Bede as a Scientist,” *American Benedictine Review* 21 (1971): 486–507.

88. Schulz, “Moralized Geography,” 448 (note 24).

89. Eckenrode, “Venerable Bede as a Scientist,” 486–507 (note 87). F. N. Estey, “Charlemagne’s Silver Celestial Table,” *Speculum* 18 (1943): 112–17. Estey’s interpretation is based on several authors, including Georg Thiele, *Antike Himmelsbilder, mit Forschungen zu Hipparchos, Aratos und seinen Fortsetzern und Beiträgen zur Kunstgeschichte des Sternhimmels* (Berlin: Weidmann, 1898), 141 n. 1, and a passage in the *Annales Bertiniani* that describes both the table and its destruction in 842: Georg Waitz, ed., *Annales Bertiniani, Scriptores rerum Germanicarum: Monumenta Germanicae historica* (Hanover: Impensis Bibliopolii Hahniani, 1883), 4, 27.

90. The most recent work is Peter K. Klein, *Der ältere Beatus-Kodex Vitr. 14-1 der Biblioteca Nacional zu Madrid: Studien zur Beatus-Illustration und der spanischen Buchmalerei des 10. Jahrhunderts* (Hildesheim: Georg Olms, 1976), but the maps are not heavily emphasized. In some works, such as Georgiana Goddard King, “Divagations on the Beatus,” in *Art Studies: Medieval, Renaissance and Modern*, 8 vols., ed. members of Departments of Fine Arts at Harvard and Princeton universities (Cambridge: Harvard University Press, 1923–30), 8:3–58, descriptions of the maps (as distinct from the other illustra-

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.”<sup>91</sup>

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.<sup>92</sup> 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.<sup>93</sup>

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.<sup>94</sup> 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.<sup>95</sup> 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 Occam (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.

tions) are deliberately avoided. See also Destombes, *Mappemondes*, 40–42 and 79–84 (note 31), and Jesús Domínguez Bordona, *Die spanische Buchmalerei vom siebten bis siebzehnten Jahrhundert*, 2 vols. (Florence, 1930).

91. Turin, Biblioteca Nazionale Universitaria, MS. I.II.1 (old D.V.39), author’s translation.

92. G. Menéndez-Pidal, “Mozárabes y asturianos en la cultura de la alta edad media en relación especial con la historia de los conocimientos geográficos,” *Boletín de la Real Academia de la Historia* (Madrid) 134 (1954): 137–291.

93. Derolez, *Liber floridus colloquium*, 20 (note 78).

94. Donald F. Lach, *Asia in the Making of Europe*, 2 vols. in 5 (Chicago: University of Chicago Press, 1965–77), 1:24.

95. On the transmission of Arabic science, see Haskins, *Renaissance of the Twelfth Century* (note 50), and Richard Walzer, *Arabic Transmission of Greek Thought to Medieval Europe* (Manchester: Manchester University Press, 1945).

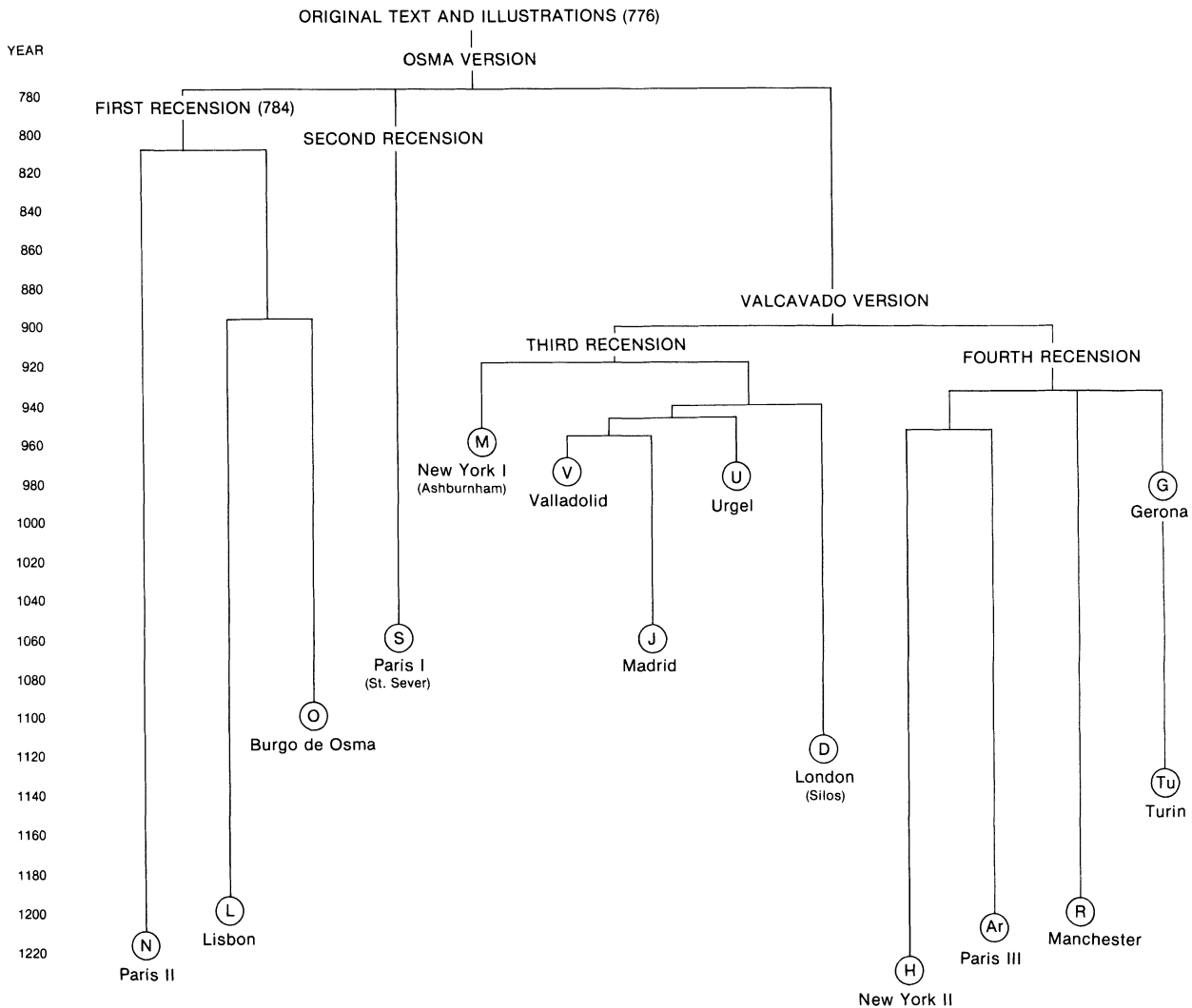


FIG. 18.15. GENERAL STEMMA FOR THE LARGE BEATUS MAPS. This genealogy shows the lineage of the extant Beatus manuscripts containing full-page maps. Two main versions or drafts are shown, from the eighth and ninth/tenth centuries respectively, each with two recensions. For full references to the extant manuscripts, designated by letters in circles, see appendix 18.2. The circles are not intended to imply

the shape of the maps. Names in parentheses are those commonly used for identification. Adapted from Peter K. Klein, *Der ältere Beatus-Kodex Vit. 14-1 der Biblioteca Nacional zu Madrid: Studien zur Beatus-Illustration und der spanischen Buchmalerei des 10. Jahrhunderts* (Hildesheim: Georg Olms, 1976).

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.<sup>96</sup>

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).<sup>97</sup>

The burgeoning of knowledge and cosmopolitan awareness in eleventh-century Europe led naturally to the development of several kinds of permanent institu-

96. Cortesão, *History of Portuguese Cartography*, 1:191 (note 34).

97. Roger Bacon, *The Opus Majus of Roger Bacon*, 2 vols., trans. Robert Belle Burke (1928; reprinted New York: Russell and Russell, 1962). Cortesão, *History of Portuguese Cartography*, 1:193–98 (note 34). See also the section on projections and coordinate systems below.

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

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

Sources: Adapted from Jean Gimpel, *The Medieval Machine: The Industrial Revolution of the Middle Ages* (New York: Penguin Books, 1977), 176–77; G. J. Toomer, “Ptolemy,” in *Dictionary of Scientific Biography*, 16 vols., ed. Charles Coulston Gillispie (New York:

Charles Scribner’s Sons, 1970–80), 11:186–206; and George Sarton, *Introduction to the History of Science*, 3 vols. (Baltimore: Williams and Wilkins, 1927–48), 2:173.

tions of higher learning, both practical and theoretical.<sup>98</sup> 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.<sup>99</sup> 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.<sup>100</sup>

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.<sup>101</sup>

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.<sup>102</sup> 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.<sup>103</sup> 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).

98. Hastings Rashdall, *The Universities of Europe in the Middle Ages*, ed. F. M. Powicke and A. B. Emden (Oxford: Oxford University Press, 1936), and Charles Homer Haskins, *The Rise of Universities* (New York: Henry Holt, 1923).

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).

101. A good summary of Sacrobosco’s life is that by John F. Daly, “Sacrobosco,” in *Dictionary of Scientific Biography*, 16 vols., ed. Charles Coulston Gillispie (New York: Charles Scribner’s Sons, 1970–80), 12:60–63. See also Lynn Thorndike, ed. and trans., *The Sphere of Sacrobosco and Its Commentators* (Chicago: University of Chicago Press, 1949).

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.

103. Carlo F. Capello, *Il mappamondo medioevale di Vercelli (1191–1218?)*, Università di Torino, Memorie e Studi Geografici, 10 (Turin: C. Fanton, 1976).

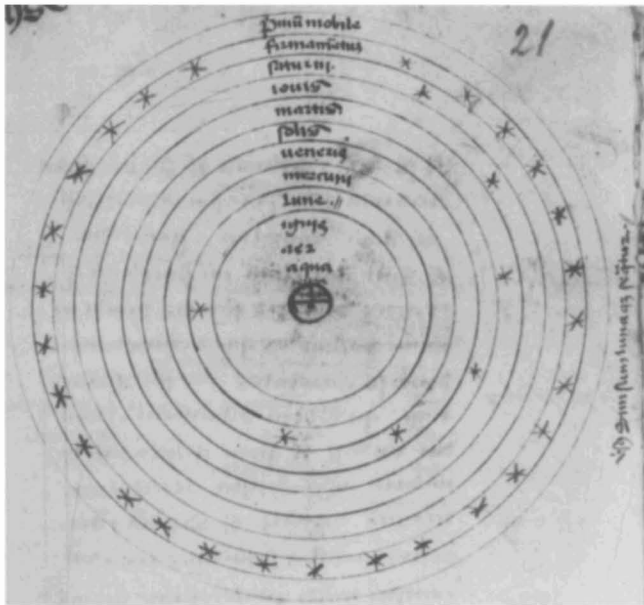


FIG. 18.16. THE TREATISE OF SACROBOSCO. Originally appearing in the early thirteenth century, Sacrobosco's *De sphaera* became a popular textbook of cosmography, being copied in many versions—both manuscript and printed—until the seventeenth century. His earth-centered diagrams of the solar system were thus in use long after they had been superseded by the Copernican theory. From a fifteenth-century manuscript of the work.

Diameter of the original detail: 10.3 cm. By permission of the Biblioteca Nacional, Lisbon (Codex ALC. 285, fol. 21).

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 *mappaemundi* 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).<sup>104</sup>

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.<sup>105</sup>

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).<sup>106</sup> 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.<sup>107</sup> 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.<sup>108</sup> 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

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.

105. Miller, *Mappaemundi*, 5:75 (note 9). The ensuing controversy concerning Gervase's connection with the map is summarized by Arentzen, *Imago Mundi Cartographica*, 140 (note 32). As a supporter of Gervase's authorship, along with Richard Ulden, “Gervasius von Tilbury und die Ebstorfer Weltkarte,” *Jahrbuch der Geographischen Gesellschaft zu Hannover* (1930): 185–200, may be added Jerzy Strzelczyk, *Gerwazy z Tilbury: Studium z dziejów uczoneści geograficznej w średniowieczu*, monograph 46 (Warsaw: Zakład Narodowy im. Ossolińskich, 1970).

106. On the discovery, see Arentzen, *Imago Mundi Cartographica*, 138 (note 32). On its restoration and reproduction, see Ernst Sommerbrodt, *Afrika auf der Ebstorfer Weltkarte*, Festschrift zum 50-Jährigen Jubiläum des Historischen Vereins für Niedersachsen (Hanover, 1885).

107. Miller, *Mappaemundi*, 5:3 (note 9).

108. Arentzen, *Imago Mundi Cartographica*, 138–47 (note 32).



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.

Size of the original: 84 × 70–72 cm. From Marcel Destombes, ed. *Mappemondes A.D. 1200: Catalogue préparé par la Commission des Cartes Anciennes de l'Union Géographique Internationale* (Amsterdam: N. Israel, 1964), pl. XXIII. By permission of the Archivio Capitolare del Duomo di Vercelli.



FIG. 18.18. THE VERCELLI MAP: DETAIL OF PHILIP. This figure, placed in Mauretania, is either Philip II of France (1180–1223) or Philip III (1270–85), probably the former. This provides a clue to its early thirteenth-century date. From Carlo F. Capello, *Il mappamondo medioevale di Vercelli (1191–1218?)*, Università di Torino, Memorie e Studi Geografici, 10 (Turin: C. Fanton, 1976), pl. 23. By permission of the Archivio Capitolare del Duomo di Vercelli.

Johannes Marcus, dean of the cathedral of Hildesheim, who may have ordered the map to be drawn.<sup>109</sup>

With dimensions of 3.58 by 3.56 meters, the Ebstorf 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”.<sup>110</sup> 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).<sup>111</sup>

It is the well-known Hereford map that represents the culmination of the Orosian type (fig. 18.20).<sup>112</sup> The map contains a clear and direct reference to its origin: “Orosius’s description of the *ornesta* of the world, as displayed within.”<sup>113</sup> Partly as a result of its sheer size (1.65 × 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.<sup>114</sup>

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).<sup>115</sup> 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.<sup>116</sup>

109. Richard Drögereit, “Die Ebstorfer Weltkarte und Hildesheim,” *Zeitschrift des Vereins für Heimatkunde im Bistum Hildesheim* 44 (1976): 9–44, esp. 43.

110. “Que scilicet non parvam prestat legentibus utilitatem, viantibus directionem rerumque viarum gratissime speculationis directionem.” 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 Cesar 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).

112. The standard facsimile and description of the Hereford map is Gerald R. Crone, *The World Map by Richard of Haldingham in Hereford Cathedral*, Reproductions of Early Manuscript Maps 3 (London: Royal Geographical Society, 1954). Further research is found in his “New Light,” 447–62 (note 21), and his “‘Is leigen fünf perg in welschen landt’ and the Hereford Map,” *Erdkunde* 21 (1967): 67–68. See also Destombes, *Mappemondes*, 197 (note 31).

113. “Descriptio Orosii de ornesta mundi sicut interius ostenditur.” Transcription from the Royal Geographical Society facsimile (note 112), author’s translation. The word *ornesta* is thought to refer generically to medieval world maps, derived from a contraction of *orosii mundi historia*. See Crone, “New Light,” 448 (note 21).

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

Transcription from the Royal Geographical Society facsimile (note 112), author’s translation. See also Arthur L. Moir, *The World Map in Hereford Cathedral*, 8th ed. (Hereford: Friends of the Hereford Cathedral, 1977).

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. 205, 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:  $3.56 \times 3.58$  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.

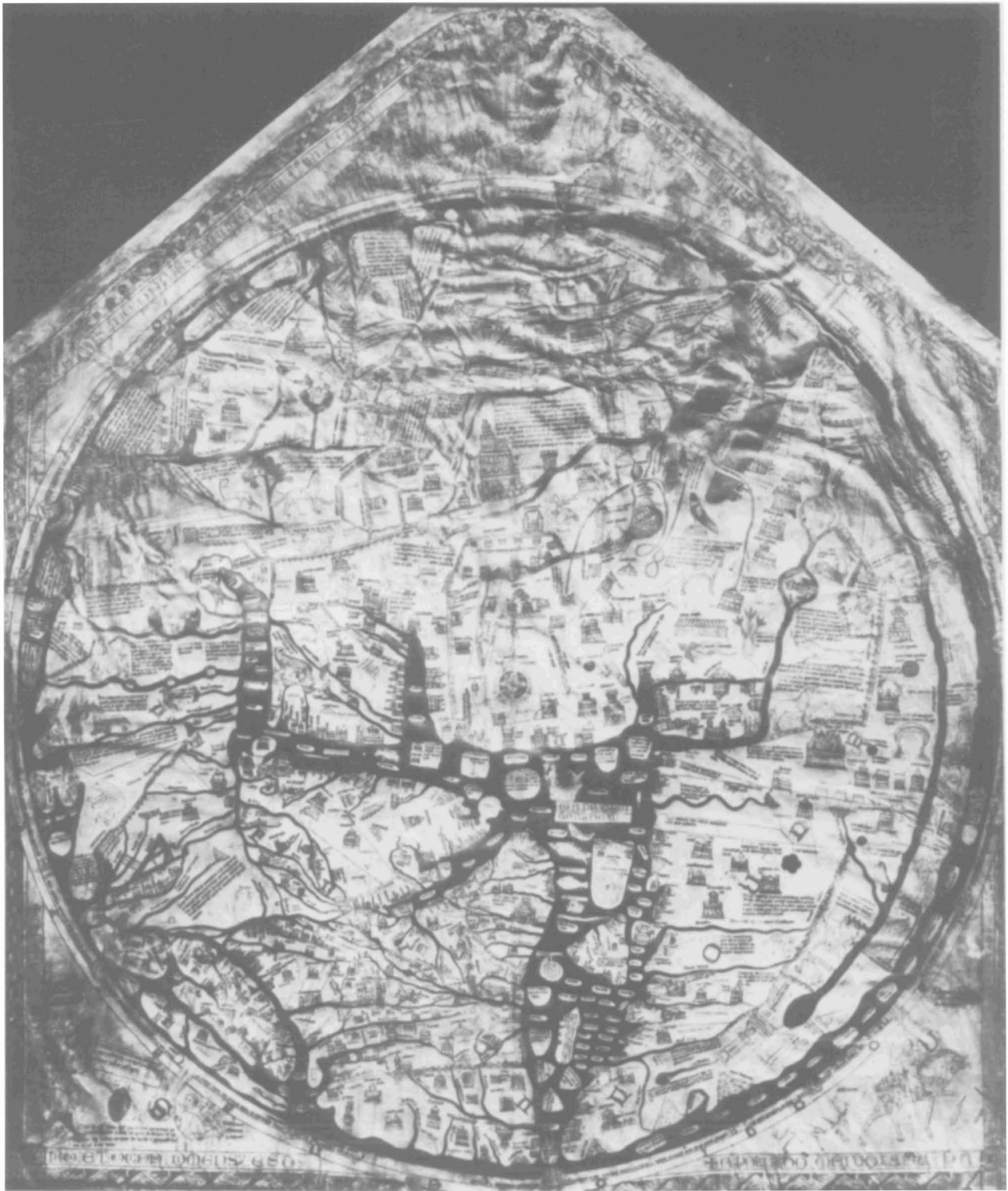


FIG. 18.20. THE HEREFORD MAP, CA. 1290. This famous map in Hereford Cathedral represents the culmination of the type based on the history of Paulus Orosius (fourth century). Its compiler, Richard de Bello, also drew on the works of Strabo, Pliny, Augustine, Jerome, the Antonine itinerary, and Isidore. See also figure 11.2.

Size of the original:  $1.65 \times 1.35$  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 Emden, have thus argued that to span such a long career, there may have been *two* Richard de Bellos.<sup>117</sup> Yates has recently summarized the issue, leaning to the speculative 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.<sup>118</sup>

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.<sup>119</sup> 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,<sup>120</sup> 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,"<sup>121</sup> 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,<sup>122</sup> but recent research points to English connections.

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).<sup>123</sup>

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.<sup>124</sup> 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).<sup>125</sup> 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.<sup>126</sup>

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,

117. Noël Denholm-Young, "The *Mappa Mundi* of Richard of Haldingham at Hereford," *Speculum* 32 (1957): 307–14. A. B. Emden, *A Biographical Register of Oxford University to A.D. 1500* (Oxford: Clarendon Press, 1957–59).

118. W. N. Yates, "The Authorship of the Hereford *Mappa Mundi* and the Career of Richard de Bello," *Transactions of the Woolhope Naturalist's Field Club* 41 (1974): 165–72. But Yates's interpretation of the "authorship" rubric on the map is puzzling. While he draws attention to the possible specific meanings of the words *estoire* and *compasse*, maintaining correctly that *estoire* can refer to either a design of a picture or a history and *compasse* can refer equally to actually doing or to abstract planning, he neglects to translate the words *ki lat fet (qui l'a fait)*, which seem to mean "who [i.e., Richard of Haldingham] has made it."

119. See Crone, *World Map*, 15 (note 112).

120. Valerie I. J. Flint, "Honorius Augustodunensis *Imago Mundi*," *Archives d'Histoire Doctrinale et Littéraire du Moyen Âge* 57 (1982): 7–153. Miller, *Mappaemundi*, 3:22 (note 9), regarded this attribution as "without doubt," but Sarton, *Introduction to the History of Science*, 2:201 (note 49), disagrees.

121. See Montague Rhodes James, *A Descriptive Catalogue of the Manuscripts in the Library of Corpus Christi College Cambridge*, 2 vols. (Cambridge: Cambridge University Press, 1912), 1:138–39.

122. Flint, "Honorius," 10–13 (note 120).

123. Miller, *Mappaemundi*, 3:95 (note 9); R. A. Skelton, in *Mappemondes*, ed. Destombes, 149–60, esp. 152–53 (note 31). See also John Taylor, *The "Universal Chronicle" of Ranulf Higden* (Oxford: Clarendon, 1966). In 1985, a small parchment fragment about 25 × 15 centimeters covering the Mediterranean from the Canaries to the Holy Land was acquired by the British Library. It is apparently part of a large late fourteenth-century *mappamundi* used as a wall map, and it is speculated that the map became extremely faded before the fragment was used as a binding for a Norfolk rental book from 1483, in which it was found. The original outline was apparently shaped as a mandorla, and its information bears some kinship to the Higden maps found in the *Polychronicon*, perhaps suggesting that it was akin to one of the wall maps available in the fourteenth century on which Higden based his reduction. I owe this note to Peter Barber of the Department of Manuscripts, British Library.

124. Skelton, in *Mappemondes*, ed. Destombes, 150–51 (note 31).

125. V. H. Galbraith, "An Autograph MS of Ranulph Higden's *Polychronicon*," *Huntington Library Quarterly* 34 (1959): 1–18.

126. Skelton, in *Mappemondes*, ed. Destombes, 153 (note 31).

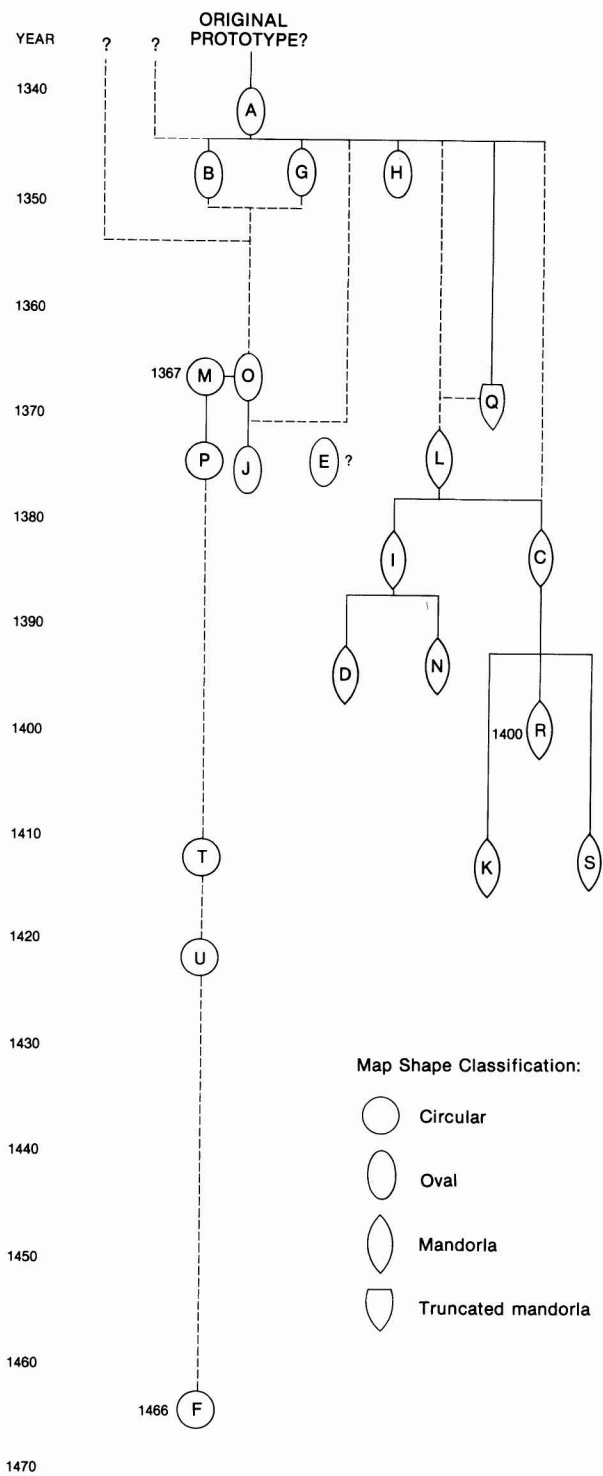


FIG. 18.21. GENERAL STEMMA FOR THE EXTANT WORLD MAPS OF RANULF HIGDEN. A provisional genealogy based on Konrad Miller, *Mappaemundi: Die ältesten Weltkarten*, 6 vols. (Stuttgart: J. Roth, 1895–98), 3:95, and Skelton in Marcel Destombes, ed., *Mappemondes A.D. 1200–1500: Catalogue préparé par la Commission des Cartes Anciennes de l'Union Géographique Internationale* (Amsterdam: N. Israel, 1964), 151–53.

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.<sup>127</sup>

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 *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

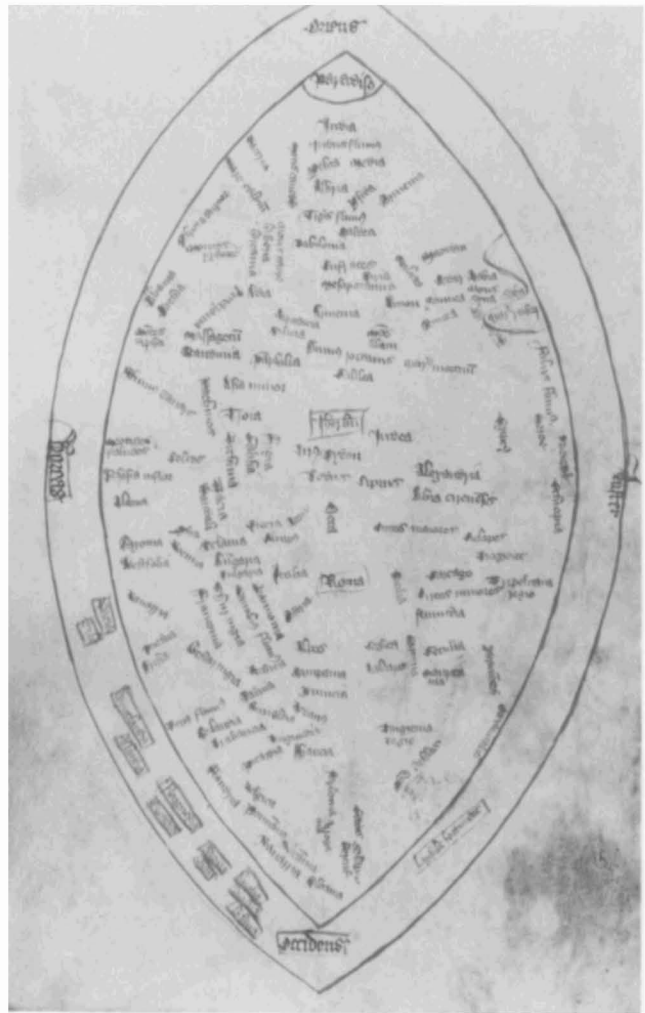


FIG. 18.22. A HIGDEN WORLD MAP: MANDORLA TYPE, MID-FOURTEENTH CENTURY. The mandorla or almond-shaped maps of Higden—perhaps representing a common Christian symbol of the aureole surrounding Christ—are generally later simplifications of the oval (see plate 15) and circular maps. Size of the original: 35.5 × 21 cm. By permission of the British Library, London (Royal MS. 14.C.xii, fol. 9v).

<sup>127</sup> Skelton, in *Mappemondes*, ed. Destombes, 150–51 (note 31). On Hugh of Saint Victor, see p. 334 below.

were to transform the *mappaemundi* 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 *mappaemundi* that lend a Renaissance character to maps of the period, though the basic frameworks of representation are medieval. The nature of the *mappaemundi* 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.<sup>128</sup> 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.<sup>129</sup>

The transition is marked by a convergence of three conceptual frameworks of world maps represented by the traditional, confined *mappamundi*, 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.<sup>130</sup>

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 *mappaemundi*, as in the Genoese world map of 1457 (fig. 18.23) or the map of Andreas Walzperger, 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).



FIG. 18.23. A SCALE ON A MAPPAMUNDI. On the later world maps, the influence of the portolan charts and Ptolemy's *Geography* is seen in the addition of the apparatus of the navigator, such as the two scales on the 1457 Genoese world map, of which one is shown.

Length of the original scale: ca. 10 cm. By permission of the Biblioteca Nazionale Centrale, Florence (Port. 1).

128. Elizabeth L. Eisenstein, *The Printing Press as an Agent of Change: Communications and Cultural Transformations in Early Modern Europe*, 2 vols. (Cambridge: Cambridge University Press, 1979), 2:510.

129. Leo Bagrow, "An Old Russian World Map," *Imago Mundi* 11 (1954): 169–74.

130. For the best general study, see Bernhard Degenhart and Annegrit Schmitt, "Marino Sanudo und Paolino Veneto," *Römisches Jahrbuch für Kunstgeschichte* 14 (1973): 1–137. See also Schulz, "Moralized Geography," 445 and 452 (note 24).

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.<sup>131</sup>

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.<sup>132</sup> 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.<sup>133</sup> 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.<sup>134</sup>

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.<sup>135</sup>

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”<sup>136</sup> 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 *map-pamundi*. 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

131. Gonçal (Gonzalo) de Reparaz, “Essai sur l'histoire de la géographie de l'Espagne de l'antiquité au XV<sup>e</sup> siècle,” *Annales du Midi* 52 (1940): 137–89, 280–341, esp. 296, 307–9; and see also *El atlas catalán de Cresques Abraham: Primera edición con su traducción al castellano en el sexto centenario de su realización* (Barcelona: Diàfora, 1975), also published in Catalan; Georges Grosjean, ed., *The Catalan Atlas of the Year 1375* (Dietikon-Zurich: Urs Graf, 1978); Pinhas Yoeli, “Abraham and Yehuda Cresques and the Catalan Atlas,” *Cartographic Journal* 7 (1970): 17–27, and Campbell below, chapter 19.

132. Leo Bagrow, “The Maps from the Home Archives of the Descendants of a Friend of Marco Polo,” *Imago Mundi* 5 (1948): 3–13.

133. Marco Polo, *The Book of Ser Marco Polo*, 3d ed., 2 vols. ed. and trans. Sir Henry Yule, rev. in accordance with discoveries by Henri Cordier (New York: Charles Scribner's Sons, 1903), 2:245 n. 7, 312, 424; Yule's reconstructed map is in vol. 1, facing 108.

134. Cortesão, *History of Portuguese Cartography*, 1:279, 290 (note 34).

135. Juergen Schulz, “Maps as Metaphors: Mural Map Cycles of the Italian Renaissance,” in *Art and Cartography: Six Historical Essays*, ed. David Woodward (Chicago: University of Chicago Press, 1987). See also Rodolfo Gallo, “Le mappe geografiche del palazzo ducale di Venezia,” *Archivio Veneto*, 5th ser., 32 (1943): 47–89; Jacopo Morelli, *Operette di Jacopo Morelli*, 2 vols. (Venice: Tipografia di Alvisopoli, 1820), 1:299; and Polo, *Book of Marco Polo*, 1:111 (note 133). It was again painted over by Giacomo Gastaldi in the mid-sixteenth century with four new maps, and once again by Francesco Griselini at the direction of the doge Marco Foscarini in 1762, each repainting obliterating the previous version, so that all that remain visible are the eighteenth-century murals.

136. Bagrow, *History of Cartography*, 72 (note 55).

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.<sup>137</sup>

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 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 Ruysch 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 *mappaemundi* 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).<sup>138</sup>

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.<sup>139</sup> 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 help 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).<sup>140</sup> 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.<sup>141</sup> 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.<sup>142</sup> To these may be added the fragment of the world map acquired by the James Ford Bell Collection in 1960.<sup>143</sup>

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 Antarctica.<sup>144</sup> 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.<sup>145</sup>

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

137. Tullia Gasparrini Leporace, *Il mappamondo di Fra Mauro* (Rome: Istituto Poligrafico dello Stato, 1956). Bagrow, *History of Cartography*, 72–73 (note 55). See also Campbell below, chapter 19.

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).

140. Durand, *Vienna-Klosterneuburg*, 106–13 (note 52).

141. Durand, *Vienna-Klosterneuburg*, 174–208 (note 52). Munich, Bayerische Staatsbibliothek, Clm. 14583.

142. Durand, *Vienna-Klosterneuburg*, 209–15 (note 52). Rome, Biblioteca Apostolica Vaticana, Pal. Lat. 1362, and Zeitz, Stiftsbibliothek, MS. Lat. Hist., fol. 497.

143. John Parker, "A Fragment of a Fifteenth-Century Planisphere in the James Ford Bell Collection," *Imago Mundi* 19 (1965): 106–7.

144. Friedman, *Monstrous Races*, 56–57 (note 3). See also Paul Gallez, "Walsperger and His Knowledge of the Patagonian Giants, 1448," *Imago Mundi* 33 (1981): 91–93.

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.

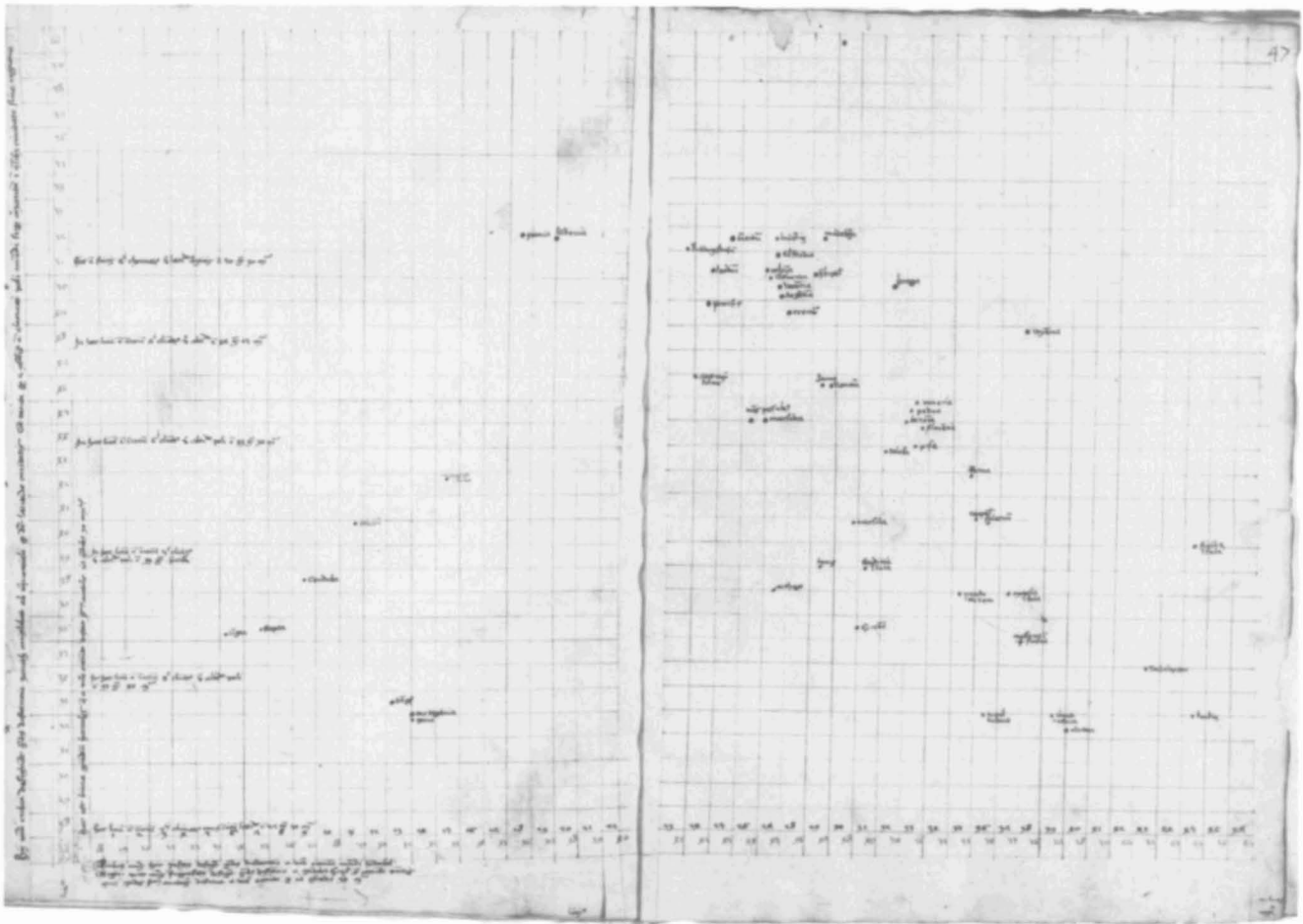


FIG. 18.24. SKETCH FROM THE VIENNA-KLOSTERNEUBURG CORPUS. Derived from versions of the Toledo tables, this sketch map of places in Europe and North Africa was plotted on a framework of latitude and longitude coordinates. It was probably prepared by Conrad of Dyffenbach in 1426.

Size of the original: 39.4 × 58.6 cm. Photograph from the Biblioteca Apostolica Vaticana, Rome (Pal. Lat. 1368, fols. 46v–47r).

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).<sup>146</sup>

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.<sup>147</sup>

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 Gasparini 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 *mappaemundi* 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 *mappaemundi* 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 MAPPAEMUNDI FORM

Contemporary evidence on the methods of construction of *mappaemundi* is extremely scanty, the brief description by Hugh of Saint Victor being unusual.<sup>148</sup> 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 *mappaemundi* (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 *Mappaemundi*

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.<sup>149</sup> 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 descrip-

tion 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).<sup>150</sup>

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.<sup>151</sup> A parallel study for maps has yet to be systematically undertaken, although it must be admitted that the lack of large *mappaemundi* 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 *mappaemundi* has also been the subject of three articles by Osvaldo Baldacci: "Ecumene ed emisferi circolari," *Bollettino della Società Geografica Italiana* 102 (1965): 1–16; "Geoecumene 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 *mappaemundi*, 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 Gullick, as reflected in Donald Jackson, *The Story of Writing* (New York: Taplinger, 1981), provides a particular example of this.



FIG. 18.25. PARADISE ON A HIGDEN WORLD MAP. As with several examples of the Higden maps, a sketch representing paradise is unfinished in this example. Size of the original detail: 4.75 × 5 cm. By permission of the British Library, London (Royal MS. 14.C.ix, fol. 2v).

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.<sup>152</sup> 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.<sup>153</sup> 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."<sup>154</sup>

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 sphericity of the earth. The shape of the earth seems to have been much less a subject of debate.<sup>155</sup>

A further confusion resulting from literal interpretation of biblical sources arose from the apparent incompatibility of the circular form of the earth and the four corners referred to in the Bible. The German encyclopedist Rabanus Maurus (ca. 776–856), for example,

asked how circular and quadrate shapes could agree and went on to relate this problem to that of Euclid's squaring the circle.<sup>156</sup> The medieval cartographer's solution was either to portray the circular earth within a square, leaving convenient spaces in the corners for iconographically suitable images, such as the symbols for the four evangelists, or to place the square within the circle so that the four cardinal directions and the circular earth could be combined.

Despite the difficulties of literal biblical interpretation, most early fathers of the church agreed that the earth was a sphere. Augustine specifically mentioned it at least twice.<sup>157</sup> The works of the popular secular writers such as Pliny, Macrobius, and Martianus Capella also contain many references to its sphericity.<sup>158</sup> Perhaps in overre-

152. For a summary of the complexities of the question, see Woodward, "Reality, Symbolism, Time, and Space," 517–19 (note 17). Recent sources used in this study include W. G. L. Randles, *De la terre plate au globe terrestre: Une mutation épistémologique rapide (1480–1520)*, Cahiers des Annales 38 (Paris: Armand Colin, 1980), and Tattersall, "Sphere or Disc?" (note 29).

153. Cosmas's concepts were derived from the following biblical passages: Isa. 40:22, "God sits throned on the vaulted roof of earth"; Matt. 24:31, "With a trumpet blast he will send out his angels, and they will gather his chosen from the four winds, from the farthest bounds of heaven on every side"; and Rev. 7:1, "After this I saw four angels stationed at the four corners of the earth, holding back the four winds." Charles W. Jones, "The Flat Earth," *Thought: A Quarterly of the Sciences and Letters* 9 (1934): 296–307, esp. 305, places Cosmas in true perspective.

154. Photius of Constantinople *Bibliotheca* 36; see *The Library of Photius*, trans. J. H. Freese (London: Macmillan, 1920), 1:31–32. For example, Randall wrote that Cosmas "had great popularity among even the educated till the twelfth century." See John Herman Randall, Jr., *The Making of the Modern Mind: A Survey of the Intellectual Background of the Present Age* (Boston: Houghton Mifflin, 1926), 23.

155. This problem has been summarized by F. S. Betten, "St. Boniface and the Doctrine of the Antipodes," *American Catholic Quarterly Review* 43 (1918): 644–63. The letter from Pope Zacharias threatening Virgil with excommunication is in *Monumenta Germaniae historica: Epistolarum*, 8 vols. (Berlin: Wiedmann, 1887–1939), 3:356–61, esp. 360.

156. Cortesão, *History of Portuguese Cartography*, 1:172 (note 34). G. L. Bertolini, "I quattro angoli del mondo e la forma della terra nel passo di Rabano Mauro," *Bollettino della Società Geografica Italiana* 47 (1910): 1433–41.

157. Saint Augustine, *De civitate Dei* 16.9: "They fail to observe that even if the world is held to be global or rounded in shape . . . it would still not necessarily follow that the land on the opposite side is not covered by masses of water," trans. Eva Matthews Sanford and William McAllen Green, vol. 5 of Saint Augustine, *The City of God against the Pagans*, 7 vols., Loeb Classical Library (Cambridge: Harvard University Press, 1965), 5:51. Also see Saint Augustine *De genesi ad litteram libri duodecim* 1.10, in *Corpus scriptorum ecclesiasticorum Latinorum* 28 (1894): 15, l. 6, and Saint Augustine *Quaestionum evangelicarum libri* 2.14, in *Patrologiae cursus completus*, 221 vols. and suppl., ed. J. P. Migne (Paris, 1844–64; suppl., 1958–), 35:1339.

158. The classical sources for the idea of the spherical earth have already been discussed above, p. 145. Less well known is Ovid's description in the *Metamorphoses* 1.32–36:

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.<sup>159</sup>

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.”<sup>160</sup> While he uses the word *globus* several times in *De natura rerum* in connection with the moon or the planets,<sup>161</sup> 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.”<sup>162</sup> 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*.<sup>163</sup> In explaining an eclipse, Sisebut uses the word *globus* for the earth coming between the sun and the moon.<sup>164</sup>

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*.”<sup>165</sup> In another passage, he seems to have misunderstood the Greek concept of parallel zones from his reading of the *Poeticon Astronomicum* 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.”<sup>166</sup> 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 *climata*.

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.”<sup>167</sup> 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

---

Whatever god it was, who out of chaos  
Brought order to the universe, and gave it  
Division, subdivision, he molded earth,  
In the beginning, into a great globe,  
Even on every side.

See Ovid, *Metamorphoses*, trans. Rolfe Humphries (Bloomington: University of Indiana Press, 1957), 4.

159. Jones, “Flat Earth” (note 153). Anna-Dorothee von den Brincken, “Die Kugelgestalt der Erde in der Kartographie des Mittelalters,” *Archiv für Kulturgeschichte* 58 (1976): 77–95, summarizes the history of the concepts of the spherical shape of the earth but avoids the controversy over Isidore’s views.

160. Brehaut, *Isidore of 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 adluit fines.” Isidore, *Traité de la nature*, ed. Fontaine, 325 (note 84).

163. Isidore, *Traité de la nature*, ed. Fontaine, 151 (note 84).

164. Isidore *Epistula Sisebuti*, in *Traité de la nature*, ed. Fontaine, 333 line 40 (note 84).

165. Isidore *Etymologies* 14.2.1: “Orbis a rotunditate circuli dictus, quia sicut rota est; unde brevis etiam rotella *orbiculus* appellatur,” in *Patrologiae cursus completus*, ed. Migne, 82:495 (note 157), author’s translation.

166. “In definitione autem mundi circulos aiunt philosophi quinque, quos Graeci parallelois, id est zonas uocant, in quibus diuiditur orbis terrae. . . . Sed fingamus eas in modum dexteræ 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 *climata* concept was transmitted to the Muslim world, but with seven circles. See George Sarton, review of Ahmed Zeki Validi Togan, “Bī-rūnī’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 Brittanis; eodem momento ab utrisque uidetur cum oritur, nec cum uergit in occasu minor apparet 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.<sup>168</sup> 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.<sup>169</sup>

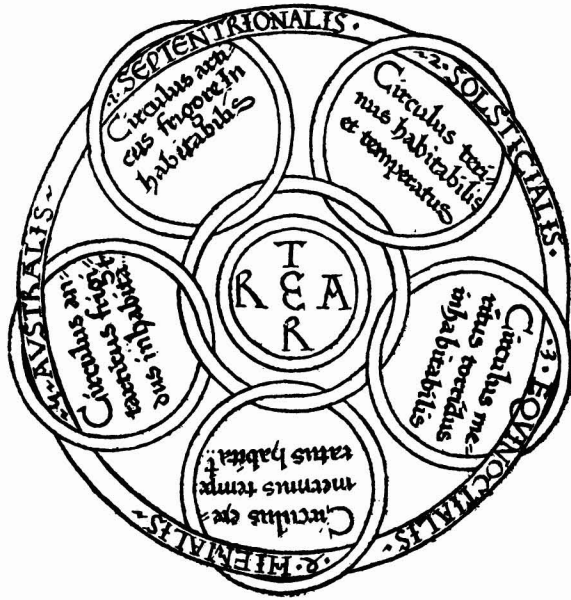


FIG. 18.26. ISIDORE'S VIEW OF THE EARTH'S FIVE ZONES. Isidore applied the Greek concept of zones not to a sphere but to a flat, circular earth, but this probably results from his misunderstanding of the nature of the concept and does not imply his ignorance of the earth's sphericity. Diameter of the original: 13.5 cm. After George H. T. Kimble, *Geography in the Middle Ages* (London: Methuen, 1938).

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 *Contra Antipodes*—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”<sup>170</sup> (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.<sup>171</sup> 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.<sup>172</sup> 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.<sup>173</sup>

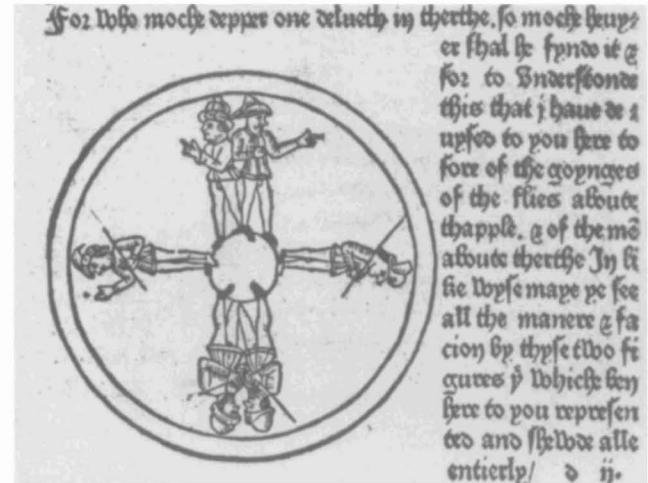


FIG. 18.27. DEMONSTRATION OF THE EARTH'S SPHERICITY IN THE THIRTEENTH CENTURY. Gautier de Metz explained that if two travelers left from the same place in opposite directions they would meet at the other side of the earth.

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.

168. Bede *De temporum ratione* 32, author's translation; see *The Complete Works of Venerable Bede*, 12 vols., ed. John Allen Giles (London: Whittaker, 1843–44), 6:210.

169. Saint Thomas Aquinas *Summa theologica* 1.47.3.3; see *Summa theologica/St. Thomas Aquinas*, 5 vols., trans. Fathers of the English Dominican Province (New York: Benziger Brothers, 1947–48).

170. For a translation of the relevant text in the Catalan atlas, see Grosjean, *Catalan Atlas*, 40 (note 131). For the Gautier de Metz quotation, see William Caxton (after Gautier de Metz), *Mirroure of the World*, Early English Text Society Extra Series 110 (London: Kegan, Paul, Trench, Trübner, 1913), 52.

171. A summary of the views of these scholars is found in Sarton, *Introduction to the History of Science*, vols. 2 and 3 (note 49). For a discussion of Hildegard's concepts, see Charles Singer, *Studies in the History and Method of Science*, 2 ed., 2 vols. (London: W. Dawson, 1955), 1:1–55.

172. See Mary Acworth Orr, *Dante and the Early Astronomers* (New York: A. Wingate, 1956). Arthur Percival Newton, *Travel and Travellers of the Middle Ages* (New York: Alfred A. Knopf, 1926), 9.

173. John Mandeville, *Mandeville's Travels*, 2 vols., ed. Paul Hamelius (London: Published for the Early English Text Society by K. Paul et al., 1919–23), 1:120–24. Newton, *Travel*, 12–13 (note 172).

## 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.<sup>174</sup> 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.<sup>175</sup> Tobler has drawn our attention to a similar pattern of deformation on the Hereford map.<sup>176</sup>

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 cosmographer” 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.<sup>177</sup> Implied in this system is an azimuthal projection, although the center of the projection is still a point of discussion.<sup>178</sup>

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.”<sup>179</sup> 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.<sup>180</sup>

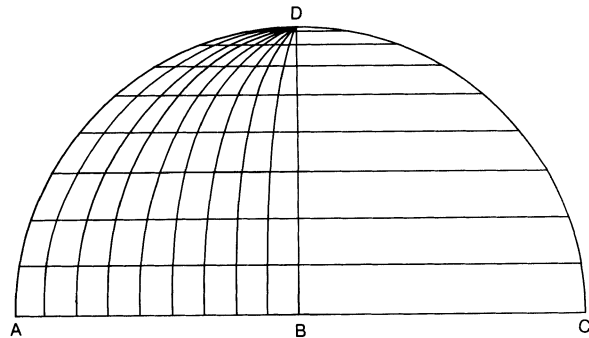


FIG. 18.28. RECONSTRUCTION OF ROGER BACON'S MAP PROJECTION. In this thirteenth-century map projection, Bacon fixes the position of a place by its distance from the equator and a central meridian. The parallel of latitude is drawn straight and parallel to the equator through the place's latitude on the colure (AD and DC). The meridians are represented as arcs of circles through the pole and the longitude of the place on the equator, except the central meridian, which is straight.

Author's reconstruction from the text of Bacon's *Opus majus*.

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

174. Waldo R. Tobler, "Medieval Distortions: The Projections of Ancient Maps," *Annals of the Association of American Geographers* 56 (1966): 351–60, esp. 351.

175. London, British Library, Cotton Nero MS. D.V., fol. 1v, and British Library, Add. MS. 10049.

176. Tobler, "Medieval Distortions," 360 (note 174).

177. D'Avezac-Macaya, "Projection des cartes," 289–91 (note 43).

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.<sup>181</sup>

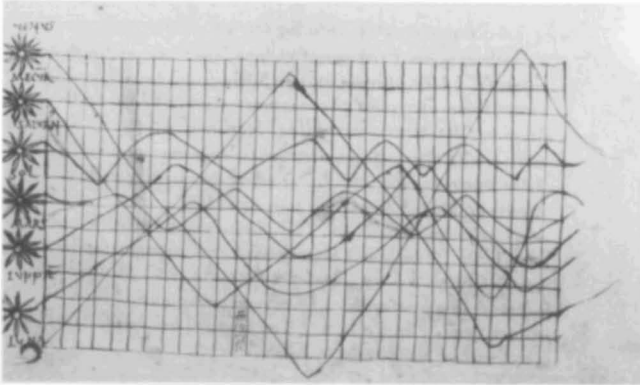


FIG. 18.29. AN ELEVENTH-CENTURY GRAPH. One of several graphs from this period, the diagram shows the passage of the sun and planets around the zodiac. Size of the original: 13 × 22 cm. By permission of the Bayerische Staatsbibliothek, Munich (Clm. 14436, fol. 58r).

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.”<sup>182</sup> 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.<sup>183</sup>

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.<sup>184</sup>

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 Iudaeo*. 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.<sup>185</sup> 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.<sup>186</sup>

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.<sup>187</sup>

181. Harriet Pratt Lattin, “The Eleventh Century MS Munich 14436: Its Contribution to the History of Coordinates, of Logic, of German Studies in France,” *Isis* 38 (1947): 205–25. She discusses the contributions of Siegmund Günther, “Die Anfänge und Entwicklungsstadien des Koordinatenprinzips,” *Abhandlungen der Naturhistorischen Gesellschaft zu Nürnberg* 6 (1877): 1–50, esp. 19, and H. Gray Funkhouser, “Notes on a Tenth-Century Graph,” *Osiris* 1 (1936): 260–62, among others.

182. Margaret E. Baron, *The Origins of the Infinitesimal Calculus* (Oxford: Pergamon Press, 1969), 5.

183. Howard Eves, *An Introduction to the History of Mathematics* (New York: Holt, Rinehart and Winston, 1969), 281.

184. 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).

185. John Kirtland Wright, “Notes on the Knowledge of Latitudes and Longitudes in the Middle Ages,” *Isis* 5 (1922): 75–98; Wright, *Geographical Lore*, 244–56 (note 18); Cortesão, *History of Portuguese Cartography*, 1:182–83 (note 34).

186. See below, appendix 18.1.

187. Durand, *Vienna-Klosterneuburg*, 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.<sup>188</sup>

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.<sup>189</sup> 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.<sup>190</sup>

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.<sup>191</sup> 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.<sup>192</sup>

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.<sup>193</sup>

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-*

*mundi*. Three are outstanding for their detail: *Mappae clavicula* (late twelfth century), *De arte illuminandi* (late fourteenth century), and the *Libro dell'arte* of Cennino Cennini (late fourteenth century).<sup>194</sup> These treatises are the recipe books of painting; they describe natural elements, minerals, and vegetable extracts as well as the artificial, manufactured salts used in preparing pigments.

Two types of ink were known and used in the Middle Ages. One was a suspension of carbon and the other a suspension of black organic salts of iron. Those *mappaemundi* drawn and lettered in ink used the same materials as any other manuscript, and the iron inks became the more common writing medium. They were sometimes mixed with gallic and tannic acid obtained from oak galls, providing an intense purple-black ink that darkened with age.<sup>195</sup>

The complex systems of map signs employed in modern cartography were less developed in the classical period and the Middle Ages. Instead, map features were often described with rubrics or legends, some of which

his statement that the influence of geographical coordinates on the cartography of the twelfth and thirteenth centuries “was absolutely nil.”

188. Daniel V. Thompson, *The Materials and Techniques of Medieval Painting* (New York: Dover, 1956), 24.

189. [John K. Wright?], “Three Early Fifteenth Century World Maps in Siena,” *Geographical Review* 11 (1921): 306–7; Giuseppe Caraci, “Tre piccoli mappamondi intarsiati del sec. XV nel Palazzo Pubblico di Siena,” *Rivista Geografica Italiana* 28 (1921): 163–65; Bernhard Brandt, *Mittelalterliche Weltkarten aus Toscana*, Geographisches Institut der Deutschen Universität in Prag (Prague: Staatsdruckerei, 1929).

190. Parchment is any kind of animal skin prepared for writing or drawing. It is a general word for such material and does not specify the animal, whether sheep, calf, goat, or whatever. Vellum was sometimes used to refer to calfskin and fine parchment, but the distinction has become less clear in recent times. Uterine vellum—from an aborted animal, was extremely rare. The distinction between parchment and vellum is also discussed by W. Lee Ustick, “Parchment and Vellum,” *Library*, 4th ser., 16 (1935): 439–43. See also Daniel V. Thompson, “Medieval Parchment-Making,” *Library*, 4th ser., 16 (1935): 113–17.

191. Durand, *Vienna-Klosterneuburg*, 123–24 (note 52), also refers to the original work on these account books by Berthold Černik, “Das Schrift- und Buchwesen im Stifte Klosterneuburg während des 15. Jahrhunderts,” *Jahrbuch des Stiftes Klosterneuburg* 5 (1913): 97–176. For another description of technical details—from a contract for world maps at the end of the fourteenth century—see Skelton, “Contract,” 107–13 (note 6), and Campbell, chapter 19 below.

192. Gasparrini Leporace, *Mappamondo di Fra Mauro*, 15 n. 2 (note 137). A transcription of the note is found in Antonio Bertolotti, *Artisti veneti in Roma nei secoli XV, XVI e XVII: Studi e ricerche negli archivi romani* (Venice: Miscellanea Pubblicata dalla Reale Deputazione di Storia Patria, 1884, reprinted Bologna: Arnaldo Forni, 1965), 8.

193. London, British Library, Add. MS. 10049, fols. 64r–64v.

194. Franco Brunello, “*De arte illuminandi*” e altri trattati sulla tecnica della miniatura medievale (Vicenza: Neri Pozza Editore, 1975), contains a valuable bibliography of recent literature on the topic.

195. Thompson, *Medieval Painting*, 81–82 (note 188).



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.<sup>196</sup>

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.<sup>197</sup> 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.<sup>198</sup> 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.<sup>199</sup> 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.<sup>200</sup> 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”<sup>201</sup> (plate 21).

196. David Woodward, “The Manuscript, Engraved, and Typographic Traditions of Map Lettering,” in *Art and Cartography* (note 135).

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.

198. Beazley, *Dawn of Modern Geography*, 2:560 (note 17). Miller, *Mappaemundi*, 1, pl. 10 (note 9).

199. Anna-Dorothee von den Brincken, “Die Ausbildung konventioneller Zeichen und Farbgebungen in der Universalkartographie des Mittelalters,” *Archiv für Diplomatik: Schriftgeschichte Siegel- und Wappenkunde* 16 (1970): 325–49; Catherine Delano Smith, “Cartographic Signs on European Maps and Their Explanation Before 1700,” *Imago Mundi* 37 (1985): 9–29.

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.

201. Von den Brincken, “Zeichen und Farbgebungen,” 345 (note 199). See also below, Campbell, chapter 19. The use of color in medieval cartography is also treated in Ulla Ehrens-värd, “Color in Cartography: An Historical Survey,” in *Art and Cartography* (note 135).



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.<sup>202</sup>

#### 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.<sup>203</sup> 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.<sup>204</sup>

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.<sup>205</sup> The teachings of Christ emphasized the spiritual and not the physical world.<sup>206</sup> 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.<sup>207</sup>

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 weighs the elements.”<sup>208</sup>

202. Von den Brincken, “Zeichen und Farbgebungen,” 336 (note 199).

203. Von den Brincken, “Mappa mundi und Chronographia,” 118 ff. (note 23).

204. Bertrand Russell, *Philosophy* (New York: W. W. Norton, 1927), 283.

205. Robert North, *A History of Biblical Map Making*, Beihefte zum Tübinger Atlas des Vorderen Orients, B32 (Wiesbaden: Reichert, 1979), 76: “The earliest Christians showed no sentimental interest in the exact location of their own most sacred events.”

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.

208. Saint Augustine, *Confessions*, trans. R. S. Pine-Coffin (London: Penguin Books, 1961), 95.

TABLE 18.4 Survey of Representational Styles of Selected Medieval Maps

Date	Author	Seas	Red Sea	Rivers	Relief Representation	Settlements
8th–9th century	Cosmas	Blue	Blue	Green	None	None
ca. 775	Isidore	Blue/green	Red	Blue/green	Red jagged chains	Six eight-pointed stars
10th century	Anglo-Saxon	Gray	Red	Orange	Green chains of “teeth”	Double towers, rotundas
ca. 1050	Beatus-Saint Sever	Blue	Red	Blue	Jagged and arched chains	Yellow battlemented buildings
1055	Theodulf	Blue/green	Red	Blue/green	Brown jagged lines	Square stone buildings
ca. 1109	Beatus-Silos	Blue	Red	Blue	Green and red arch clusters	Only legends
ca. 1110	Henry of Mainz	Green	Red	Violet	Red lobed chains	Double towers, ramparts
1119	Guido of Pisa	Blue	Red	Green	Double leaves, green inside	Legends only
13th	Psalter map	Green	Red	Blue	Natural-colored lobed chains	Ocher triangles
After 1342	Higden	Green	Red	Green	Green/red, green/black mountain chains	Large vignettes
ca. 1430	Borgia map	-----	No coloring-----		Rows of “teeth”	Triple towers
1448	Andreas Walsperger	Green	Red	Blue	Brown or green shapes	Red or black circles; individual buildings
1452	Giovanni Leardo	Blue	Red	Gray	Red/green three-tiered mountains	Building clusters
1457	Genoese map	Blue	Red	Gray	Green patches, gray/white hill drawings	Red, pink, and white tower clusters
1459	Fra Mauro	Blue	Blue	Blue	Green/blue hill drawings	Red, green, and blue tower clusters

Source: After Anna-Dorothee von den Brincken, “Die Ausbildung konventioneller Zeichen und Farbgebungen in der Universalkartographie Mittelalters,” *Archiv für Diplomatik*

*matik: Schriftgeschichte Siegel- und Wappenkunde* 16 (1970):325–49.

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 Meotides 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).<sup>209</sup> 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.<sup>210</sup>

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).<sup>211</sup> 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).<sup>212</sup> 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.<sup>213</sup>

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.<sup>214</sup> 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.<sup>215</sup>

Information regarding human settlements on *mappaemundi* was also derived from a mixture of classical and biblical sources.<sup>216</sup> 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 long 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.

As the influence of the classical tradition declined, biblical sources became more prominent. Although originally Roman, the basic structure of the tripartite diagrams now owed their form to the tradition of the peopling of the earth by the descendants of Noah. The families of Shem, Ham, and Japheth are sometimes listed on the maps in full, taken from the passage in Genesis

209. Miller, *Mappaemundi*, 3:97–98 (note 9). Beazley, *Dawn of Modern Geography*, 2:632 (note 17).

210. Saint Basil *Homily* 4.2–4; see *Exegetic Homilies*, trans. Sister Agnes Clare Way, The Fathers of the Church, vol. 46 (Washington, D. C.: Catholic University of America Press, 1963). Kimble, *Middle Ages*, 33–34 (note 55), and 2 Esd. 6:42: "On the third day you ordered the waters to collect in a seventh part of the earth; the other six parts you made into dry land."

211. Miller, *Mappaemundi*, 2, pl. 12 (note 9).

212. Madrid, Biblioteca de la Real Academia de la Historia, Codex 25, fol. 204. Kamal, *Monumenta cartographica*, 3.2:667 (note 53).

213. Samuel E. Morison, *Admiral of the Ocean Sea: A Life of Christopher Columbus*, 2 vols. (Boston: Little, Brown, 1942), 2:283.

214. Strabo: "The Pactolus . . . anciently brought down a large quantity of gold-dust, whence it is said, the proverbial wealth of Croesus and his ancestors obtained renown." See Eva G. R. Taylor, "Pactolus: River of Gold," *Scottish Geographical Magazine* 44 (1928): 129–44.

215. Kimble, *Middle Ages*, 107–8 (note 55). Charles de La Roncière, *La découverte de l'Afrique au Moyen Age: Cartographes et explorateurs*, Mémoires de la Société Royal de Géographie d'Égypte, vols. 5, 6, 13 (Cairo: Institut Français d'Archéologie Orientale, 1924–27), is the fullest account, with an excellent bibliography.

216. I would like to acknowledge the help of George Kish with this section. See also von den Brincken, "Mappa mundi und Chronographia," 169 (note 23), who makes a very useful systematic survey of place-names on selected *mappaemundi*, providing seven tables of place-names as found on twenty-one maps.

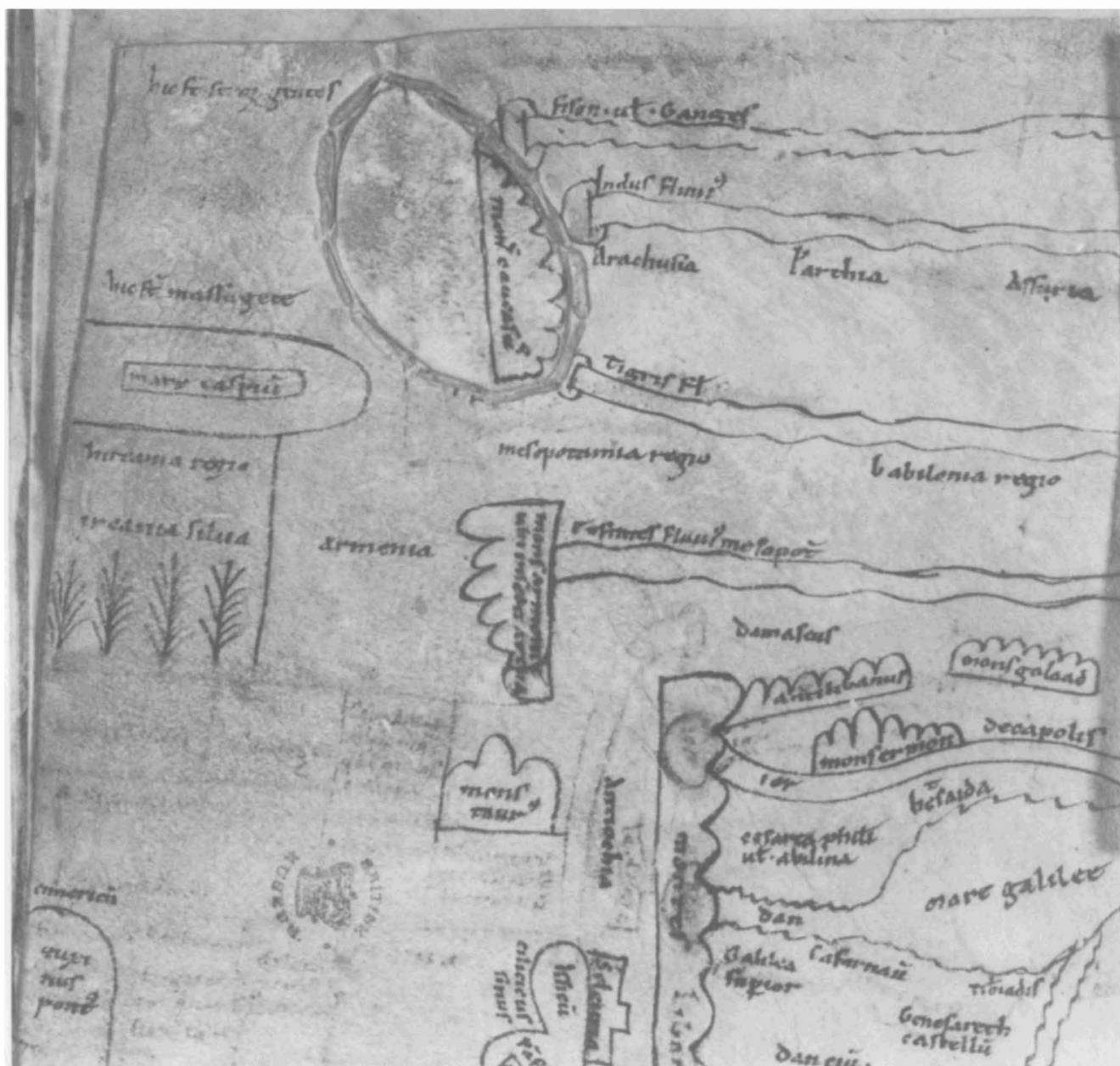


FIG. 18.31. THE RIVERS OF PARADISE. This detail from the twelfth-century “Jerome” map of Palestine shows the four rivers of paradise represented as real watercourses. The rivers are (top to bottom) the Ganges, Indus, Tigris, and Euphrates.

Size of the original detail: 15.7 × 15.7 cm. By permission of the British Library, London (Add. MS. 10049, fol. 64v).

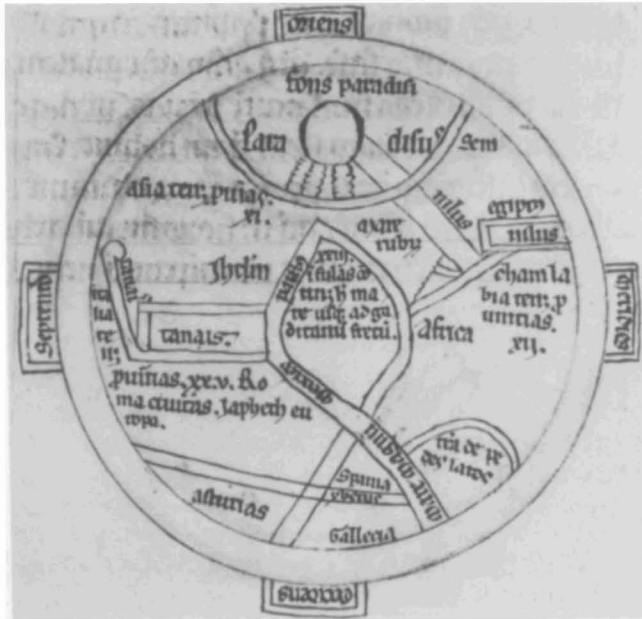


FIG. 18.32. THE NILE AS AN EXTENSION OF THE FOUR RIVERS OF PARADISE. This schematic T-O map, from a tenth-century manuscript of Isidore of Seville, shows the Nile with two sources: one in paradise and another in Africa. Diameter of the original: 11.5 cm. By permission of the Biblioteca Medicea Laurenziana, Florence (Plut. 27 sin. 8, fol. 64v).

(fig. 18.33).<sup>217</sup> Noah's ark, Mount Sinai, the Tower of Babel, Babylon, the Dead Sea, the river Jordan, Samaria, and the twelve tribes of Israel are also shown. Although the New Testament provided much less of the content of the *mappaemundi* by the later Middle Ages, those places that evoke the life of Christ and the apostles tended to be marked. In addition to Jerusalem, we find Bethlehem, Nazareth, the Sea of Galilee, Damascus, Ephesus, Antioch, Nicaea, Tarsus, and even the tombs of Saint Thomas, Saint Philip, and Saint Bartholomew identified on the Beatus (Saint Sever) and Ebstorf maps.<sup>218</sup>

Pilgrimage goals were often emphasized on *mappaemundi*, and the associated itineraries provided the source for many of the place-names, as Crone has demonstrated for the Hereford map.<sup>219</sup> Santiago de Compostela in Spain and Mont Saint-Michel in Brittany were commonly shown. Not surprisingly, Rome appears on almost every map, reflecting its multiple role as the old imperial capital of the West, the seat of the papacy, and the city of many churches where indulgence was offered to pilgrims. Jerusalem's importance as the greatest of all Christian pilgrims' goals is underlined not only by its appearance on most *mappaemundi*, but also by the popularity in the same period of detailed maps of the Holy Land, and plans of the Holy City as well, as Harvey describes in chapter 20 of this volume.

### Marvels and Legends

Representations of monstrous races and historical legends on *mappaemundi* reflected the medieval craving for the bizarre and fantastic.<sup>220</sup> 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 Amyc-tyrae with protruding lower lips could well have been based on remote contact with the Ubangi tribe.<sup>221</sup> Table 18.5 summarizes the main groups of semimythical races that appear on *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.<sup>222</sup> 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

217. 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.

219. Crone, "New Light," 451–53 (note 21).

220. Rudolf Wittkower, "Marvels of the East: A Study in the History of Monsters," *Journal of the Warburg and Courtauld Institutes* 5 (1942): 159–97, esp. 159.

221. Friedman, *Monstrous Races*, 24 (note 3).

222. Wittkower, "Marvels," 160 (note 220). See also Jean Céard, *La nature et les prodiges: L'insolite au 16<sup>e</sup> siècle*, *Travaux d'Humanisme et Renaissance*, no. 158 (Geneva: Droz, 1977).

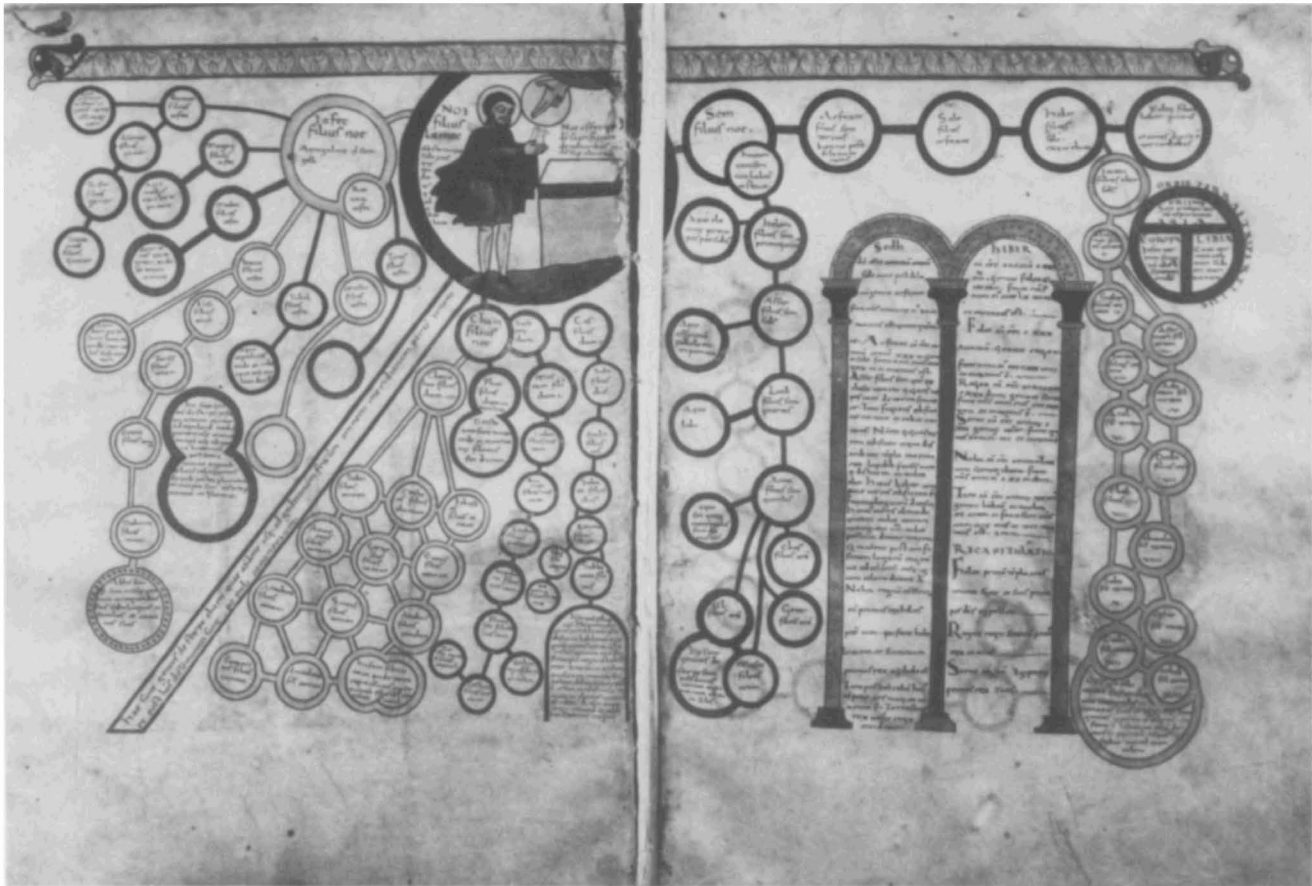


FIG. 18.33. DESCENDANTS OF NOAH. The families of Noah’s three sons, “Sem,” “Cham,” and “Sefet” (i.e., Shem, Ham, and Japheth), are shown in this genealogical diagram from an eleventh-century manuscript of the *Commentary on the Apocalypse of Saint John* of Beatus of Liebana. The *mappaemundi*, top right (detail, fig. 18.52), is used to illustrate the division of the world between the three sons.

Size of the original: 37 × 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*

Name	Characteristics	Location	Maps
Amyctyrae	Protruding lower or upper lip		Ebstorf
Anthropophagi	Man-eaters; drink from skulls	Scythia; Africa	Walsperger; Ebstorf
Antipodeans	Opposite-footed	Antipodes	Beatus
Artibatirae	Walk on all fours		Psalter
Astomi	Mouthless; apple smellers	Ganges	Walsperger
Blemmyae	Faces on chests; no necks; also known as Acephali	Libya (Africa)	Walsperger
Cyclopes	One-eyed; also known as Monoculi	Sicily; India	Walsperger
Cynocephali	Dog-headed	India	Borgia; Hereford; Ebstorf; Walsperger; Psalter
Epiphagi	Eyes on shoulders (similar to Blemmyae)		Psalter
Hippopodes	Horses’ hooves		Ebstorf
Maritimi	Hold bow and arrow (four eyes)	Africa	Psalter; Ebstorf
Martikhora	Four-legged beasts with men’s heads		Hereford; Ebstorf
Sciopods	Shadow-footed (sometimes also called Monocoli, from the Greek, causing confusion with the Monoculi above)	India	Beatus; Hereford; Psalter
Troglodytes	Cave dwellers	Ethiopia	Walsperger; Psalter

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.<sup>223</sup> 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.”<sup>224</sup>

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.<sup>225</sup> These creatures are thus found on the didactic *mappaemundi*. 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).<sup>226</sup>

The placing of the monstrous races on the world map varied according to the three main types of *mappaemundi*. 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.<sup>227</sup>

The fear of races and spiritual forces outside Christianity gave rise to two other legends that appear so frequently on *mappaemundi* that they merit individual



FIG. 18.34. CYNOCEPHALI ON THE BORGIA MAP. A dog-headed people, associated with Islam and supposed to exist in Ethiopia, the Cynocephali were prime candidates for conversion by medieval missionaries and were therefore frequently shown on the didactic *mappaemundi* as in the upper right here. Size of the original detail: 12 × 7.2 cm. Photograph from the Biblioteca Apostolica Vaticana, Rome (Borgiano XVI).

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.<sup>228</sup> 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 *mappaemundi*, Gog and Magog were personified as two

223. The marvels continued to appear in printed illustrated histories and cosmographies, such as those by Hartmann Schedel, Sebastian Münster, André Thevet, Sebastian Franck, and other Renaissance figures.

224. François Rabelais, *Pantagruel*, 5.31, in *Oeuvres complètes*, ed. Jacques Boulenger (Paris: Gallimard, 1955), 844.

225. Friedman, *Monstrous Races*, 59–86 (note 3).

226. “Ebinichibel rex est sarracenus ethiopicus cum populo suo habiens caninam.” *Almagià, Vaticana*, 1:27–29 and pl. XI (note 83).

227. Friedman, *Monstrous Races*, 50 (note 3).

228. Ezek. 38:1–9, Rev. 20:7–8.

giants situated somewhere in the northern or north-eastern 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).<sup>229</sup>

The Prester John legend, which Cortesão has called "the greatest hoax in the history of geography,"<sup>230</sup> 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.<sup>231</sup>



FIG. 18.35. THE WALL ABOUT THE KINGDOM OF MAGOG. The purpose of this wall—which derived from the Alexander legend—was to contain Gog, whose hordes in the kingdom of Magog were supposed to overrun the world at the Day of Judgment. Since it was situated in Asia, such depictions have been mistaken for the Great Wall of China. The detail is from the thirteenth-century Psalter map.

Size of the original detail: 3.3 × 2.5 cm. By permission of the British Library, London (Add. MS. 28681, fol. 9r).

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).



FIG. 18.36. PRESTER JOHN. A mythical Christian king, Prester John first appeared in Asia. But as successive expeditions found no trace of this possible ally in the West's struggles with Islam, he was moved to various parts of Africa.

From Diogo Homem's atlas of about 1565. By permission of the British Library, London (Add. MS. 5415a).

229. Andrew R. Anderson, *Alexander's Gate, Gog and Magog, and the Inclosed Nations* (Cambridge, Mass.: Medieval Academy of America, 1932). An enormous body of legend was generated by the travels of Alexander the Great and found its way into medieval thought—and hence onto the *mappaemundi*—by way of the Alexander romances. See also W. J. Aerts et al., eds., *Alexander the Great in the Middle Ages: Ten Studies on the Last Days of Alexander in Literary and Historical Writing*, Symposium Interfacultaire Werkgroep Mediaevistiek, Groningen, 12–15 October, 1977 (Nijmegen: Alfa Nijmegen, 1978). Friedman, *Monstrous Races*, 33 (note 3).

230. Cortesão, *History of Portuguese Cartography*, 1:255–75 (note 34).

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 *mappaemundi* 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.”<sup>232</sup> 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 breadth.<sup>233</sup> 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.<sup>234</sup>

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.<sup>235</sup>

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.<sup>236</sup> 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.

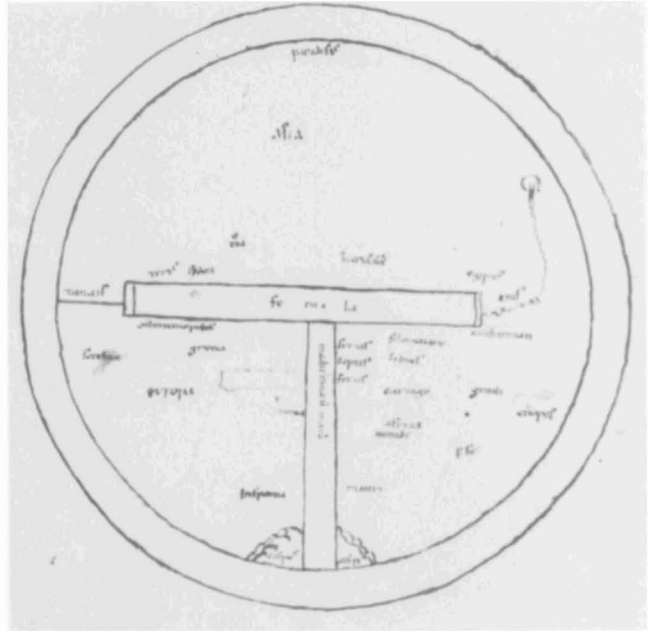


FIG. 18.37. T-O MAP WITH TAU CROSS. Such images reinforce the symbolization of the Passion of Christ that is inherent within the T-O schema, the T-O representing the tau cross (*crux commissa*). The map shown here is dated to the eleventh century.

Diameter of the original: 16.2 cm. From a manuscript of Salust, *De bello Jugurthino*. By permission of the Universitätsbibliothek Rostock, GDR (Codex Philol. 27, fol. 1v).

232. Gerhart B. Ladner, “Medieval and Modern Understanding of Symbolism: A Comparison,” *Speculum* 54 (1979): 223–56, quotation on 225. Hugh of Saint Victor’s graphic bent is also shown by his indication that, when seeking the meaning of a passage of Scripture, he used to help himself by drawing diagrams. See Beryl Smalley, *The Study of the Bible in the Middle Ages*, 2d ed. (Oxford: Blackwell, 1952), 96.

233. Eph. 3:18.

234. Gerhart B. Ladner, “St. Gregory of Nyssa and St. Augustine on the Symbolism of the Cross,” in *Late Classical and Mediaeval Studies in Honor of Albert Mathias Friend, Jr.*, ed. Kurt Weitzmann (Princeton: Princeton University Press, 1955), 88–95, esp. 92–93. John 19:23.

235. See above, pp. 288–90.

236. Jonathan T. Lanman, “The Religious Symbolism of the T in T-O Maps,” *Cartographica* 18, no. 4 (1981): 18–22. This is strongly confirmed by the small *mappaemundi* functioning as an initial T with a crucified figure. Florence, Biblioteca Medicea Laurenziana, *Conventus soppressus* 319, fol. 90v. See Arentzen, *Imago Mundi Cartographica*, 235–36 and pl. 79 (note 32).

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.<sup>237</sup>

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.<sup>238</sup>

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).<sup>239</sup> 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.<sup>240</sup> Isidore presented a similar diagram of the elements and their relation to the cardinal directions and climates (fig. 18.39).<sup>241</sup> 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:

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.<sup>242</sup>

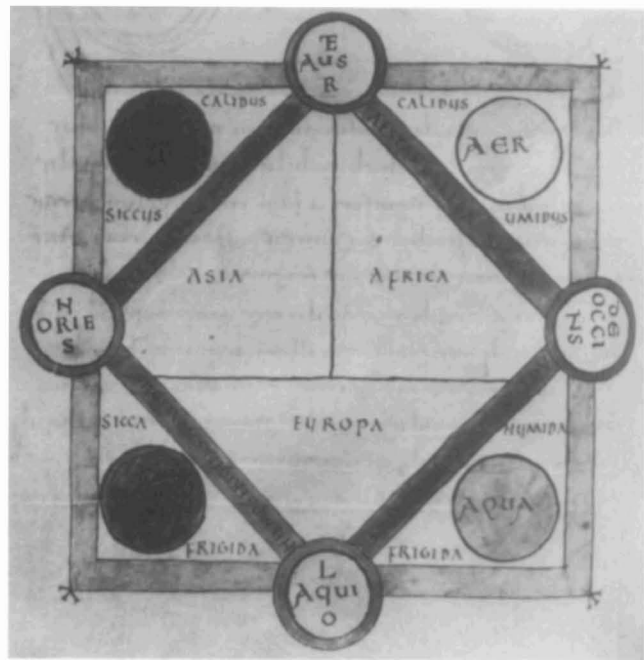


FIG. 18.38. THE SYMBOLISM OF THE NUMBER FOUR. From a ninth-century manuscript of Bede’s *De natura rerum*, this diagram indicates the relationships perceived in the Middle Ages to have existed between the four cardinal directions (and the three continents), the four seasons, the four elements, and the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

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).

239. Karl A. Nowotny, *Beiträge zur Geschichte des Weltbildes* (Vienna: Ferdinand Berger, 1970), 26. For a summary of element diagrams, see John Emery Murdoch, *Antiquity and the Middle Ages*, *Album of Science* (New York: Charles Scribner’s Sons, 1984), 346–59. As a magnificent iconographical statement of the interconnectivity of the seasons, climates, elements, rivers of paradise, and other cosmographical subjects, the stained glass rose window in Lausanne cathedral has few equals. See Ellen Judith Beer, *Die Glasmalereien der Schweiz vom 12. bis zum Beginn des 14. Jahrhunderts*, *Corpus Vitrearum Medii Aevi*, Schweiz, vol. 1 (Basel: Birkhäuser, 1956).

240. Ernst Cassirer, *The Individual and the Cosmos in Renaissance Philosophy* (Oxford: Clarendon Press, 1963). Leonard Barkan, *Nature’s Work of Art: The Human Body as Image of the World* (New Haven: Yale University Press, 1975).

241. Isidore, *Traité de la nature*, ed. Fontaine, fig. 2, 202 ff. (note 84).

242. Hugh of Saint Victor *De arca Noe mystica* XIV, in *Patrologiae cursus completus*, ed. Migne, 176:700 (note 157), author’s translation.

TABLE 18.6 The Number Four and Its Symbolic Association with Medieval *Mappaemundi*

	Cardinal Directions			
	North	East	South	West
<i>Major world divisions</i>				
Continents	Europe	Asia	Africa	Fourth continent
Peoples	Japheth	Shem	Ham	Antipodes
<i>Astronomy and astrology</i>				
Winds (Isidore)	Septentrio	Subsolanus	Auster	Favonius
Winds (Aristotle)	Boreas	Apeliotes	Notos	Zephyros
Seasons	Winter	Spring	Summer	Fall
Times of day	Midnight	Morning	Midday	Evening
Elements	Earth	Air	Fire	Water
Climates	Cold humid	Hot humid	Hot dry	Cold dry
Humors	Black bile	Blood	Choler	Phlegm
<i>Classical mythology</i>				
Personifications	Vulcan	Flora/Venus	Ceres	Bacchus
Planets	Jupiter	Venus	Mars	Neptune
<i>Bible</i>				
Evangelists	Matthew	Mark	Luke	John
How Gospel begins	Angel	Voice in wilderness	Sacrifice	Winged word
Form	Man	Lion	Ox	Eagle
Attribute	Wisdom	Strength	Patience	Freedom
Chartres south transept window	Isaiah	Daniel	Jeremiah	Ezekiel
Fathers of church	Ambrose	Jerome	Augustine	Gregory
Rivers of paradise	Pishon	Tigris	Gihon	Euphrates
Representation of rivers	Ganges	Tigris	Nile (Indus)	Euphrates
<i>Colors</i>				
Persia	Black	Red	White	Yellow
Israel	Black	Red	Green	White
Greece	Black	Blue green	Red	White
Roman chariot races	White	Green	Red	Blue
Aristotle	Black	Red	Yellow	White

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.<sup>243</sup>

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 *mappaemundi*, 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 depingitur ita ut 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 damnandi cum apostatis spiritibus detrudentur. Post haec supradicto circulo alter paulo laxior circumducitur, ut quasi zonam videatur efficere, et hoc spatium aer est. In quo spatio secundum quatuor partes mundi quatuor anni tempora disponuntur, ita ut ver sit ad orientem, ad austrum aestas, ad occidentem autumnus, ad aquilonem 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-

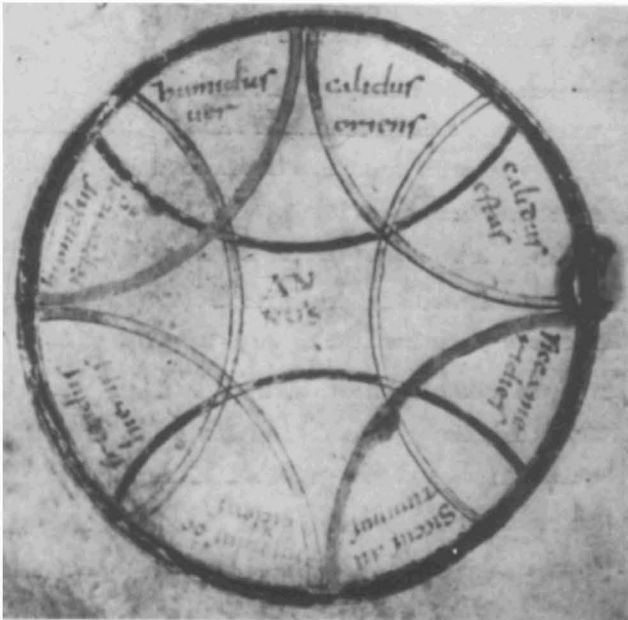


FIG. 18.39. DIAGRAM OF THE ELEMENTS FROM ISIDORE. Similar to Bede's representation (see fig. 18.38), this again indicates the combination of properties that are held by the four elements. Thus, fire is hot and dry, air is hot and wet, water is cold and wet, and earth is cold and dry. Isidore's use of circles reflects his misunderstanding of the earth's climatic zones (see fig. 18.26). From a manuscript of various treatises on astronomy and chronology dated to about 850. Diameter of the original: 14 cm. By permission of the Bibliothèque Municipale, Rouen (MS. 524, fol. 74v).

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.<sup>244</sup>

The cardinal directions thus not only were an abstract means of orientation, but became mythical entities in their own right.<sup>245</sup> 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.<sup>246</sup> 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.<sup>247</sup>

*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.<sup>248</sup> 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.<sup>249</sup> 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

---

bridge: Cambridge University Press, 1957). Occasionally each evangelist is shown holding a vessel, the symbolic source of the four rivers emanating from paradise.

244. B. L. Gordon, "Sacred Directions, Orientation, and the Top of the Map," *History of Religions* 10 (1971): 211–27, esp. 218. Later, of course, the habitual outlook of the Arabic culture was on the Indian Ocean, thus confirming south as a favored direction. See also Salvatore Cusa, "Sulla denominazione dei venti e dei punti cardinali, e specialmente di nord, est, sud, ovest," *Terzo Congresso Geografico Internazionale, Venice, 1881*, 2 vols. (Rome: Società Geografica Italiana, 1884), 2:375–415.

245. Cassirer, *Individual and the Cosmos*, 98 (note 240).

246. Cecil H. Brown, "Where Do Cardinal Direction Terms Come From?" *Anthropological Linguistics* 25 (1983): 121–61. But see Gordon, "Sacred Directions," 211 (note 244), who points out the variability of the position of sunrise and sunset according to season and latitude.

247. Brown, "Cardinal Direction Terms," 124 (note 246). The Cornish word for both left and north is *cleth*; the Welsh for left is *cledd* and for north is *gogledd*.

248. Miller, *Mappaemundi*, 3:129–31, fig. 66 (note 9).

249. Miller, *Mappaemundi*, 3:131 (note 9) dates it 22 B.C. If so, the name on the medal—M. Cocceius Nerva—clearly does not refer to the emperor of the same name who lived A.D. 35–98.

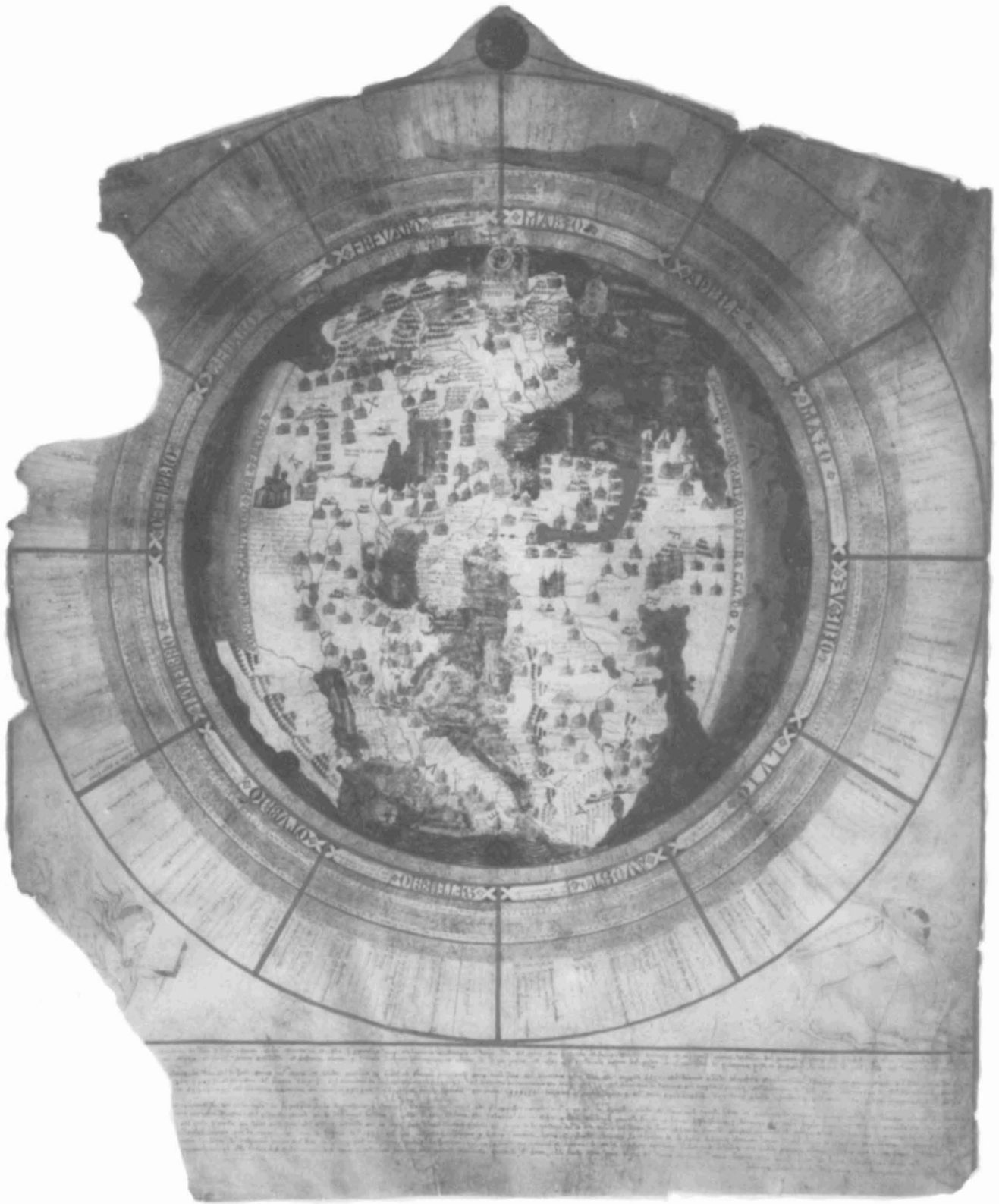


FIG. 18.40. LEARDO WORLD MAP, 1452. The authors of the four Gospels are shown in the four corners of this map following their evangelical association with the four corners of the earth in the Book of Revelation.

Size of the original: 73 × 60 cm. By permission of the American Geographical Society Collection, University of Wisconsin, Milwaukee.



FIG. 18.41. THE MOSAIC OF THE GODDESS FORTUNA. This twelfth-century floor mosaic combines a world map with a depiction of Fortuna's wheel as the central circle, a common theme in medieval art representing the earth as a place of vain pursuits.

well documented for the post-Renaissance period, but its sources date from much earlier.<sup>250</sup> 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).<sup>251</sup> 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).<sup>252</sup> A poem by Baudri de Bourgueil (ca. 1100) refers to a *mappamundi* 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.<sup>253</sup>

Size of the original: 6.5 × 7 m. By permission of the Museo Civico, Turin.

250. The standard late baroque source was Cesare Ripa, *Iconologia* (3d ed., 1603; facsimile reprint, Hildesheim and New York: Georg Olms, 1970). See also the work of James A. Welu, most recently "The Sources of Cartographic Ornamentation in the Netherlands," in *Art and Cartography* (note 135).

251. Ernst Kitzinger, "World Map and Fortune's Wheel: A Medieval Mosaic Floor in Turin," *Proceedings of the American Philosophical Society* 117 (1973): 344–73.

252. See H. M. Colvin, ed., *History of the King's Works*, 6 vols. (London: Her Majesty's Stationery Office, 1963–82), 1:127, 497, 2:859, 861.

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).

*Mappaemundi* 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.<sup>254</sup>

*Mappaemundi* 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. *Mappae-mundi* 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 *mappamundi*, a microcosm of earth and heaven.<sup>255</sup>

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 *mappaemundi*, 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.<sup>256</sup> There was also a sensitive awareness of space in the Old Testament that gave location an integral role in the events of Jewish history.<sup>257</sup> 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."<sup>258</sup>

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.<sup>259</sup>

Despite such beliefs, Jerusalem was not shown as the center of most medieval *mappaemundi*.<sup>260</sup> 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 *mappaemundi*—the Ebstorf, 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.<sup>261</sup>

254. Yi-Fu Tuan, *Topophilia: A Study of Environmental Perception, Attitudes, and Values* (Englewood Cliffs, N. J.: Prentice-Hall, 1974), and idem, *Space and Place: The Perspective of Experience* (Minneapolis: University of Minnesota Press, 1977). Barkan, *Nature's Work of Art* (note 240). Cassirer, *Individual and the Cosmos* (note 240).

255. Mieczyslaw Wallis, "Semantic and Symbolic Elements in Architecture: Iconology as a First Step towards an Architectural Semiotic," *Semiotica* 8 (1973): 220–38, esp. 224–28; Mircea Eliade, *The Sacred and the Profane: The Nature of Religion* (New York: Harcourt Brace Jovanovich, 1959).

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

257. See also Eliade, *Sacred and Profane*, 42–47 (note 255). Robert L. Cohn, *The Shape of Sacred Space: Four Biblical Studies* (Chico, Calif.: Scholars Press, 1981), 2. For a general discussion of the concept of space and place in Jewish philosophy, see Israel Isaac Efron, *The Problem of Space in Jewish Mediaeval Philosophy* (New York: Columbia University Press, 1917).

258. Quoted in Friedman, *Monstrous Races*, 219 n. 23 (note 3).

259. J. H. Bernard, trans., *The Itinerary of Bernard the Wise*, Palestine Pilgrims Text Society 3 (London, 1893; reprinted New York: AMS Press, 1971), 8.

260. Beazley, *Dawn of Modern Geography*, 1:339 (note 17).

261. For example, Paris, Bibliothèque Nationale, MS. Lat. 7676 (Reg. 6067), fol. 161. Destombes, *Mappemondes*, 63 (28.13) and fig. IIIb (note 31).

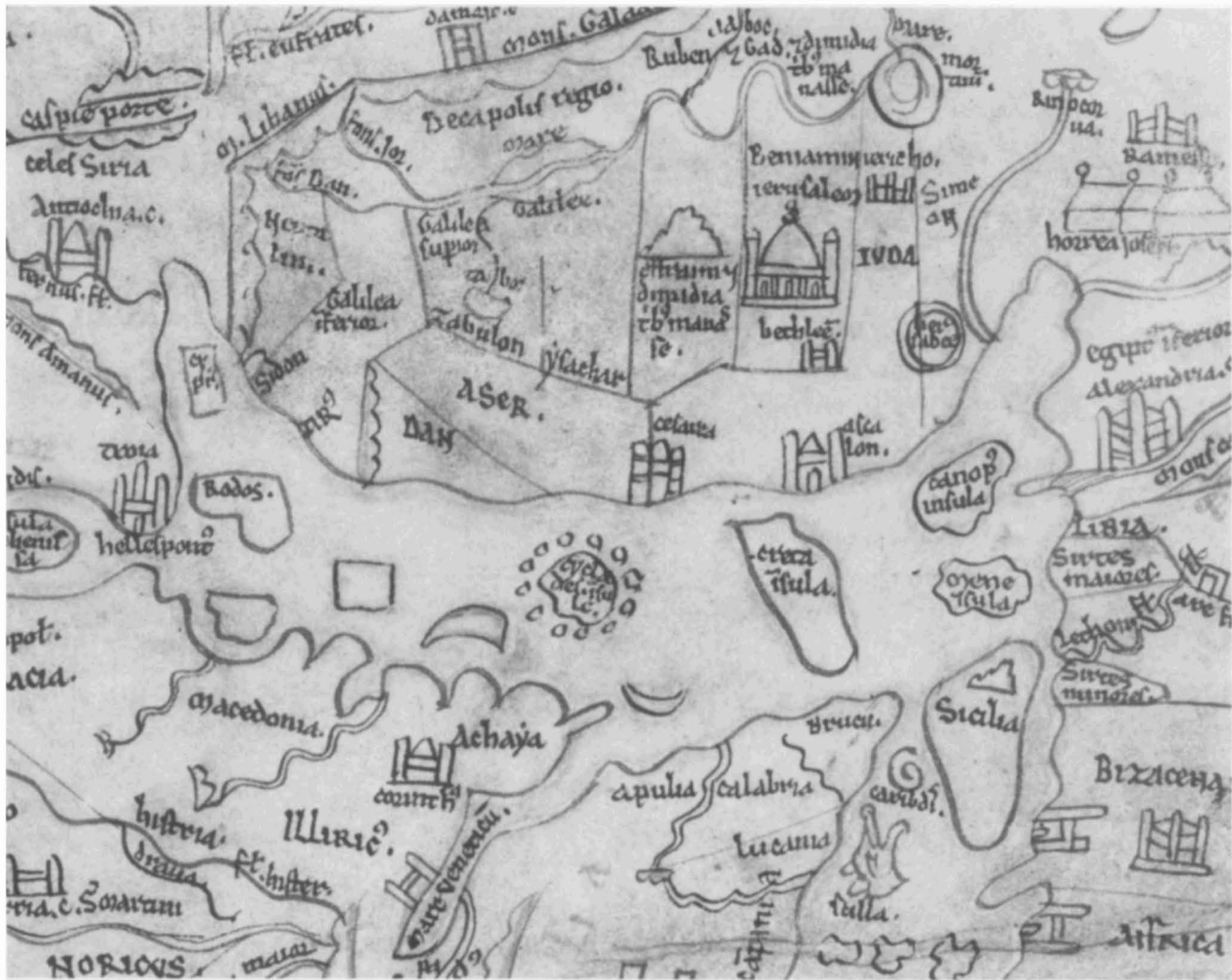


FIG. 18.42. THE TWELFTH-CENTURY WORLD MAP OF HENRY OF MAINZ. Representing a class of *mappaemundi* which did not place Jerusalem at the center, this map is thought to have influenced later maps of the same type. Derived from an ancient Greek tradition, the center is the Cyclades, the islands circling 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.<sup>262</sup>

### CONCLUSIONS

Traditional histories of cartography contain a number of misconceptions concerning the *mappaemundi*. The three most important of these are the assumption that geographical accuracy was the prime function of the *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 *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 *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 *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 *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 *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 *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 *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 *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

262. This point is also made by Wright, *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 MAPPAEMUNDI

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.<sup>1</sup> 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.<sup>2</sup> Its popularity in the fifteenth century is attested by the appearance of some fifty-five printed editions between 1470 and 1500.

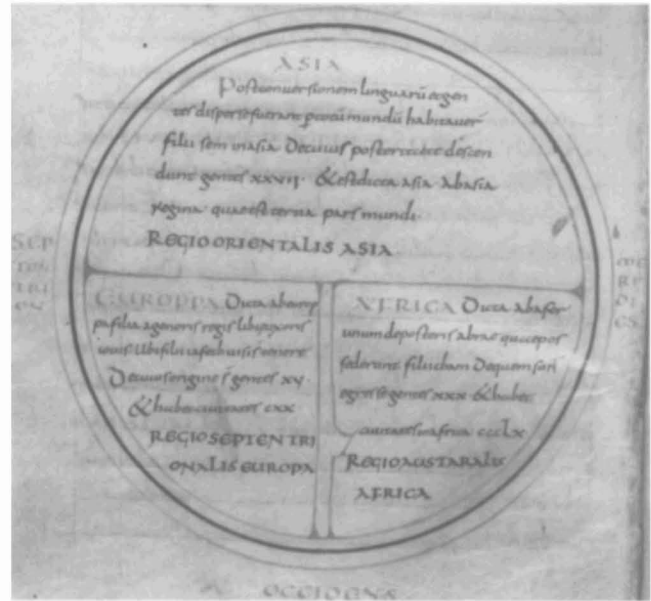


FIG. 18.43. ISIDORE T-O MAP. From a late ninth-century manuscript of Isidore's *De natura rerum*. Diameter of the original: 12.5 cm. By permission of the Burgerbibliothek, Bern (Codex 417, fol. 88v).

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).<sup>3</sup> The ends of the crossbar of the T may be truncated at an angle as in figure 18.47.

1. Marcel Destombes, ed., *Mappemondes A.D. 1200–1500: Catalogue préparé par la Commission des Cartes Anciennes de l'Union Géographique Internationale* (Amsterdam: N. Israel, 1964), 29–34 and 54–64.

2. Destombes, *Mappemondes*, 37–38 and 65–73 (note 1). See also A. D. Leeman, *A Systematical Bibliography of Sallust, 1879–1950* (Leiden: E. J. Brill, 1952); Bernhard Brandt, "Eine neue Sallustkarte aus Prag," *Mitteilungen des Vereins der Geographen an der Universität Leipzig* 14–15 (1936): 9–13; Johannes Keuning, "XVIIth Century Cartography in the Netherlands (Mainly in the Northern Provinces)," *Imago Mundi* 9 (1952): 35–64; and Ingeborg Stolzenberg, "Weltkarten in mittelalterlichen Handschriften der Staatsbibliothek Preussischer Kulturbesitz," in *Karten in Bibliotheken: Festgabe für Heinrich Kramm zur Vollendung seines 65. Lebensjahre*, ed. Lothar Zögner, Kartensammlung und Kartendokumentation 9 (Bonn-Bad Godesberg: Bundesforschungsanstalt für Landeskunde und Raumordnung, Selbstverlag, 1971), 17–32, esp. 21–22.

3. Jill Tattersall, "Sphere or Disc? Allusions to the Shape of the Earth in Some Twelfth-Century and Thirteenth-Century Vernacular French Works," *Modern Language Review* 76 (1981): 31–46.

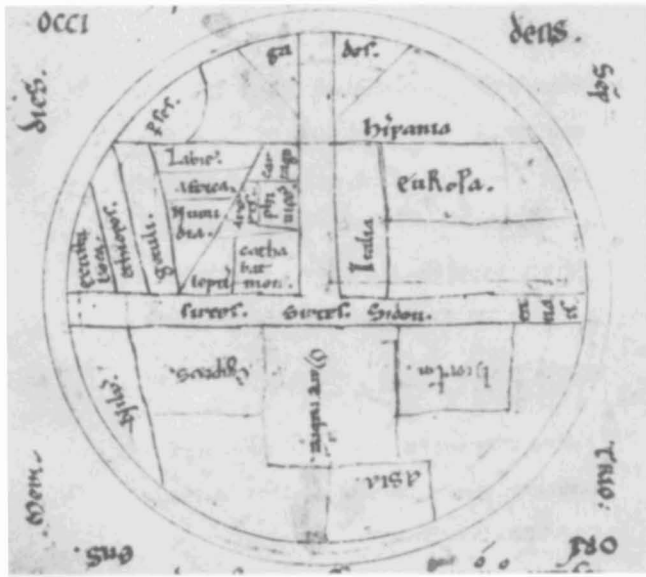


FIG. 18.44. SALLUST T-O MAP, WEST ORIENTATION. From a manuscript of the *De bello Jugurthino* of Sallust. Diameter of the original: 6.8 cm. Photograph from the Bibliothèque Nationale, Paris (MS. Lat. 6253, fol. 52v).

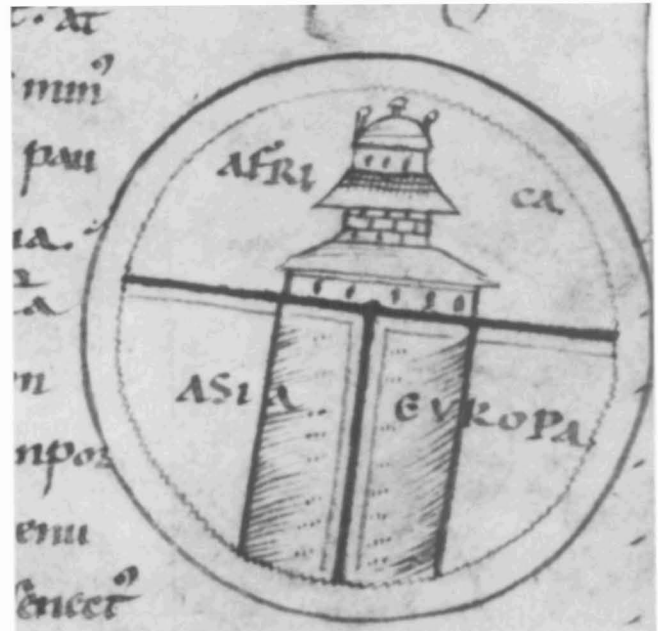


FIG. 18.46. SALLUST T-O MAP, AFRICA AS THE LARGEST CONTINENT. From a twelfth-century manuscript of the *De bello Jugurthino* of Sallust. Diameter of the original: 4 cm. Photograph from the Bibliothèque Nationale, Paris (MS. Lat. 5751, fol. 18r).

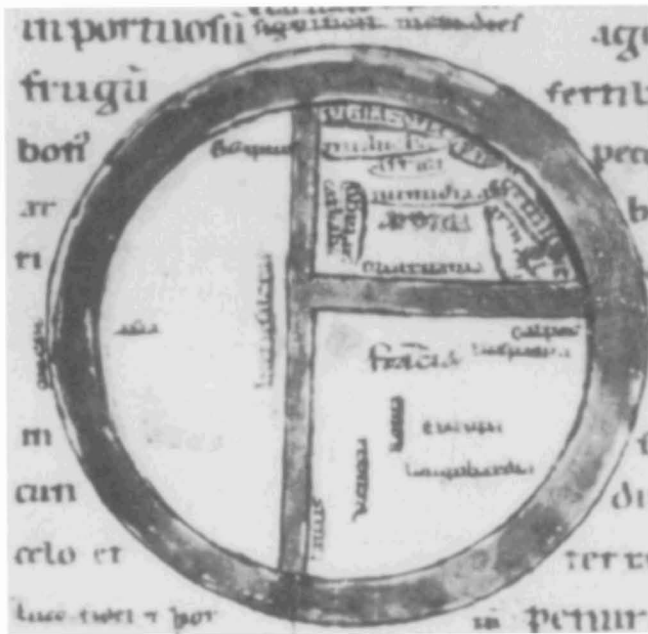


FIG. 18.45. SALLUST T-O MAP, SOUTH ORIENTATION. From a thirteenth-century manuscript of the *De bello Jugurthino* of Sallust. Diameter of the original: 4.3 cm. Photograph from the Bibliothèque Nationale, Paris (MS Lat. 6088 [Reg. 5974], fol. 33v).

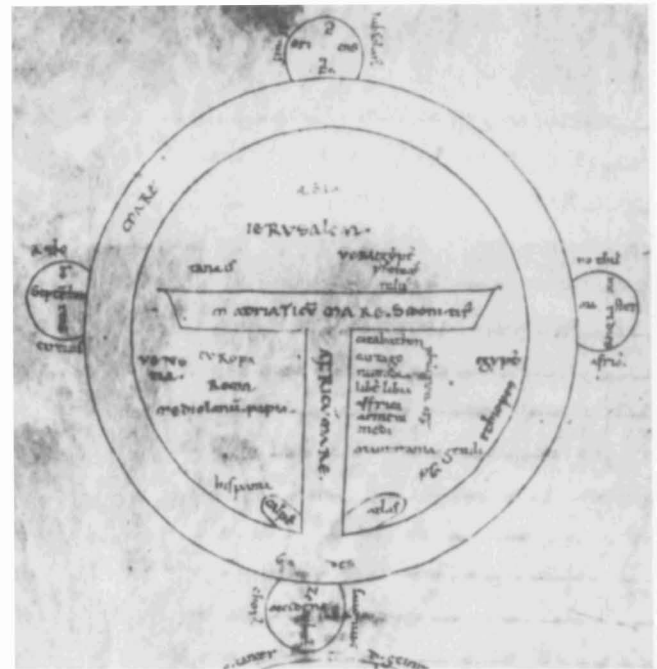


FIG. 18.47. SALLUST T-O MAP WITH TRUNCATED RIVERS. From a thirteenth-century manuscript of the *De bello Jugurthino* of Sallust. Diameter of the original: 16.5 cm. By permission of the Biblioteca Medicea Laurenziana, Florence (Plut. 16.18, fol. 63v).

## 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.<sup>4</sup>

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).

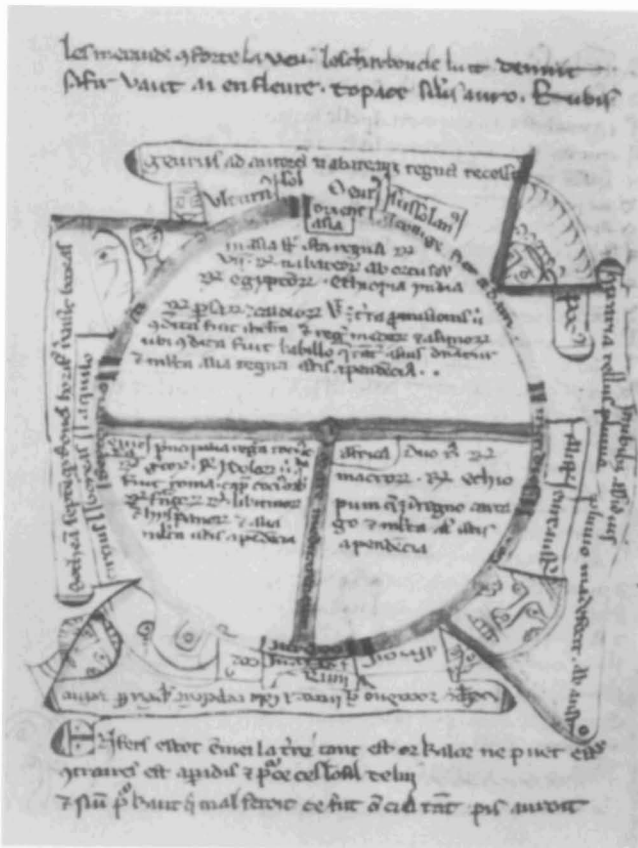


FIG. 18.48. GAUTIER DE METZ T-O MAP. From a thirteenth-century manuscript of *L'image du monde* of Gautier de Metz. The original, previously in the Bibliothèque Municipale, Verdun, is lost.

Diameter of the original: 6.6 cm. From Marcel Destombes, ed., *Mappemondes* A.D. 1200–1500: *Catalogue préparé par la Commission des Cartes Anciennes de l'Union Géographique Internationale* (Amsterdam: N. Israel, 1964), pl. Va.

## 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.<sup>5</sup> 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.<sup>6</sup> However, Stevens has shown that this class of maps forms a well-defined subgroup based on an intentional reversal.<sup>7</sup> 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.<sup>8</sup> 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.<sup>9</sup> 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).<sup>10</sup>

4. Destombes, *Mappemondes*, 117–48 (note 1).

5. Destombes, *Mappemondes*, 39, 46–49, 74–78, and 164–90 (note 1).

6. Destombes, *Mappemondes*, 67 (note 1).

7. Wesley M. Stevens, "The Figure of the Earth in Isidore's 'De Natura Rerum,'" *Isis* 71 (1980): 268–77, esp. 275 n. 24.

8. Roger Bacon, *The Opus Majus of Roger Bacon*, 2 vols., trans. Robert Belle Burke (1928; reprinted New York: Russell and Russell, 1962), 375.

9. Destombes, *Mappemondes*, map 26.9 (note 1).

10. G. Menéndez-Pidal, "Mozárabes y asturianos en la cultura de la alta edad media en relación especial con la historia de los conocimientos geográficos," *Boletín de la Real Academia de la Historia* (Madrid) 134 (1954): 137–291.

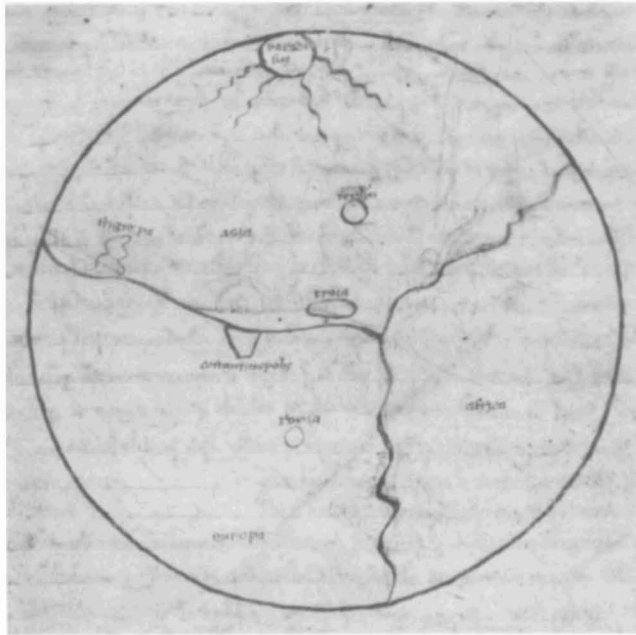


FIG. 18.49. MISCELLANEOUS T-O MAP, Y-O VARIANT. From a twelfth-century manuscript of Macrobius's *Commentarium in somnium Scipionis*. Diameter of the original: 8.7 cm. Photograph from the Bibliothèque Nationale, Paris (MS. Lat. 16679, fol. 33v).

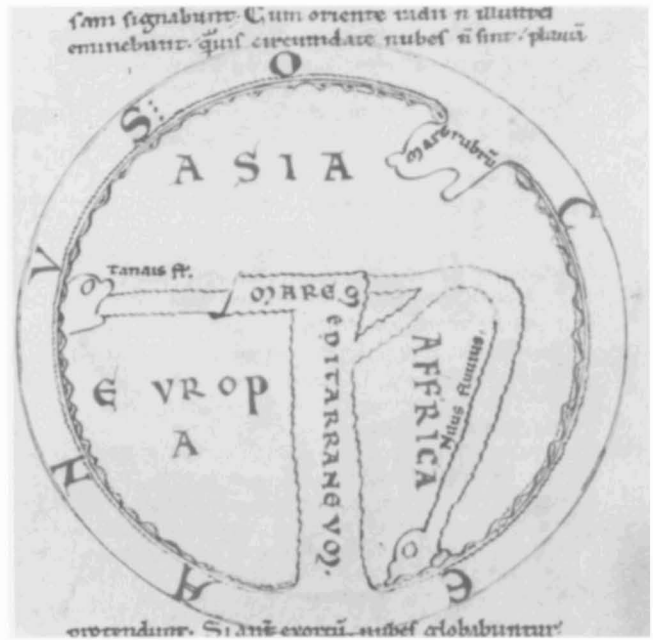


FIG. 18.51. MISCELLANEOUS T-O MAP, MODIFIED RIVER NILE. From a twelfth-century manuscript of Bede's *De natura rerum*. Diameter of the original: 8.1 cm. Photograph from the Bibliothèque Nationale, Paris (MS. Lat. 11130, fol. 82r).

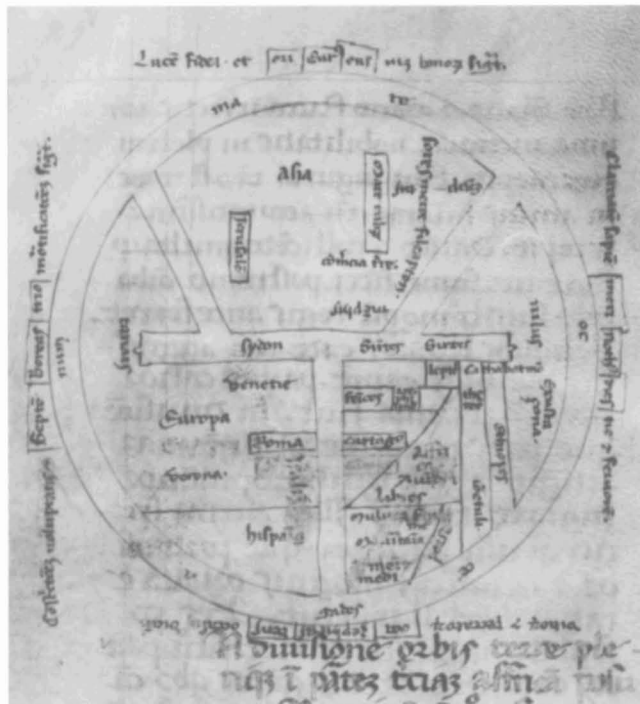


FIG. 18.50. MISCELLANEOUS T-O MAP, SYMMETRICAL RIVERS. From a thirteenth-century manuscript of Sallust. Diameter of the original: 10.5 cm. By permission of the Master and Fellows of Gonville and Caius College, Cambridge (MS. 719/748, fol. 37v).



FIG. 18.52. 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).



FIG. 18.53. REVERSE T-O MAP. From a twelfth-century manuscript of Isidore's *De natura rerum*. Diameter of the original: 19 cm. By permission of the Dean and Chapter of the Cathedral Church of Exeter (MS. 3507, fol. 67r).

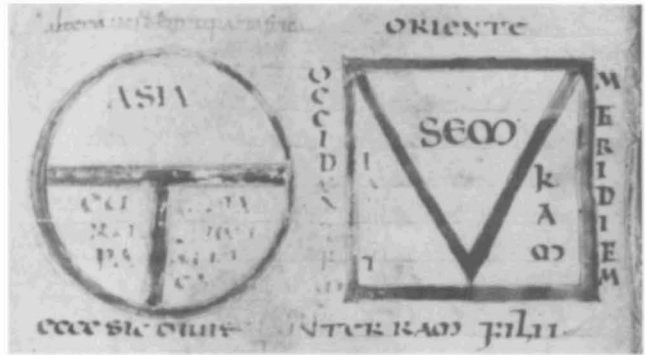


FIG. 18.55. V-IN-SQUARE MAP. From a ninth-century manuscript of various treatises (see also fig. 18.38). Size of the original: 4.8 cm square. By permission of the Bibliothèque Municipale, Rouen (MS. 524, fol. 74v).

### 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.<sup>12</sup> 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),<sup>13</sup> the Cotton "Anglo-Saxon" map (fig. 18.57),<sup>14</sup> two Matthew Paris maps (fig. 18.58),<sup>15</sup> the world map of Henry of Mainz (fig. 18.59),<sup>16</sup> and the Hereford *mappamundi* (figs. 12.4, 18.20, and 18.60).<sup>17</sup>

#### 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

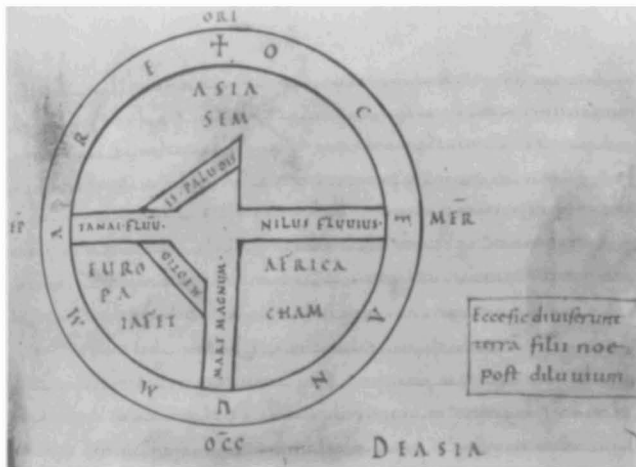


FIG. 18.54. Y-O MAP WITH SEA OF AZOV. From a tenth-century manuscript of the *Etymologies* of Isidore. Diameter of the original: 9.7 cm. By permission of the Stiftsbibliothek, Saint Gall (Codex 236, fol. 89r).

#### 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).<sup>11</sup>

11. Destombes, *Mappemondes*, map 6.1, p. 36 (note 1). See also Karl A. Nowotny, *Beiträge zur Geschichte des Weltbildes* (Vienna: Ferdinand Berger, 1970), 26.

12. For a modern translation of Paulus Orosius, see *The Seven Books of History against the Pagans*, trans. Roy J. Deferrari (Washington, D.C.: Catholic University of America Press, 1964).

13. Destombes, *Mappemondes*, 22.1 (note 1). See also Charles Raymond Beazley, *The Dawn of Modern Geography: A History of Exploration and Geographical Science from the Conversion of the Roman Empire to A.D. 900*, 3 vols. (London: J. Murray, 1897–1906), 2:586; and Y. Janvier, *La géographie d'Orose* (Paris: Belles Lettres, 1982).

14. Destombes, *Mappemondes*, map 24.6 (note 1).

15. Richard Vaughan, *Matthew Paris* (Cambridge: Cambridge University Press, 1958).

16. Destombes, *Mappemondes*, map 25.3 (note 1).

17. Destombes, *Mappemondes*, 197–202 (note 1).

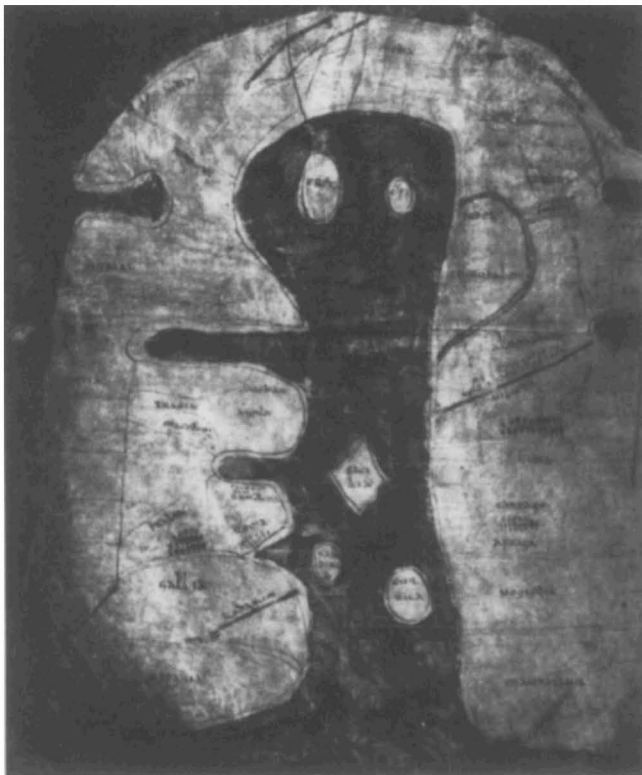


FIG. 18.56. THE ALBI MAP. From an eighth-century manuscript of miscellanea. Size of the original: 29 × 23 cm. By permission of the Bibliothèque Municipale d'Albi (MS. 29 Albi, fol. 57v).



FIG. 18.57. THE "ANGLO-SAXON" MAP. From a tenth-century manuscript of the *Periegesis* of Priscian, included in a codex of divers authors. See also plate 22. Size of the original: 21 × 17 cm. By permission of the British Library, London (Cotton MS. Tiberius, BV, fol. 56v).

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*.<sup>18</sup>

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

#### 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, exegetic, 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*.<sup>23</sup> 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).

18. Beazley, *Dawn of Modern Geography*, 2:632–33 (note 13).

19. London, British Library, Add. MS. 28681, fol. 9.

20. Destombes, *Mappemondes*, 202–03 (note 1).

21. Destombes, *Mappemondes*, 193–94 (note 1), and Carlo F. Capello, *Il mappamondo medioevale di Vercelli (1191–1218?)*, Università di Torino, Memorie e Studi Geografici, 10 (Turin: C. Fanton, 1976).

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).



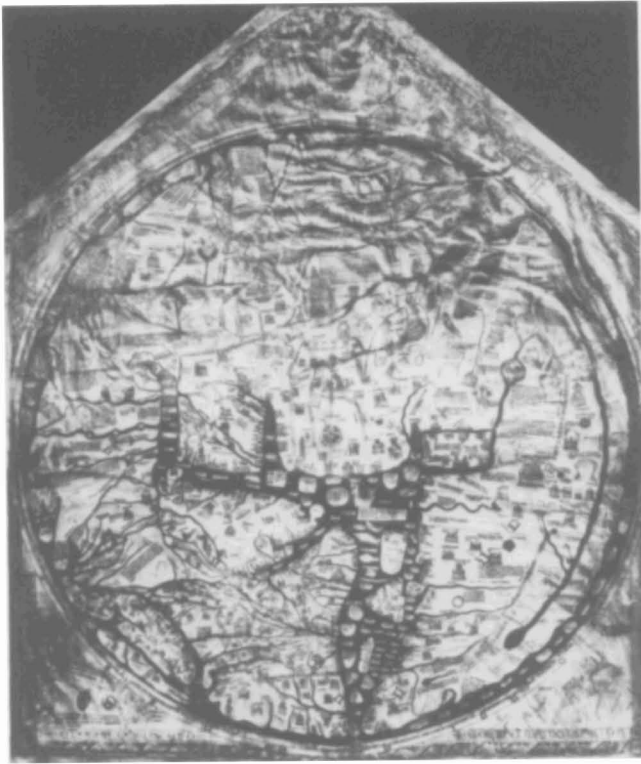


FIG. 18.60. THE HEREFORD MAP, CA. 1290. See also figures 12.4 and 18.20.  
Diameter of the original: 1.32 m. By permission of the Royal Geographical Society, London.

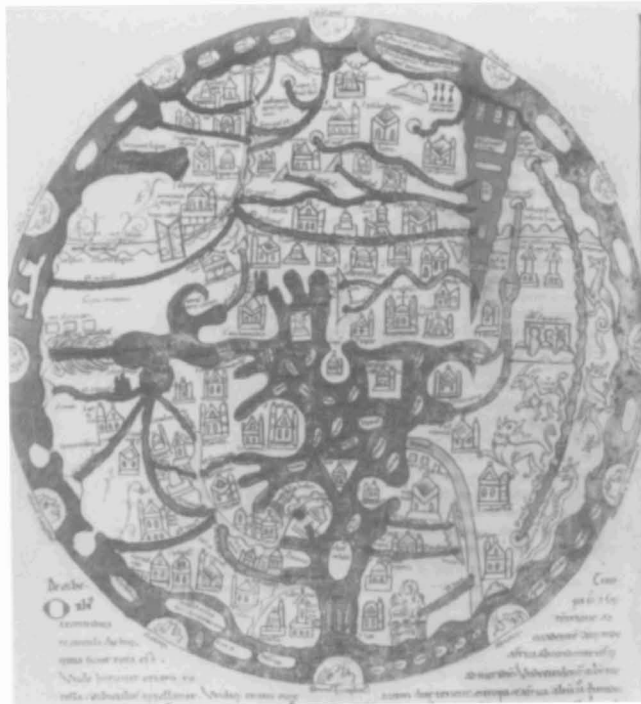


FIG. 18.61. OROSIAN-ISIDORIAN MAPPAMUNDI. From an eleventh-century copy of Isidore's *Etymologies*.  
Diameter of the original: 26.5 cm. By permission of the Bayerische Staatsbibliothek, Munich (Clm. 10058, fol. 154v).



FIG. 18.62. MAPPAMUNDI BY GUIDO OF PISA, 1119.  
Diameter of the original: 13 cm. Copyright Bibliothèque Royale Albert I<sup>er</sup>, 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).

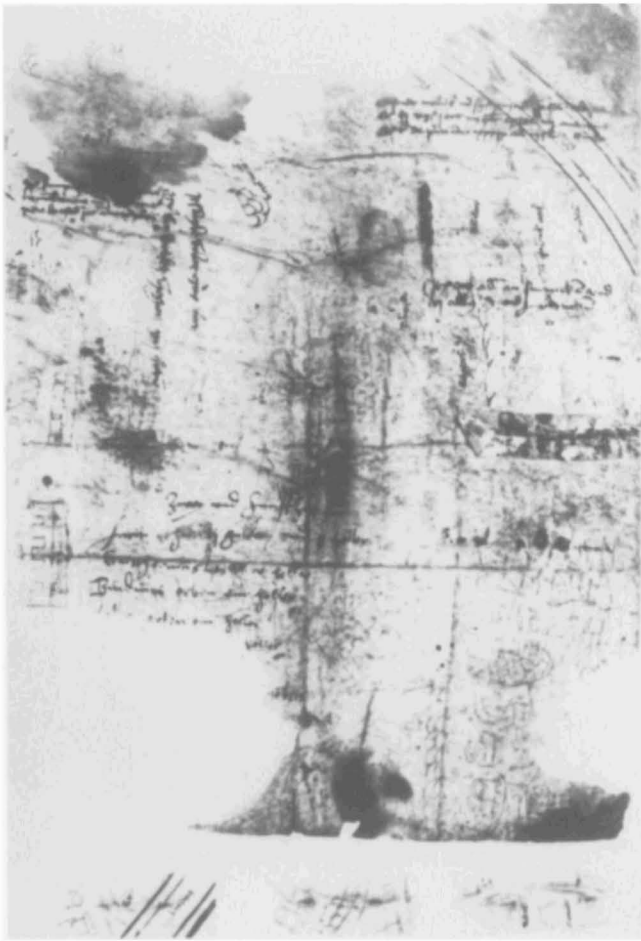


FIG. 18.64. THE WIESBADEN FRAGMENT.  
Size of the original: 75 × 59 cm. By permission of the Hessisches Hauptstaatsarchiv, Wiesbaden (MS. A.60).



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.

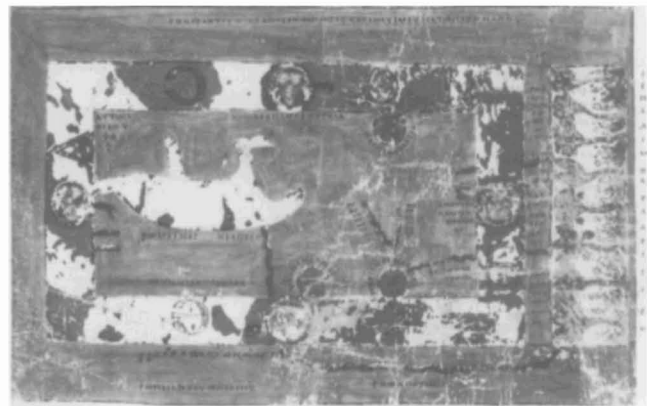


FIG. 18.66. COSMAS INDICOPLEUSTES' MAP FROM THE *CHRISTIAN TOPOGRAPHY*. See also figure 15.2.

Size of the original: 23.3 × 31.5 cm. Photograph from the Biblioteca Apostolica Vaticana, Rome (Vat. Gr. 699, fol. 40v).

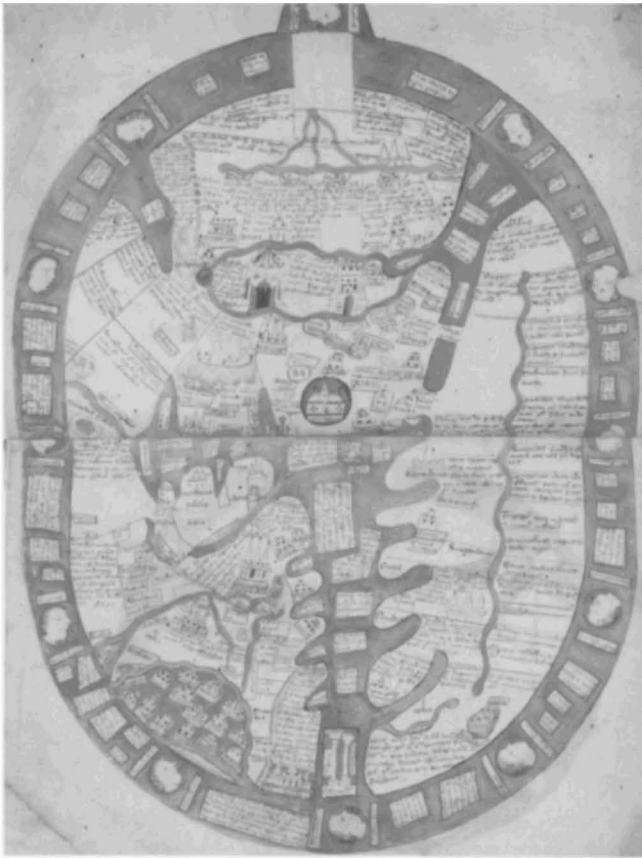


FIG. 18.67. HIGDEN'S OVAL MAPPAMUNDI. From a fourteenth-century manuscript of Higden's *Polychronicon*. Size of the original: 46.5 × 34.2 cm. By permission of the British Library, London (Royal MS. 14.C.ix, fols. 1v–2r).

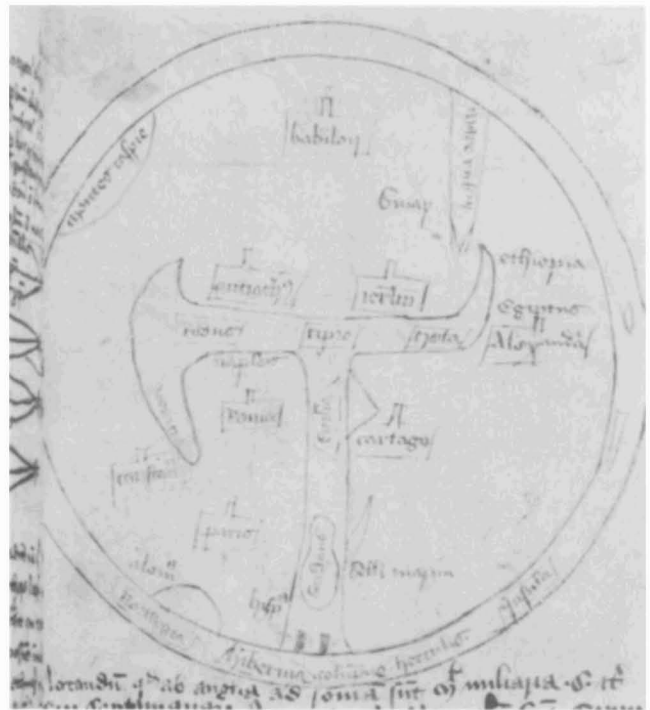


FIG. 18.68. HIGDEN'S CIRCULAR MAPPAMUNDI. From a manuscript of miscellanea dated 1466. Diameter of the original: 14 cm. By permission of the British Library, London (Harl. MS. 3673, fol. 84r).

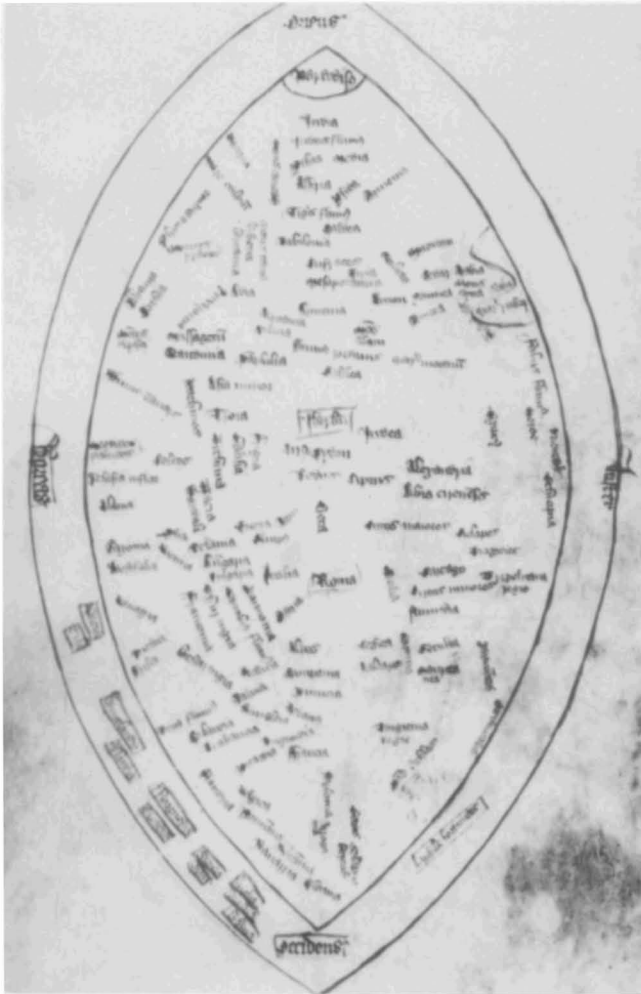


FIG. 18.69. HIGDEN'S MANDORLA-SHAPED MAPPA-MUNDI. From a fourteenth-century manuscript of Higden's *Polychronicon*.

Size of the original: 35.5 × 21 cm. By permission of the British Library, London (Royal MS. 14.C.xii, fol. 9v).

## 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.).<sup>24</sup> 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.<sup>25</sup>

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).<sup>26</sup> 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.<sup>27</sup> Similar maps are also found in the *De philosophia mundi* (ca. 1130?) of William of Conches (ca. 1080 to ca. 1154) (fig. 18.72).<sup>28</sup>

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 ALPHONSUS AND D'AILLY

Petrus Alphonsus (1062–1110) was a learned Spanish astronomer and geographer whose map appears in the *Dialogi cum Iudaeo*. 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

24. Macrobius, *Commentary on the Dream of Scipio*, ed. and trans. William Harris Stahl (New York: Columbia University Press, 1952; second printing with supplementary bibliography, 1966). See also Carlos Sanz, "El primer mapa del mundo con la representación de los dos hemisferios," *Boletín de la Real Sociedad Geográfica* 102 (1966): 119–217, who provides a list of printed editions of Macrobius's *Commentary* with an index to maps in these editions.

25. Destombes, *Mappemondes*, 85–95 (note 1).

26. Destombes, *Mappemondes*, 96–116 (note 1).

27. William Harris Stahl, *The Quadrivium of Martianus Capella: Latin Traditions in the Mathematical Sciences, 50 B.C.–A.D. 1250* (New York: Columbia University Press, 1971), and Martianus Capella *The Marriage of Philology and Mercury*, trans. William Harris Stahl and Richard Johnson with E. L. Burge (New York: Columbia University Press, 1977), vols. 1 and 2, respectively, of the series *Martianus Capella and the Seven Liberal Arts*.

28. Lambert of Saint-Omer, *Liber floridus*; see *Liber floridus colloquium*, ed. Albert Derolez (Ghent: Story-Scientia, 1973); and *Lamberti S. Audomari Canonici liber floridus*, ed. Albert Derolez (Ghent: Story-Scientia, 1968).

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.<sup>29</sup>

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.

29. Destombes, *Mappemondes*, 161–63 (note 1). See also Armando Cortesão, *History of Portuguese Cartography*, 2 vols. (Coimbra: Junta de Investigações do Ultramar-Lisboa, 1969–71), 1:195–98. Among other works, Columbus copiously annotated a copy of D'Ailly's *Imago Mundi* [Louvain: 1480 or 1483] now in the Biblioteca Colombina, Seville. For a discussion of this link, and other references to the geographical conceptions of Columbus, see Pauline Moffitt Watts, "Prophecy and Discovery: On the Spiritual Origins of Christopher Columbus's 'Enterprise of the Indies,'" *American Historical Review* 90 (1985): 73–102, esp. 82.

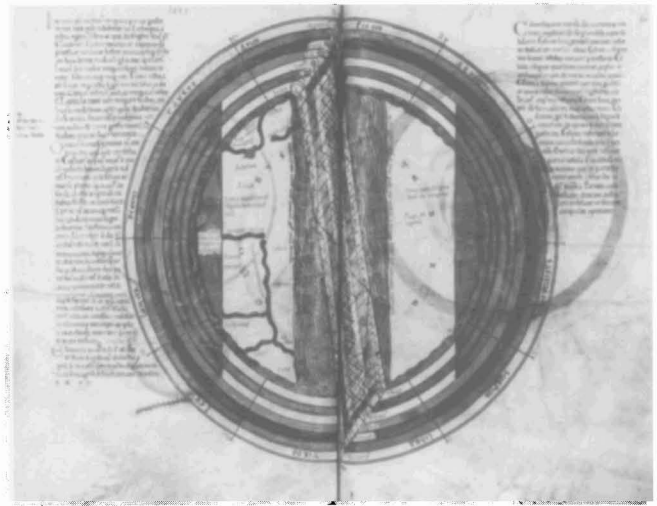


FIG. 18.71. ZONAL MAPPAMUNDI BY LAMBERT OF SAINT-OMER. From a twelfth-century manuscript of the *Liber floridus* of Lambert of Saint-Omer. Diameter of the original: 41.3 cm. By permission of the Herzog August Bibliothek, Wolfenbüttel (Codex Guelf. 1 Gud. Lat. [cat. 4305], fols. 59v–60r).



FIG. 18.70. MACROBIAN ZONAL MAPPAMUNDI. From a fifteenth-century manuscript of Macrobius's *Commentarium in somnium Scipionis*. Diameter of the original: 12.5 cm. Photograph from the Biblioteca Apostolica Vaticana, Rome (Ottob. Lat. 1137, fol. 54v).

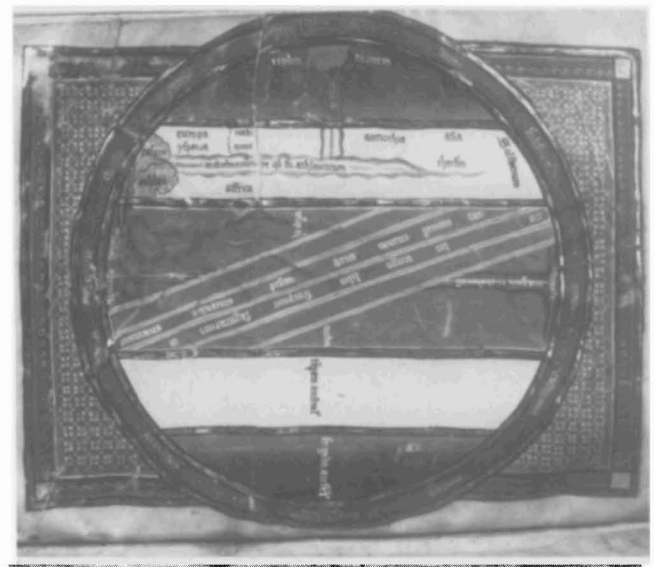


FIG. 18.72. ZONAL MAPPAMUNDI BY WILLIAM OF CONCHES. From a twelfth-century manuscript of the *De philosophia mundi* of William of Conches. Diameter of the original: 12.8 cm. By permission of the Bibliothèque Sainte-Geneviève, Paris (MS. 2200, fol. 34v).



FIG. 18.73. ZONAL MAPPAMUNDI BY PETRUS ALPHONSUS. 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).

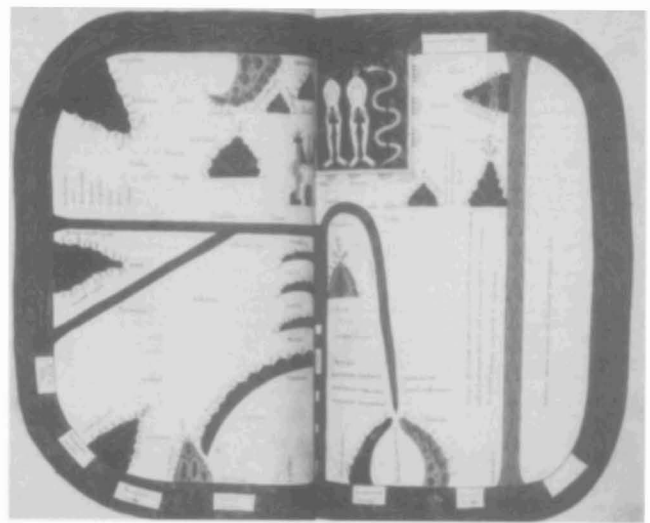


FIG. 18.75. QUADRIPARTITE MAPPAMUNDI: BEATUS TYPE. From a twelfth-century manuscript of the *Commentary on the Apocalypse of Saint John*. See also plate 13. Size of the original: 32 × 43 cm. By permission of the British Library, London (Add. MS. 11695, fols. 39v–40r).

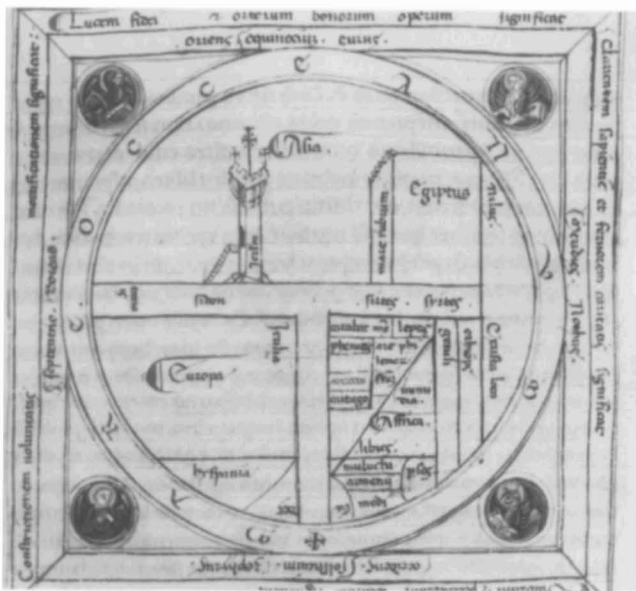


FIG. 18.74. TRIPARTITE/ZONAL MAPPAMUNDI. From a fourteenth-century manuscript of the *Opera* of Sallust. Size of the original: 13 cm square. By permission of the Biblioteca Nazionale Marciana, Venice (Lat. Z.432, [MS. 1656], fol. 40r).



FIG. 18.76. 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).

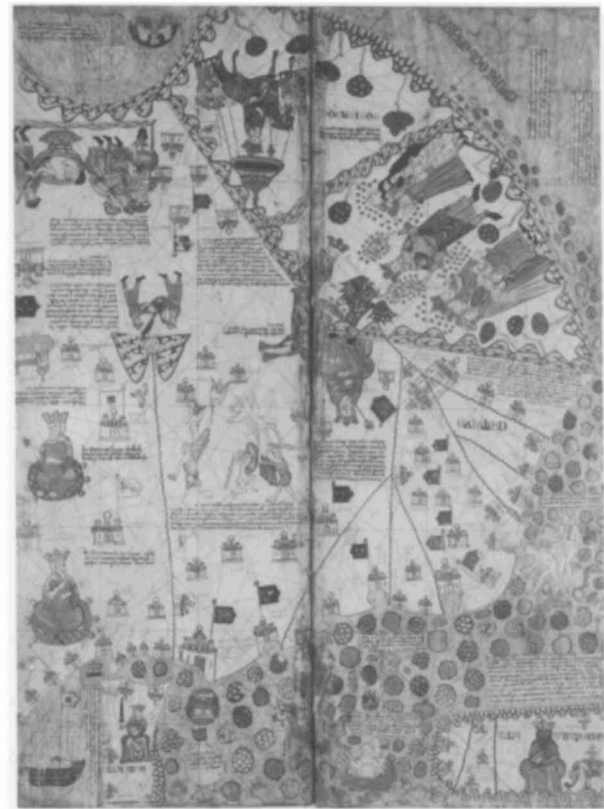


FIG. 18.77. THE CATALAN ATLAS, [1375]. See also plate 17.

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

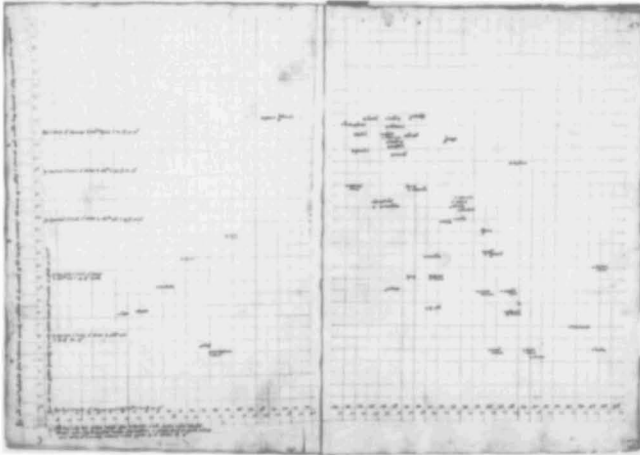


FIG. 18.78. MAPPAMUNDI FROM THE VIENNA-KLOSTERNEUBURG SCHOOL. See also figure 18.24. Size of the original: 39.4 × 58.6 cm. Photograph from the Biblioteca Apostolica Vaticana, Rome (Pal. Lat. 1368, fols. 46v–47r).

## 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 *mappaemundi* 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 *mappaemundi* known.<sup>30</sup> 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.<sup>31</sup>

### 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*.<sup>32</sup> 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.

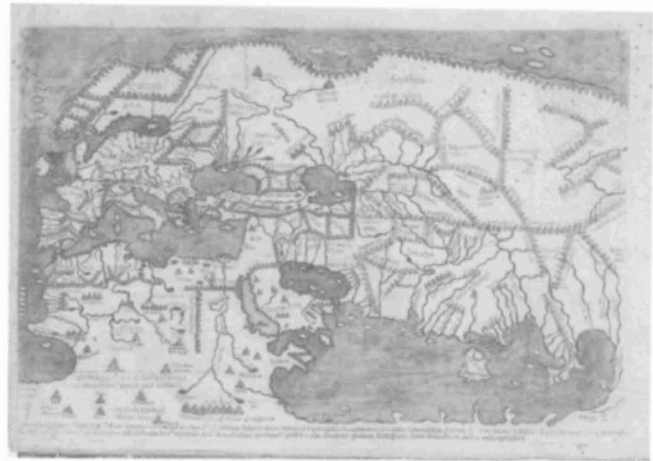


FIG. 18.79. MAPPAMUNDI SHOWING PTOLEMAIC INFLUENCE. From an early fifteenth-century incipit by Pirrus de Noha of the *De cosmographia* of Pomponius Mela. See also plate 19. Size of the original: 18 × 27 cm. Photograph from the Biblioteca Apostolica Vaticana, Rome (Archivio di San Pietro H. 31, fol. 8r).

The circular, oval, and rectangular maps of Beatus share several characteristics. They are oriented to the east and are usually richly drawn and illuminated in a Spanish-Arabic style. The surrounding ocean sea contains representations of fish, and paradise is represented in a square vignette, occasionally including its four rivers. There is also shown an ocean river, sometimes associated with the Red Sea (Mare Rubrum). Beyond this barrier, a rubric informs the reader that outside the three known parts of the world there is a fourth part that is unknown on account of the sun's heat, but inhabited by the Antipodeans.

## Transitional Type

Many later *mappaemundi* 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 *mappaemundi* of Fra Paolino and Pietro Vesconte in the 1320s

30. Konrad Miller, *Mappaemundi: Die ältesten Weltkarten*, 6 vols. (Stuttgart: J. Roth, 1895–98), vol. 6, *Rekonstruierte Karten* (1898), 57.

31. Anna-Dorothee von den Brincken, "Die Klimatenkarte in der Chronik des Johann von Wallingford—ein Werk des Matthaeus Parisiensis?" *Westfalen* 51 (1973): 47–57.

32. Destombes, *Mappemondes*, 40–42 and 79–84 (note 1).



(fig. 18.76).<sup>33</sup> 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,<sup>34</sup> 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 1457 (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-Klosterneuburg 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.

---

33. Bernhard Degenhart and Annegrit Schmitt, "Marino Sanudo und Paolino Veneto," *Römisches Jahrbuch für Kunstgeschichte* 14 (1973): 1–137.

34. Destombes, *Mappemondes*, 205–7 (note 1).

## APPENDIX 18.2 CHRONOLOGICAL LIST OF MAJOR MEDIEVAL MAPPAEMUNDI, A.D. 300–1460

Content Date <sup>a</sup>	Date of Artifact	Description	Location	References			
				Miller <sup>b</sup>	Uhdén <sup>c</sup>	Kamal <sup>d</sup>	Destombes <sup>e</sup>
THIRD CENTURY							
	297	Eumenius reference	†		3		
	ca. 1150	Jerome <sup>f</sup>	London, British Library, Add. MS. 10049	2, pl. 12			
	4th century	Julius Honorius	†	6:69	5		
FIFTH CENTURY							
	418	Paulus Orosius	†	6:61	6		
	12th century	Martianus Capella (Lambert of Saint-Omer)	Ghent, Rijksuniversiteit, MS. 92	3:45	4		43.1
	12th century	Lambert of Saint-Omer	Wolfenbüttel, Herzog August Bibliothek, Codex Guelf. 1 Gud. Lat. (cat. 4305), fols. 69v–70r				43.2
	13th century	Lambert of Saint-Omer	Paris, Bibliothèque Nationale, MS. Lat. 8865 (Suppl. 10–2)	3:46			43.3
	14th century	Lambert of Saint-Omer	Leiden, Rijksuniversiteit, Codex Voss. Lat., fol. 31	3:45 and pl. 4			43.4
	14th century	Lambert of Saint-Omer	Genoa, Biblioteca Durazzo				43.5
	14th century	Lambert of Saint-Omer	Chantilly, Musée Condé				43.6
	15th century	Lambert of Saint-Omer	The Hague, Koninklijke Bibliotheek MS. 72.A.23 (old Y392)	3:45			43.7
SIXTH CENTURY							
	8th–9th century	Cosmas	Rome, Biblioteca Apostolica Vaticana, Vat. Gr. 699, fol. 40v	3:60		2.3:370	22.5
	11th century	Cosmas	Florence, Biblioteca Medicea Laurenziana, Plut. 9.28, fol. 92v	3:60		2.3:371	24.3
SEVENTH CENTURY							
	7th century	Isidore	Saint Gall, Stiftsbibliothek, Codex 237, fol. 1r	6:57	7	3.1:512	1.6

APPENDIX 18.2—*continued*

Content Date <sup>a</sup>	Date of Artifact	Description	Location	References			
				Miller <sup>b</sup>	Uhdén <sup>c</sup>	Kamal <sup>d</sup>	Destombes <sup>e</sup>
	ca. 775	Isidore	Rome, Biblioteca Apostolica Vaticana, Vat. Lat. 6018, fols. 64v–65				
	11th century	Isidore	Munich, Bayerische Staatsbibliothek, Clm. 10058, fol. 154v			3.3:694	4.6
	ca. 650	Ravenna cosmographer	†	6:5	8		
EIGHTH CENTURY	ca. 750	Pope Zacharias	†	3:151	9		
	ca. 730	Merovingian map	Albi, Bibliothèque Municipale, MS. 29 (old 23), fol. 57v	3:57	10	3.1:500	22.1
	ca. 950–60	Beatus (M) <sup>g</sup>	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 <sup>h</sup>	†				
	975	Beatus (G)	Gerona, Museo de la Catedral, MS. 10	1:16		3.2:641	17.5
	ca. 1047	Beatus (J)	Madrid, Biblioteca Nacional, Vitr. 14.2 (old B.31), fols. 63v–64	1:15			17.6
	ca. 1050	Beatus (S)	Paris, Bibliothèque Nationale, MS. Lat. 8878 (S. Lat. 1075), fol. 45	1:11	11	3.3:709	17.7
	ca. 1086	Beatus (O)	Burgo de Osma, Archivo de la Catedral, MS. 1, fols. 35v–36	1:12		3.3:744	17.8
	ca. 1109	Beatus (D)	London, British Library, Add. MS. 11695, fols. 39v–40	1:15		3.3:766	17.9
	ca. 1100–1150	Beatus (Tu)	Turin, Biblioteca Nazionale Universitaria, MS. I.II.1 (old D.V.39) fols. 38v–39	1:17		3.3:752	17.10
	1189	Beatus (L)	Lisbon, Arquivo Nacional da Torre do Tombo, Codex 160			3.3:745	17.11

Content Date <sup>a</sup>	Date of Artifact	Description	Location	References			
				Miller <sup>b</sup>	Uhden <sup>c</sup>	Kamal <sup>d</sup>	Destombes <sup>e</sup>
	12th–13th century	Beatus (N)	Paris, Bibliothèque Nationale, NAL 1366, fols. 24v–25	1:11		3.4:918	17.12
	12th–13th century	Beatus (R)	Manchester, John Rylands Library, MS. Lat. 8, fols. 43v–44			3.4:871	17.13
	1220	Beatus (H)	New York, Pierpont Morgan Library, MS. 429, fols. 31v–32			3.5:947	35.1
	13th century	Beatus (Ar)	Paris, Bibliothèque Nationale, NAL 2290, fols. 13v–14	1:17		3.4:919	35.2
NINTH CENTURY							
	ca. 800	Charlemagne <sup>1</sup>	†	3:151	12		
	1055	Theodulf	Vatican		13		24.11
	ca. 840	Author unknown	Saint Riquier†	3:151	14		
	842	Author unknown	Reichenau†	3:151	15		
	ca. 870	Author unknown	Saint Gall†§	3:151	16		
TENTH CENTURY							
	983	Gerbert (Sylvester II)	†	3:151	17		
	10th century	Anglo-Saxon	London, British Library, Cotton MS. Tiberius B.V., fol. 56v	3:29	18	3.1:545	24.6
ELEVENTH CENTURY							
	11th century	Authors unknown	Tegernsee (2 maps)†	3:151			
	ca. 1050	Asaph Judaeus	Paris, Bibliothèque Nationale, MS. Lat. 6556 (Reg. 4764)	3:150	19	3.3:820	50.17
TWELFTH CENTURY							
	ca. 1100	Adela, countess of Blois	[In poem of Baudri de Bourgueil: see above, p. 339]†		20		
	ca. 1110	Henry of Mainz	Cambridge, Corpus Christi College, MS. 66, p. 2	3:21	21	3.3:785	25.3
	1112–23	Authors unknown	Bamberg (3 maps)†				

APPENDIX 18.2—*continued*

Content Date <sup>a</sup>	Date of Artifact	Description	Location	References			
				Miller <sup>b</sup>	Uhden <sup>c</sup>	Kamal <sup>d</sup>	Destombes <sup>e</sup>
	1119	Guido of Pisa	Brussels, Bibliothèque Royale Albert I <sup>er</sup> , MS. 3897–3919 (cat. 3095), fol. 53v		22	3.3:774	25.2
	1120	Henry of Huntingdon	Oxford, Bodleian Library, MS e Musaeo 223 (S.C. 3538)				49.13
	ca. 1150	Author unknown	Norheim†		23		
	1195	Author unknown	Durham†				
	12th century	Author unknown	Lincoln Cathedral†				
	12th century	Author unknown	Muri†				
	12th century	Authors unknown	Göttweig (2 maps)†				
	12th century	Author unknown	Elno, Saint Amand†§				
	12th century	Author unknown	Weihenstephan†§	3:151	24		
THIRTEENTH CENTURY	ca. 1214	Gervase of Tilbury	†		25		
	ca. 1200	Vercelli map	Vercelli, Archivio Capitolare			3.5:997	52.1
	13th century	Psalter map	London, British Library, Add. MS. 28681, fol. 9r	3:37	26	3.5:998	49.8
	ca. 1235	Ebstorf map	Hanover†	5: whole vol.	27	4.1:1117	52.2
	1236	Henry III <sup>p</sup>	†				
	ca. 1250	Matthew Paris	Cambridge, Corpus Christi College, MS. 26, p. 284	3:71		3.5:1000	54.2
	ca. 1250	Matthew Paris	London, British Library, Cotton MS. Nero D.V., fol. 1v	3:70	28		54.1
	ca. 1250	Robert of Melkeley	†	3:72	29		
	ca. 1250	Robert of Melkeley	Waltham†	3:72	30		
	ca. 1250	Matthew Paris	†	3:72	31		
	1265	Conrad of Basle	†	3:151	32		
	1268	Roger Bacon	†				

Content Date <sup>a</sup>	Date of Artifact	Description	Location	References			
				Miller <sup>b</sup>	Uhdén <sup>c</sup>	Kamal <sup>d</sup>	Destombes <sup>e</sup>
	ca. 1290	Richard de Bello	Hereford Cathedral	4: whole vol.	33	4.1:1077	52.3
	13th century	Albertus Magnus	†	3:151			
	1299	Edward I inventory <sup>k</sup>	†				
	13th century	Wiesbaden fragment	Wiesbaden, Hessisches Hauptstaatsarchiv, MS. A.60				52.4
FOURTEENTH CENTURY							
	ca. 1337	Romance map	†				
	ca. 1320	Fra Paolino	Rome, Biblioteca Apostolica Vaticana, Vat. Lat. 1960, fol. 264v	3:132			54.3
	ca. 1320	Fra Paolino <sup>1</sup>	Paris, Bibliothèque Nationale, MS. Lat. 4939, fol. 9	3:132			54.10
	ca. 1321	Pietro Vesconte	Brussels, Bibliothèque Royale Albert I <sup>er</sup> , MS. 9347–48, fols. 162v–163	3:132			54.4
	ca. 1321	Pietro Vesconte	Brussels, Bibliothèque Royale Albert I <sup>er</sup> , MS. 9404–5, fols. 173v–174	3:132			54.5
	ca. 1321	Pietro Vesconte	Florence, Biblioteca Medicea Laurenziana, Plut. 21.23, fols. 138v–139				54.6
	ca. 1321	Pietro Vesconte	London, British Library, Egerton MS. 1500, fol. 3				54.7
	ca. 1321	Pietro Vesconte	London, British Library, Add. MS. 27376*, fols. 8v–9				54.8
	ca. 1321	Pietro Vesconte	Oxford, Bodleian Library, Tanner 190, fols. 203v–204	3:132			54.9
	ca. 1321	Pietro Vesconte	Rome, Biblioteca Apostolica Vaticana, Pal. Lat. 1362A, fol. 2	3:132			54.11

APPENDIX 18.2—*continued*

Content Date <sup>a</sup>	Date of Artifact	Description	Location	References			
				Miller <sup>b</sup>	Uhden <sup>c</sup>	Kamal <sup>d</sup>	Destombes <sup>e</sup>
	ca. 1321	Pietro Vesconte	Rome, Biblioteca Apostolica Vaticana, Reg. Lat. 548, fols. 138v–139				54.12
	ca. 1321	Pietro Vesconte	Rome, Biblioteca Apostolica Vaticana, Vat. Lat. 2972, fols. 112v–113				54.13
	1329–39	Author unknown	Venice, Palazzo Ducale†				
	1335–36	Opicinus de Canistris	Rome, Biblioteca Apostolica Vaticana, Vat. Lat. 1993				
	1341	Opicinus de Canistris	Rome, Biblioteca Apostolica Vaticana, Vat. Lat. 6435				
	After 1342	Higden (A) <sup>m</sup>	London, British Library, Royal MS. 14.C.ix, fols. 1v–2r	3:95		4.2:1265	47.1
	After 1342	Higden (B)	London, British Library, Royal MS. 14.C.ix, fol. 2v	3:96		4.2:1266	47.2
	After 1377	Higden (C)	London, British Library, Royal MS. 14.C.xii, fol. 9v	3:97		4.2:1269	47.9
	After 1377	Higden (D)	London, British Library, Add. MS. 10104, fol. 8				47.10
	14th century	Higden (E)	London, Lambeth Palace, MS. 112, fol. 2v				47.15
	1466	Higden (F)	London, British Library, Harl. MS. 3673, fol. 84r			4.3:1382	47.21
	ca. 1350	Higden (G)	San Marino, Huntington Library, HM 132, fol. 4v				47.3
	After 1347	Higden (H)	Oxford, Bodleian Library, Tanner 170 (S.C. 9996), fol. 15v				47.4
	14th century	Higden (I)	Oxford, Magdalen College, MS. 190, fol. 1v				47.8
	14th century	Higden (J)	Oxford, Corpus Christi College, MS. 89, fol. 13v	3:97		4.2:1267	47.13

Content Date <sup>a</sup>	Date of Artifact	Description	Location	References			
				Miller <sup>b</sup>	Uhdén <sup>c</sup>	Kamal <sup>d</sup>	Destombes <sup>e</sup>
	early 15th century	Higden (K)	Oxford, Bodleian Library, Digby 196 (S.C. 1797), fol. 195v				47.17
	early 15th	Higden (L)	Warminster, Library of the Marquess of Bath, Longleat House, MS. 50, fol. 7v				47.5
	1367	Higden (M)	Cambridge, University Library, Add. MS. 3077, fol. 11	3:98			47.6
	14th century	Higden (N)	Cambridge, Corpus Christi College, MS. 21, fol. 9v	3:97			47.12
	After 1367	Higden (O)	Paris, Bibliothèque Nationale, MS. Lat. 4922, fol. 2	3:96		4.2:1268	47.7
	14th century	Higden (P)	Paris, Bibliothèque Nationale, MS. Lat. 4126, fol. 1v			4.3:1381	47.14
	14th century	Higden (Q)	Edinburgh, National Library of Scotland Adv. MS. 33.4.12, fol. 13v	3:97			47.11
	1400	Higden (R)	Winchester College, MS. 15, fol. 13r	3:99			47.16
	15th century	Higden (S)	Rome, Biblioteca Apostolica Vaticana, Reg. Lat. 731				47.18
	15th century	Higden (T)	Glasgow, University Library, MS. T 3.10, fol. 15r				47.19
	15th century	Higden (U)	Lincoln, Cathedral Library, MS. A.4.17				47.20
	1344	Ambrogio Lorenzetti <sup>n</sup>	Siena†				
	ca. 1350	Johannes Utinensis	Stuttgart, Württembergische Landesbibliothek, Theol. Fol. 100 fol. 3v	3:146	36		51.29
	ca. 1350	Johannes Utinensis	Munich, Bayerische Staatsbibliothek, Clm. 721, fol. 3v				51.14
	ca. 1370	Saint-Denis Chronicles	Paris, Bibliothèque Sainte Geneviève, MS. 782, fol.374v	3:136	37	4.2:1270	50.19



APPENDIX 18.2—*continued*

Content Date <sup>a</sup>	Date of Artifact	Description	Location	References			
				Miller <sup>b</sup>	Uhden <sup>c</sup>	Kamal <sup>d</sup>	Destombes <sup>e</sup>
	1363–81 [1375]	Author unknown Catalan atlas	Heiligenkreuz†§ Paris, Bibliothèque Nationale, MS. Esp. 30. See above, pp. 314–15.				
	ca. 1380	Catalan fragment	Istanbul, Topkapi Sarayi, Kutuphané no. 1828 (old 2758, 49361)				52.5
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 1414?	Albertin de Virga Pirrus de Noha	Location unknown Rome, Biblioteca Apostolica Vaticana, Archivio di San Pietro H.31, fol. 8r			4.3:1377	52.6
	1416	Authors unknown	Duc de Berry (3 maps)†				
	1417	Pomponius Mela	Reims, Bibliothèque de la Ville, MS. 1321, fol. 13	3:138	38		51.27
	ca. 1430	Borgia map	Rome, Biblioteca Apostolica Vaticana, Borgiano XVI (galerie)	3:148		5:1493	53.1
	15th century	Anonymous Venetian	Rome, Biblioteca Apostolica Vaticana, Borgiano V				52.15
	15th century	Catalan (Estense)	Modena, Biblioteca Estense, C.G.A. 1				52.12
	15th century	Author unknown	Minneapolis, University of Minnesota, James Ford Bell Collection				52.11
	15th century	Bartholomaeus Anglicus	Wolfenbüttel, Herzog August Bibliothek, Codex Helmstedt 422 (cat. 477)		39		51.39

Content Date <sup>a</sup>	Date of Artifact	Description	Location	References			
				Miller <sup>b</sup>	Uhdén <sup>c</sup>	Kamal <sup>d</sup>	Destombes <sup>e</sup>
	15th century	Circular Ptolemy	Zeitz, Stiftsbibliothek, MS. Lat. Hist., fol. 497, fol. 48				54.17
	15th century	Author unknown	Venice, Palazzo Du- cale, Sala dello Scudo†				
	15th century	Jan van Eyck <sup>o</sup>	†				
	1436	Andrea Bianco	Venice, Biblioteca Nazionale Marciana, MS. Fondo Ant. It. Z.76	3:143			54.16
	1440?	Vinland map <sup>p</sup>	New Haven, Beinecke Library, Yale Univer- sity				
	1448	Andreas Walsper- ger	Rome, Biblioteca Apostolica Vaticana, Pal. Lat. 1362b	3:147			52.10
	1442	Giovanni Leardo	Verona, Biblioteca Comunale				52.7
	1443	Fra Mauro	†				
	1447	Giovanni Leardo	†				
	1448	Giovanni Leardo	Vicenza, Biblioteca Civica Bertoliana	3:145			52.8
	1448–49	Fra Mauro	†				
	1452	Giovanni Leardo	Milwaukee, Univer- sity of Wisconsin, American Geographi- cal Society Collection				52.9
	1457	Genoese map	Florence, Biblioteca Nazionale Centrale, Port. 1			5:1494	52.13
	1459	Fra Mauro	[To Portugal]†				
	1459	Fra Mauro	Venice, Biblioteca Nazionale Marciana			5:1495	52.14

APPENDIX 18.2—*continued*

Note: Small T-O maps by Macrobius, Sallust, and others have been omitted from this list.

†Not extant.

§Maps referred to by Leo Bagrow, “Old Inventories of Maps,” *Imago Mundi* 5 (1948): 18–20.

<sup>a</sup>This column is ordered by the century to which the content of the map refers.

<sup>b</sup>Konrad Miller, *Mappaemundi: Die ältesten Weltkarten*, 6 vols. (Stuttgart: J. Roth, 1895–98).

<sup>c</sup>Richard Uhden, “Zur Herkunft und Systematik der mittelalterlichen Weltkarten,” *Geographische Zeitschrift* 37 (1931): 321–40.

<sup>d</sup>Youssouf Kamal, *Monumenta cartographica Africae et Aegypti* 5 vols. in 16 parts (Cairo, 1926–51).

<sup>e</sup>Marcel Destombes, ed., *Mappemondes A.D. 1200–1500: Catalogue préparé par la Commission des Cartes Anciennes de l'Union Géographique Internationale* (Amsterdam: N. Israel, 1964).

<sup>f</sup>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.

<sup>g</sup>Letters refer to manuscript designations in the Beatus stemma in figure 18.17. Only the large Beatus maps are included here.

<sup>h</sup>The large map in Madrid, Archivo Histórico Nacional, MS. 1240 is missing.

<sup>i</sup>This map is interpreted by some to be a celestial map. See above, p. 303.

<sup>j</sup>Ernest William Tristram, *English Medieval Wall Painting*, 2 vols. (London: Oxford University Press, 1944–50), vol. 2, *The Thirteenth Century*, 180, 610.

<sup>k</sup>Otto Lehmann-Brockhaus, *Lateinische Schriftquellen zur Kunst in England, Wales und Schottland, vom Jahre 901 bis zum Jahre 1307*, 5 vols. (Munich: Prestel, 1955–60), 3: no. 6261.

<sup>l</sup>Bernhard Degenhart and Annegrit Schmitt, “Marino Sanudo und Paolino Veneto,” *Römisches Jahrbuch für Kunstgeschichte* 14 (1973), 1–137, esp. 107, pl. 145.

<sup>m</sup>Letter designation refers to copies in the stemma in figure 18.21.

<sup>n</sup>Aldo Cairoli and Enzo Carli, *Il Palazzo Pubblico di Siena* (Rome: Editalia, 1963), 139–40.

<sup>o</sup>Charles Sterling, “Le mappemonde de Jan van Eyck,” *Revue de l'Art* 33 (1976): 69–82.

<sup>p</sup>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 Crocker 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

- Almagià, Roberto. *Monumenta cartographica Vaticana*. Vol. 1, *Planisferi, carte nautiche e affini dal secolo XIV al XVII esistenti nella Biblioteca Apostolica Vaticana*. Rome: Biblioteca Apostolica Vaticana, 1944.
- Andrews, Michael Corbet. "The Study and Classification of Medieval Mappae Mundi." *Archaeologica* 75 (1925–26): 61–76.
- Arentzen, Jörg-Geerd. *Imago Mundi Cartographica: Studien zur Bildlichkeit mittelalterlicher Welt- und Ökumenekarten unter besonderer Berücksichtigung des Zusammenwirkens von Text und Bild*. Münstersche Mittelalter-Schriften 53. Munich: Wilhelm Fink, 1984.
- Bagrow, Leo. *History of Cartography*. Revised and enlarged by R. A. Skelton. Translated by D. L. Paisey. Cambridge: Harvard University Press; London: C. A. Watts, 1964.
- Barkan, Leonard. *Nature's Work of Art: The Human Body as Image of the World*. New Haven: Yale University Press, 1975.
- Beazley, Charles Raymond. *The Dawn of Modern Geography: A History of Exploration and Geographical Science from the Conversion of the Roman Empire to A.D. 900*. 3 vols. London: J. Murray, 1897–1906.
- . "New Light on Some Mediæval Maps." *Geographical Journal* 14 (1899): 620–29; 15 (1900): 130–41, 378–89; 16 (1900): 319–29.
- Bevan, W. L., and H. W. Phillott. *Medieval Geography: An Essay in Illustration of the Hereford Mappa Mundi*. London: E. Stanford, 1873.
- Brehaut, Ernest. *An Encyclopedist of the Dark Ages: Isidore of Seville*. Studies in History, Economics and Public Law, vol. 48, no. 1. New York: Columbia University Press, 1912.
- Brincken, Anna-Dorothee von den. "Mappa mundi und Chronographia." *Deutsches Archiv für die Erforschung des Mittelalters* 24 (1968): 118–86.
- . "Die Ausbildung konventioneller Zeichen und Farbgebungen in der Universalkartographie des Mittelalters." *Archiv für Diplomatik: Schriftgeschichte Siegel- und Wappenkunde* 16 (1970): 325–49.
- . "Zur Universalkartographie des Mittelalters." In *Methoden in Wissenschaft und Kunst des Mittelalters*, edited by Albert Zimmermann, 249–78. *Miscellanea Mediaevalia* 7. Berlin: Walter de Gruyter, 1970.
- . "Europa in der Kartographie des Mittelalters." *Archiv für Kulturgeschichte* 55 (1973): 289–304.
- . "Weltbild der Lateinischen Universalhistoriker und -Kartographen." In *Popoli e paesi nella cultura altomedievale*, 2 vols., *Settimane di Studio del Centro Italiano di Studi sull'alto Medioevo*, 19, 1:377–408 and plates. Spoleto: Presso la Sede del Centro, 1983.
- Cortêsão, Armando. *History of Portuguese Cartography*. 2 vols. Coimbra: Junta de Investigações do Ultramar-Lisboa, 1969–71.
- Crone, Gerald R. *The World Map by Richard of Haldingham in Hereford Cathedral*. Reproductions of Early Manuscript Maps 3. London: Royal Geographical Society, 1954.
- . "New Light on the Hereford Map." *Geographical Journal* 131 (1965): 447–62.
- . *Maps and Their Makers: An Introduction to the History of Cartography*. 5th ed. Folkestone, Kent: Dawson; Hamden, Conn.: Archon Books, 1978.
- Destombes, Marcel, ed. *Catalogue des cartes gravées au XV<sup>e</sup> siècle*. Paris: International Geographical Union, 1952.
- . *Mappemondes A.D. 1200–1500: Catalogue préparé par la Commission des Cartes Anciennes de l'Union Géographique Internationale*. Amsterdam: N. Israel, 1964.
- Duhem, Pierre. *Le système du monde: Histoire des doctrines cosmologiques de Platon à Copernic*. 10 vols. Paris: Hermann, 1913–59.
- Durand, Dana Bennett. *The Vienna-Klosterneuburg Map Corpus of the Fifteenth Century: A Study in the Transition from Medieval to Modern Science*. Leiden: E. J. Brill, 1952.
- Friedman, John Block. *The Monstrous Races in Medieval Art and Thought*. Cambridge: Harvard University Press, 1981.
- Glacken, Clarence J. *Traces on the Rhodian Shore*. Berkeley and Los Angeles: University of California Press, 1967.
- Gordon, B. L. "Sacred Directions, Orientation, and the Top of the Map." *History of Religions* 10 (1971): 211–27.
- Isidore of Seville. *Traité de la nature*. Edited by Jacques Fontaine. Bibliothèque de l'École des Hautes Etudes Hispaniques, fasc. 28. Bordeaux: Féret, 1960.
- Jomard, Edme-François. *Les monuments de la géographie; ou, Recueil d'anciennes cartes européennes et orientales*. Paris: Duprat, 1842–62.
- Jones, Charles W. "The Flat Earth." *Thought: A Quarterly of the Sciences and Letters* 9 (1934): 296–307.
- Kamal, Youssouf. *Monumenta cartographica Africae et Aegypti*. 5 vols. in 16 pts. Cairo, 1926–51.
- Kimble, George H. T. *Geography in the Middle Ages*. London: Methuen, 1938.
- Klein, Peter K. *Der ältere Beatus-Kodex Vitr. 14–1 der Biblioteca Nacional zu Madrid: Studien zur Beatus-Illustration und der spanischen Buchmalerei des 10. Jahrhunderts*. Hildesheim: Georg Olms, 1976.
- Leithäuser, Joachim G. *Mappae mundi: Die geistige Eroberung der Welt*. Berlin: Safari-Verlag, 1958.
- Lelewel, Joachim. *Géographie du Moyen Age*. 4 vols. and epilogue. Brussels: J. Pilliet, 1852–57; reprinted Amsterdam: Meridian, 1966.
- Menéndez-Pidal, G. "Mozárabes y asturianos en la cultura de la alta edad media en relación especial con la historia de los conocimientos geográficos." *Boletín de la Real Academia de la Historia* (Madrid) 134 (1954): 137–291.
- Migne, J. P., ed. *Patrologiae cursus completus*. 221 vols. and suppl. Paris, 1844–64; suppl. 1958–.
- Miller, Konrad. *Mappaemundi: Die ältesten Weltkarten*. 6 vols. Stuttgart: J. Roth, 1895–98. Vol. 1, *Die Weltkarte des Beatus* (1895). Vol. 2, *Atlas von 16 Lichtdruck-Tafeln* (1895). Vol. 3, *Die kleineren Weltkarten* (1895). Vol. 4, *Die Herefordkarte* (1896). Vol. 5, *Die Ebstorkarte* (1896). Vol. 6, *Rekonstruierte Karten* (1898).
- Murdoch, John Emery. *Antiquity and the Middle Ages*. Album of Science. New York: Charles Scribner's Sons, 1984.

- North, Robert. *A History of Biblical Map Making*. Beihefte zum Tübinger Atlas des Vorderen Orients, B32. Wiesbaden: Reichert, 1979.
- Santarém, Manuel Francisco de Barros e Sousa, Viscount of. *Atlas composé de mappemondes, de portulans et de cartes hydrographiques et historiques depuis le VI<sup>e</sup> jusqu'au XVII<sup>e</sup> siècle*. Paris, 1849. Reprint, Amsterdam: R. Muller, 1985.
- . *Essai sur l'histoire de la cosmographie et de la cartographie pendant le Moyen-Age et sur les progrès de la géographie après les grandes découvertes du XV<sup>e</sup> siècle*. 3 vols. Paris: Maulde et Renou, 1849–52.
- Sanz, Carlos. "El primer mapa del mundo con la representación de los dos hemisferios." *Boletín de la Real Sociedad Geográfica* 102 (1966): 119–217.
- Sarton, George. *Introduction to the History of Science*. 3 vols. Baltimore: Williams and Wilkins, 1927–48.
- Schulz, Juergen. "Jacopo de' Barbari's View of Venice: Map Making, City Views, and Moralized Geography before the Year 1500." *Art Bulletin* 60 (1978): 425–74.
- Shirley, Rodney W. *The Mapping of the World: Early Printed World Maps 1472–1700*. London: Holland Press, 1983.
- Simar, Théophile. "La géographie de l'Afrique Centrale dans l'antiquité et au Moyen-Age." *Revue Congolaise* 3 (1912–13): 1–23, 81–102, 145–69, 225–52, 289–310, 440–41.
- Skelton, R. A. "A Contract for World Maps at Barcelona, 1399–1400." *Imago Mundi* 22 (1968): 107–13.
- Skelton, R. A., Thomas E. Marston, and George D. Painter. *The Vinland Map and the Tartar Relation*. New Haven: Yale University Press, 1965.
- Stahl, William Harris. *Roman Science: Origins, Development, and Influence to the later Middle Ages*. Madison: University of Wisconsin Press, 1962.
- Tattersall, Jill. "Sphere or Disc? Allusions to the Shape of the Earth in Some Twelfth-Century and Thirteenth-Century Vernacular French Works." *Modern Language Review* 76 (1981): 31–46.
- Thompson, Daniel V. *The Materials and Techniques of Medieval Painting*. New York: Dover, 1956. Unabridged and unaltered republication of the first edition, 1936, titled *The Materials of Medieval Painting*.
- Tobler, Waldo R. "Medieval Distortions: The Projections of Ancient Maps." *Annals of the Association of American Geographers* 56 (1966): 351–60.
- Uhden, Richard. "Zur Herkunft und Systematik der mittelalterlichen Weltkarten." *Geographische Zeitschrift* 37 (1931): 321–40.
- Wittkower, Rudolf. "Marvels of the East: A Study in the History of Monsters." *Journal of the Warburg and Courtauld Institutes* 5 (1942): 159–97.
- Woodward, David. "Reality, Symbolism, Time, and Space in Medieval World Maps." *Annals of the Association of American Geographers* 75 (1985): 510–21.
- Wright, John Kirtland. "Notes on the Knowledge of Latitudes and Longitudes in the Middle Ages." *Isis* 5 (1922): 75–98.
- . *The Geographical Lore of the Time of the Crusades: A Study in the History of Medieval Science and Tradition in Western Europe*. American Geographical Society Research Series no. 15. New York: American Geographical Society, 1925; republished with additions, New York: Dover, 1965.