

42 • Cartography in the German Lands, 1450–1650

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INTRODUCTION

The state structure in the heart of central Europe was a group of individual regions that in some cases were politically and culturally very independent. Additionally, many developments and influences affected these regions differently for more than two eventful centuries—from about 1450 to 1650. This highly complex situation is reflected with unusual clarity in the history of cartography.¹ Parallel events and continuities in space and time can be recognized in only a few cases. Taken as a whole, Renaissance cartography in that area is a mosaic of individual parts differing in type and importance, and the systematic structure applied here is only one of several logical possibilities.

At the threshold of the modern age, “Germany” was a federation of more than six hundred territories that had grown together over a period of about seven hundred years.² It included an area that is covered today by Germany, Austria, Switzerland, Belgium, Luxembourg, and the Netherlands, as well as parts of France, Poland, Italy, and Czechia. The medieval expressions in Latin were *Alemania*, *Germania*, and *Teutonia*, while the German generic term *Teutschlandt* occurs only in the last decades of the fifteenth century. All earlier sources in vernacular language use the plural form “German lands” (*teutsche lant*). This reflects the nonpolitical way the German nation saw itself as a community linked by common language and culture. By 1450, sources were using phrases such as *regnum nostrum et natio germanica*, underlining a mental distinction between kingdom and nation.

STATE STRUCTURE

The political state structure, as it existed at the end of the fifteenth century in Germany, is difficult to define (fig. 42.1). The constitutional foundation was the kingdom of Germany (*Regnum Teutonicum*). German kingship was a *de jure* nonhereditary dignity; every candidate had to be elected by a collegium of seven electors (*Kurfürsten*).³ This realm was a hierarchically structured federation of fiefs subject to the king. The individual ranks of these imperial estates (*Reichsstände*) and the form and

the degree of their subjection under royal sovereignty differed greatly. They included the secular dominions (duchies, counties, and baronies) as direct or indirect fiefs; the ecclesiastical territories (dioceses and imperial abbeys) somewhat outside the immediate feudal structure; the imperial cities; and, as a special case, the kingdom of Bohemia, a fief of the German crown since 1198, but which was also ruled by kings from non-German dynasties. The main criterion for affiliation with the kingdom of Germany was the right to attend meetings of the joint parliament (*Reichstag*).

Along with the German lands were the two “side lands” (*Nebenländer*), united with the German crown since the Middle Ages: the kingdom of Italy, which, after 1454,

Abbreviations used in this chapter include: *Karten hüten* for Joachim Neumann, ed., *Karten hüten und bewahren: Festgabe für Lothar Zögner* (Gotha: Perthes, 1995); *Lexikon* for Ingrid Kretschmer, Johannes Dörflinger, and Franz Wawrik, eds., *Lexikon zur Geschichte der Kartographie*, 2 vols. (Vienna: Franz Deuticke, 1986); *Mercator* for Wolfgang Scharfe, ed., *Gerhard Mercator und seine Zeit* (Duisburg: W. Braun, 1996); and *Wandlungen* for Manfred Büttner, ed., *Wandlungen im geographischen Denken von Aristoteles bis Kant* (Paderborn: Schöningh, 1979).

1. A first version of this contribution was finished in 1990. The present, entirely reworked text is based on a research project executed by the author from 1992 to 1997 at the University of Trier; see Peter H. Meurer, *Corpus der älteren Germania-Karten: Ein annotierter Katalog der gedruckten Gesamtkarten des deutschen Raumes von den Anfängen bis um 1650*, text and portfolio (Alphen aan den Rijn: Canaletto, 2001).

2. General literature on the subject is endless. An easy, legible introduction in English is provided by Peter H. Wilson, *The Holy Roman Empire, 1495–1806* (Houndsmills, Eng.: Macmillan, 1999). A useful recent monograph in German on a major part of the period is Horst Rabe, *Deutsche Geschichte, 1500–1600: Das Jahrhundert der Glaubensspaltung* (Munich: C. H. Beck, 1991). The history of the singular territories is found summarized in Georg Wilhelm Sante and A. G. Ploetz-Verlag, eds., *Geschichte der deutschen Länder: “Territorien-Ploetz,”* vol. 1, *Die Territorien bis zum Ende des alten Reiches* (Würzburg: A. G. Ploetz, 1964), and Gerhard Köbler, *Historisches Lexikon der deutschen Länder: Die deutschen Territorien vom Mittelalter bis zur Gegenwart* (Munich: C. H. Beck, 1988). For a popular science atlas, see Manfred Scheuch, *Historischer Atlas Deutschland: Vom Frankenreich bis zur Wiedervereinigung* (Vienna: C. Brandstätter, 1997).

3. From the Middle Ages forward, the members of the collegium were the archbishops of Cologne, Mainz, and Trier; the king of Bohemia; the palatine of the Rhine; the margrave of Brandenburg; and the duke of Saxony.



FIG. 42.1. REFERENCE MAP OF THE POLITICAL STRUCTURE OF THE GERMAN LANDS IN THE SIXTEENTH AND SEVENTEENTH CENTURIES. Based on Peter H. Meurer, *Corpus der älteren Germania-*

Karten: Ein annotierter Katalog der gedruckten Gesamtkarten des deutschen Raumes von den Anfängen bis um 1650, text and portfolio (Alphen aan den Rijn: Canaletto, 2001), 4 (fig. 0-1).

was comprised of just Savoy, Piedmont, Milan, Tuscany, and some city-states as far as Siena in the south, and the kingdom of Burgundy, which in the fifteenth century consisted only of the Franche-Comté. The three realms formed the real Holy Roman Empire (in German: *Heiliges Römisches Reich* or *Römisch-Deutsches Reich*; in Latin, *Sacrum Imperium Romanum*). The partially spiritual dignity of emperorship included in principle the sovereignty over all of Western Christianity. This position changed in the late Middle Ages. The Roman-German king had the right (but no claim) to be crowned emperor by the pope. The extended title “Holy Roman Empire of the German Nation” was introduced as an instrument of political propaganda by the house of Habsburg, which came to the German throne in 1452.

Maximilian I, Romano-German king since 1486 and the first self-appointed “Elected Roman Emperor” (from 1508) without coronation by the pope, was the first dominant figure.⁴ He was successful in creating a concrete European empire under Habsburg rule by acquiring Burgundy and Spain through dynastic marriages. Maximilian’s reform of the empire, including the introduction of imperial taxes and the founding of an imperial court of justice (*Reichskammergericht*), was an important step toward constitutional and political consolidation. A new territorial structure resulted in the subdivision of the German heartland into ten imperial districts (*Reichskreise*) that brought a certain territorial identity of the empire with the German nation for the first time. Outside the structure remained the Swiss cantons, which had declared their independence from the German crown in 1499.

Maximilian’s successors did much to fragment this identity. His grandson, Emperor Charles V, acquired the Dutch provinces for the Habsburgs in his role as king of Spain.⁵ He also affiliated the rest of the kingdom of Italy to the Spanish crown. In all, his interests were concentrated on southern Europe and the Spanish overseas possessions.

Charles’s reign in the German lands ended disastrously. Stimulated by the ideas of the Reformation, uprisings of peasants and knights had been unsettling the empire’s stability since 1523. Numerous territorial rulers—among them all three secular electors—accepted the new faith along with their subjects. In 1531, Protestant princes founded the League of Schmalkalden and several times sought to form an alliance with France against the emperor. The denominational and political schism ended in 1555 in the Religious Peace of Augsburg, which gave the same rights to the old and new creeds.

One year later, Charles abdicated the throne. The way he distributed his power and possessions between his brother Ferdinand I and his son Philip II had far-reaching consequences. Emperorship with rule over the German lands was given to Ferdinand, who had already been nominated German king in 1531. Philip became king of

Spain and attained the Burgundian possessions of the house of Habsburg, including the Netherlands. A strong Catholic, Philip exercised a much more rigid opposition to upheaval and heresy in his lands than the Counter-Reformation did in the rest of the empire. A consequence was the Eighty Years War of the Netherlands against the Spanish crown from 1568, stemming from religious, political, and economic motives.⁶ In 1579, the seven northern provinces proclaimed the Union of Utrecht, asserting the Dutch republic’s independence from Spain.

A HISTORIOGRAPHICAL SKETCH

The history of cartography in the German-speaking area was first routinely studied in the eighteenth century within the field of map documentation.⁷ Precursory works by Caspar Gottschling in 1711 and Johann Gottfried Gregorii in 1713 were followed in 1724 by the epochal annotated bibliography of old and contemporary maps by the Swabian theologian and geographer Eberhard David Hauber.⁸ Hauber’s work, organized by subjects and regions, is still a rich source of information. This tradition was continued in specialized form in Switzerland at the end of the century by von Haller.⁹

4. See Hermann Wiesflecker, *Maximilian I.: Das Reich, Österreich und Europa an der Wende zur Neuzeit*, 5 vols. (Munich: Oldenbourg, 1971–86), and Gerhard Benecke, *Maximilian I (1459–1519): An Analytical Biography* (London: Routledge and Kegan Paul, 1982).

5. The older literature is summarized in some publications commemorating the quincentenary of Charles’s birth: Alfred Kohler, *Karl V., 1500–1558: Eine Biographie* (Munich: C. H. Beck, 1999); *Kaiser Karl V. (1500–1558): Macht und Ohnmacht Europas*, exhibition catalog (Bonn: Kunst- und Ausstellungshalle der Bundesrepublik Deutschland, 2000); and Hugo Soly and Johan van de Wiele, comps., *Carolus: Charles Quint, 1500–1558* (Ghent: Snoeck-Ducaju & Zoon, 1999).

6. Geoffrey Parker, *The Dutch Revolt* (Harmondsworth, Eng.: Penguin Books, 1977).

7. A useful aid is Lothar Zögner, *Bibliographie zur Geschichte der deutschen Kartographie* (Munich: Saur, 1984).

8. Caspar Gottschling, *Versuch von einer Historie der Land-Charten* (Halle: Renger, 1711); Johann Gottfried Gregorii, *Curieuse Gedancken von den vornehmsten und accuratesten Alt- und Neuen Land Charten nach ihrem ersten Ursprunge, Erfindung, Auctoribus und Sculptoribus, Gebrauch und Nutzen entworfen* (Frankfurt: Ritschel, 1713); and Eberhard David Hauber, *Versuch einer umständlichen Historie der Land-Charten: Sowohl von denen Land-Charten insgemein, derselben ersten Ursprung, ihrer Beschaffenheit, unterschiedlichen Gattungen . . . als auch von denen Land-Charten eines jeden Landes insonderheit, deren Güte und Vorzüge* (Ulm: Bartholomäi, 1724; reprinted Karlsruhe: Fachhochschule Karlsruhe, 1988).

9. Gottlieb Emanuel von Haller’s main work in cartobibliography was *Verzeichniss derjenigen Landcharten, welche über Helvetien und dessen Theile bis hieher verfertigt worden sind* (Bern, 1771); also, his six-volume *Bibliothek der Schweizer-Geschichte und aller Theile so dahin Bezug haben, systematisch-chronologisch geordnet* (Bern, 1785–87), has many references to maps. This Swiss tradition continued through the twentieth century in Walter Blumer’s *Bibliographie der Gesamtkarten der Schweiz von Anfang bis 1802* (Bern: Kommis-

German scholars played an important role in the formation of the modern discipline in the middle of the nineteenth century, particularly through the study and source material editions of early maps of the New World.¹⁰ A clearly visible academic-scientific professional milieu developed a little later in Germany and within the larger framework of the history of geography. A milestone was the *Geschichte der Erdkunde*, published in 1865 by Oscar Peschel, a professor of geography in Leipzig.¹¹ Afterward, research at the German universities very quickly established itself over a wide spectrum that included mathematical topics,¹² biographical monographs, and initial overviews of the entire discipline. This phase, which defined the discipline by sorting out the material, lasted until about 1900. Among the first generation of academic researchers and teachers were the professors of geography Siegmund Günther in Munich, Konrad Kretschmer in Berlin, Eugen Oberhummer in Vienna, and Hermann Wagner in Göttingen, and an early universalist, Wilhelm Wolkenhauer, teacher of navigation in Bremen.¹³ Already during this phase, historical research on maps was not restricted only to universities. There were also great editorial achievements by theologians trained in geography and philology, such as Joseph Fischer and Konrad Miller.¹⁴

August Wolkenhauer, a geographer in Göttingen, probably would have become a dominant figure in twentieth-century history of cartography had he not died at a young age in the First World War.¹⁵ Long-overdue credit should be given to Max Eckert, professor of geography in Aachen, whose book *Die Kartenwissenschaft* (1921–22) established cartography as an independent discipline.¹⁶ The

sionsverlag Kümmerly und Frey, 1957) and a supplement by Franchino Giudicetti, *Eine Ergänzung der Bibliographie der Gesamtkarten der Schweiz von Mercator bis 1802* (Murten: Cartographica Helvetica, 1996). For a detailed survey, see Hans-Peter Höhener, “Zur Geschichte der Kartendokumentation in der Schweiz,” in *Karten hüten*, 57–66.

10. See, for instance, Alexander von Humboldt, *Examen critique de l'histoire de la géographie du nouveau continent et des progrès de l'astronomie nautique aux quinzième et seizième siècles*, 5 vols. (Paris: Gide, 1836–39); Friedrich Kunstmann, *Die Entdeckung Amerikas: Nach den ältesten Quellen geschichtlich dargestellt* (Munich, 1859), with thirteen maps reprinted; and J. G. Kohl, *Die beiden ältesten General karten von Amerika: Ausgeführt in den Jahren 1527 und 1529 auf Befehl Kaiser Karl's V.* (Weimar: Geographisches Institut, 1860), an edition of the two world maps by Diego Ribeiro preserved at Weimar.

11. Oscar Peschel, *Geschichte der Erdkunde bis auf A. v. Humboldt und Carl Ritter* (Munich: Cotta, 1865).

12. A good survey is given in a reprint of several older articles: *Das rechte Fundament der Seefahrt: Deutsche Beiträge zur Geschichte der Navigation*, ed. Wolfgang Köberer (Hamburg: Hoffmann und Campe, 1982).

13. Among Siegmund Günther's extensive but nevertheless high-quality works are his biographical studies, including *Peter und Philipp Apian, zwei deutsche Mathematiker und Kartographen: Ein Beitrag zur Gelehrten-Geschichte des 16. Jahrhunderts* (Prague, 1882); *Martin Behaim* (Bamberg: Buchnersche Verlagsbuchhandlung, 1890); and *Jakob Ziegler, ein bayerischer Geograph und Mathematiker* (Ansbach:

M. Eichinger, 1896). Konrad Kretschmer's main works are *Die Entdeckung Amerikas in ihrer Bedeutung für die Geschichte des Weltbildes* (Berlin: W. W. Kühn, 1892), with forty map reproductions, and *Die italienischen Portolane des Mittelalters: Ein Beitrag zur Geschichte der Kartographie und Nautik* (Berlin: Mittler, 1909). Eugen Oberhummer wrote on numerous topics of the early sixteenth century, among them—in collaboration with Franz Ritter von Wieser—the fundamental edition of Wolfgang Lazius, *Karten der österreichischen Lande und des Königreichs Ungarn aus den Jahren 1545–1563*, ed. Eugen Oberhummer and Franz Ritter von Wieser (Innsbruck: Wagner, 1906). Hermann Wagner was especially important as an academic teacher. He mainly worked on the history of mathematical cartography and nautical science. Wilhelm Wolkenhauer's most important work was the continuously amended universal history of cartography, which first appeared, with special attention to Germany, in the essay “Zeittafel zur Geschichte der Kartographie mit erläuternden Zusätzen und mit Hinweis auf die Quellenliteratur unter besonderer Berücksichtigung Deutschlands,” *Deutsche Geographische Blätter* 16 (1893): 319–48, and was reprinted in *Acta Cartographica* 9 (1970): 469–98. There followed an enlarged monograph version, *Leitfaden zur Geschichte der Kartographie in tabellarischer Darstellung* (Breslau: Hirt, 1895), and a series of essays, “Aus der Geschichte der Kartographie,” *Deutsche Geographische Blätter* 27 (1904): 95–116; 33 (1910): 239–64; 34 (1911): 120–29; 35 (1912): 29–47; 36 (1913): 136–58; and 38 (1917): 157–201, which was reprinted in *Acta Cartographica* 18 (1974): 332–504.

14. Fischer's first great achievement—in collaboration with von Wieser—was the edition of Martin Waldseemüller, *Die älteste Karte mit dem Namen Amerika aus dem Jahre 1507 und die Carta Marina aus dem Jahre 1516*, ed. Joseph Fischer and Franz Ritter von Wieser (Innsbruck: Wagner, 1903; reprinted Amsterdam: Theatrum Orbis Terrarum, 1968). Later, Fischer became the Nestor of the scientific study of Ptolemy; the culmination was the annotated edition, Joseph Fischer, ed., *Claudii Ptolemai Geographiae, Codex Urbinas Graecus 82*, 2 vols. in 4 (Leiden: E. J. Brill and O. Harrassowitz, 1932).

Konrad Miller is one of the early great editors of original sources in the history of cartography. His main works are *Die Weltkarte des Castorius, genannt die Peutingersche Tafel* (Ravensburg: O. Maier, 1887); *Mappaemundi: Die ältesten Weltkarten*, 6 vols. (Stuttgart: Roth, 1895–98); *Itineraria Romana: Römische Reisenwege an der Hand der Tabula Peutingeriana* (Stuttgart: Strecker und Schröder, 1916); and *Mappae arabicae: Arabische Welt- und Länderkarten des 9.–13. Jahrhunderts*, 6 vols. (Stuttgart, 1926–31).

15. Among August Wolkenhauer's preparatory works were “Über die ältesten Reisekarten von Deutschland aus dem Ende des 15. und dem Anfange des 16. Jahrhunderts,” *Deutsche Geographische Blätter* 26 (1903): 120–38, reprinted in *Acta Cartographica* 8 (1970): 480–98; *Beiträge zur Geschichte der Kartographie und Nautik des 15. bis 17. Jahrhunderts* (Munich: Straub, 1904), reprinted in *Acta Cartographica* 13 (1972): 392–498; “Seb. Münsters verschollene Karte von Deutschland von 1525,” *Globus* 94 (1908): 1–6, reprinted in *Acta Cartographica* 9 (1970): 461–68; *Sebastian Münsters handschriftliches Kollegienbuch aus den Jahren 1515–1518 und seine Karten* (Berlin: Weidmann, 1909), reprinted in *Acta Cartographica* 6 (1969): 427–98; and “Die Koblenzer Fragmente zweier handschriftlichen Karten von Deutschland aus dem 15. Jahrhundert,” *Nachrichten von der Königlichen Gesellschaft der Wissenschaften zu Göttingen, Philologisch-historische Klasse*, 1910, 17–47, reprinted in *Acta Cartographica* 12 (1971): 472–505. See also Ruthardt Oehme, “August Wolkenhauer: Ein Wegbereiter deutscher kartenhistorischer Forschung,” *Kartographische Nachrichten* 35 (1985): 217–24.

16. Max Eckert, *Die Kartenwissenschaft: Forschungen und Grundlagen zu einer Kartographie als Wissenschaft*, 2 vols. (Berlin: W. De Gruyter, 1921–25). See also Wolfgang Scharfe, “Max Eckert's Kartenwissenschaft: The Turning Point in German Cartography,” *Imago Mundi* 38 (1986): 61–66.

early twentieth century also saw first attempts to write the history of maps of individual regions, in many cases as doctoral dissertations.¹⁷ Around the same time, librarians became more interested in cartography; for example, Viktor Hantzsch edited the old map catalog of the former Royal Library of Dresden.¹⁸ Also of note is Walther Ruge's great library tour to catalog pre-1600 cartographic material in German collections.¹⁹ An outsider, teacher Konstantin Cebrian, made the first attempt at a general history of cartography, but the project never made it beyond the first volume.²⁰ Leo Bagrow, a native of Russia who lived in Berlin after 1918, became the great universalist on the German professional scene. His edition of Abraham Ortelius's catalog of mapmakers is one of the outstanding classics in cartohistorical writing.²¹ In 1935, he founded *Imago Mundi* together with its publisher, Hans Wertheim. His world history of cartography, which was seminal for decades, did not appear until 1951.²²

After the Second World War, working groups in the history of cartography were founded in German states and in Austria and Switzerland, mainly as divisions of cartographic societies, and Austria played a leading role. The university tradition was continued only in Vienna, by the geographer Ernst Bernleithner and the historian Günter Hamann, the academic father of a school of famous map historians. The 1952 founding of the Coronelli-Gesellschaft, the society for the study of old globes and related instruments, underlined Austria's top position in the historiography of globemaking.²³ A basic lexicon on the history of cartography (1986) and a bibliography of Austrian atlases (1995) are only two of the recent national achievements.²⁴

A highly renowned map historian from Switzerland was Franz Grenacher, a merchant from Basel.²⁵ Academic education was built up by the geographer Georges Grosjean at the University of Bern. The publication of high-quality facsimile editions became a Swiss specialty.

At the German universities, there was a hiatus in the study of the history of cartography after 1945. Arend W. Lang, who studied medicine, held the only lectures on the subject in Göttingen and Berlin in the 1950s and 1960s.²⁶ The bearers of a new scientific progress came

Sebastian Münster: Leben, Werk, wissenschaftliche Bedeutung (Leipzig: Teubner, 1898; reprinted Nieuwkoop: B. de Graaf, 1965), and *Die ältesten gedruckten Karten der sächsisch-thüringischen Länder (1550–1593)* (Leipzig: Teubner, 1905).

19. It resulted in a series of articles: Walther 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; and 1916, Beiheft, 1–128; reprinted in *Acta Cartographica* 17 (1973): 105–472.

20. Konstantin Cebrian, *Geschichte der Kartographie: Ein Beitrag zur Entwicklung des Kartenbildes und Kartenwesens*, pt. 1, vol. 1, *Von den ersten Versuchen der Länderabbildung bis auf Marinus und Ptolemaios* (Gotha: Perthes, 1923); no further volumes published. See Wilhelm Bonacker, "Eine unvollendet gebliebene Geschichte der Kartographie von Konstantin Cebrian," *Die Erde* 3 (1951–52): 44–57.

21. Leo Bagrow, "A. Ortelii catalogus cartographorum," *Petermanns Mitteilungen, Ergänzungsheft* 199 (1928): 1–137 and 210 (1930): 1–135, reprinted in *Acta Cartographica* 27 (1981): 65–357. The life and work of Leo Bagrow are described in the long obituary "Leo Bagrow, Historian of Cartography and Founder of *Imago Mundi*, 1881–1957," *Imago Mundi* 14 (1959): 5–12; see also J. B. Harley, "The Map and the Development of the History of Cartography," in *HC* 1:1–42, esp. 24–26.

22. The first issue was Leo Bagrow, *Geschichte der Kartographie* (Berlin: Safari, 1951). A reprint of a later, translated edition, *History of Cartography*, rev. and enl. R. A. Skelton, trans. D. L. Paisley (Cambridge: Harvard University Press; London: C. A. Watts, 1964; reprinted and enlarged, Chicago: Precedent Publishing, 1985), is still on the market.

23. The earlier name was Coronelli-Weltbund der Globusfreunde. The society's journal is *Der Globusfreund* (1952–), and from volume 42 (1994) it has been published in both German and English; as of 2002 (volume 49–50), the English version is published under the title *Globe Studies*. The society helped establish the globe museum in the Österreichische Nationalbibliothek; see Franz Wawrik and Helga Hühnel, "Das Globenmuseum der Österreichischen Nationalbibliothek," *Der Globusfreund* 42 (1994): 3–188. In 2005 it moved to its own building in Vienna.

24. *Lexikon* and Ingrid Kretschmer and Johannes Dörflinger, eds., *Atlantes Austriaci: Kommentierter Katalog der österreichischen Atlanten von 1561 bis 1994*, 2 vols. in 3 (Vienna: Böhlau, 1995). See also Ingo Nebel and Robert Wagner, *Bibliographie altösterreichischer Ansichtenwerke aus fünf Jahrhunderten*, 5 vols. (Graz: Akademische Druck- und Verlagsanstalt, 1981–84, with later supplements); Franz Wawrik and Elisabeth Zeilinger, eds., *Austria Picta: Österreich auf alten Karten und Ansichten*, exhibition catalog (Graz: Akademische Druck- und Verlagsanstalt, 1989); Peter E. Allmayer-Beck, ed., *Modelle der Welt: Erd- und Himmelsgloben* (Vienna: Brandstätter, 1997); and Ingrid Kretschmer, Johannes Dörflinger, and Franz Wawrik, eds., *Österreichische Kartographie von den Anfängen im 15. Jahrhundert bis zum 21. Jahrhundert* (Vienna: Institut für Geographie und Regionalforschung der Universität Wien, 2004).

25. Grenacher wrote numerous articles on the history of the cartography of Switzerland and southern Germany; see the obituary by Arthur Dürst, "Franz Grenacher (1900–1977)," *Imago Mundi* 30 (1978): 98–99.

26. Lang did research mainly on marine cartography. See Arend W. Lang, *Seekarten der südlichen Nord- und Ostsee: Ihre Entwicklung von den Anfängen bis zum Ende des 18. Jahrhunderts* (Hamburg: Deutsches Hydrographisches Institut, 1968); the unfinished facsimile edition, *Historisches Seekartenwerk der Deutschen Bucht*, vol. 1 (Neumünster: Wachholtz, 1969); and the posthumously published *Die "Caerte van Oostlant" des Cornelis Anthonisz. 1543: Die älteste gedruckte Seekarte Nordeuropas und ihre Segelanweisung* (Hamburg: Ernst Kabel, 1986). See also the obituary by Lothar Zögner, "Arend W. Lang (1909–1981)," *Imago Mundi* 35 (1983): 98–99.

17. See, for example, Alfons Heyer, *Geschichte der Kartographie Schlesiens bis zur preussischen Besitzergreifung* (Breslau: Nischkowsky, 1891), reprinted in *Acta Cartographica* 13 (1972): 55–171; Max Gasser, *Studien zu Philipp Apians Landesaufnahme* (Munich: Straub, 1903), reprinted in *Acta Cartographica* 16 (1973): 153–208; Eduard Moritz, *Die Entwicklung des Kartenbildes der Nord- und Ostseeländer bis auf Mercator* (Halle: Kaemmerer, 1908; reprinted Amsterdam: Meridian, 1967); and Johannes Werner, *Die Entwicklung der Kartographie Südbadens im 16. und 17. Jahrhundert* (Karlsruhe, 1913).

18. Viktor Hantzsch, ed., *Die Landkartenbestände der Königlichen öffentlichen Bibliothek zu Dresden: Nebst Bemerkungen über Einrichtung und Verwaltung von Kartensammlungen* (Leipzig: Harrassowitz, 1904). Hantzsch was also important as a scholar; see, for example, his

from very different professions. Among them, aside from Lang, were the cartographer Wilhelm Bonacker, librarian Ruthardt Oehme, and astronomer Ernst Zinner.²⁷ The German journal *Speculum Orbis* (1985–87) ceased publication after five issues and was replaced by *Cartographica Helvetica* (from 1990). The highly innovative “IKAR Datenbank,” a cartobibliographic database of pre 1850 maps in German libraries, was started in 1985.²⁸ But in spite of singular lessons and courses, the history of cartography at German universities had less academic support after the war than during the early twentieth century.

In the German-speaking lands, Arthur Dürst (Zurich), Ingrid Kretschmer (Vienna), and Wolfgang Scharfe (Berlin) have engaged map historians during the last two decades. Close cooperation has resulted in the series “Kartographiehistorisches Colloquium,” organized biannually since 1982 in different towns, and the first printed survey on the history of cartography in the German-speaking countries.²⁹ In 1996, the working group D-A-CH was established to focus on the common interests of German, Austrian, and Swiss map historians.

THE DAWN OF EARLY MODERN CARTOGRAPHY

The adoption of Ptolemaic techniques and data in the second half of the fifteenth century cannot serve as the sole criterion for defining the beginning of the early modern period in German cartography. There were other traditions with various roots in the country itself. Determinations of latitude for individual places were known from at least the twelfth century; they were mainly carried out for astrological calculations. Selective measurements of parcels of land were continuously recorded beginning in the early thirteenth century and became commonplace about a century later. For instance, the duke of Geldern on the lower Rhine had the sworn surveyor (*ghesworen landmeter*) Johann Werderlieven in permanent service between 1346 and 1356. Among his works was the “Gocher Landrolle” of 1349, a register on the measuring of newly cultivated land and its exact subdivision into equal lots.³⁰ This register was probably accompanied by a graphic depiction that is unfortunately lost. A similar contemporary estate map has been preserved in the Netherlands.³¹

The first surviving specimens of early large-scale mapping came from the same region and include sketches of lands on the lower reaches of the Maas and the Rhine of 1357 and a recently discovered map of Flanders of 1452.³² Both the sketches and the map are based less on exact metrical data than on itineraries and general knowledge of the respective countries. However, they evoke the already rich tradition and experience in mapping in the middle of the fifteenth century, and they give a vague impression of what has been lost. It is difficult to state reliably when and where

more exact astronomical and terrestrial measurements were used to map larger areas. There is the Albertinische plan of Vienna and its surroundings from about 1421, the oldest preserved town plan from north of the Alps, but it is not as accurate as suggested by the scale bar—which was probably added later.³³

The American historian Dana Bennett Durand elaborated on early cartographic knowledge and activities in the German lands. He studied a manuscript collection of astronomical and geographical texts and tables, the so-called Klosterneuburg corpus. It was compiled between 1447 and 1455 at the monastery of Saint Emmeran in Regensburg by a Brother Fridericus, who modestly called himself an *astronomunculus* (a less skilled astronomer).³⁴

27. Wilhelm Bonacker was the author of reference works: *Das Schrifttum zur Globenkunde* (Leiden: Brill, 1960); *Kartenmacher aller Länder und Zeiten* (Stuttgart: Hiersemann, 1966); and the posthumously published *Bibliographie der Straßenkarte* (Bonn-Bad Godesberg: Kirschbaum, 1973). See also Karl-Heinz Meine, ed., *Kartengeschichte und Kartenbearbeitung: Festschrift zum 80. Geburtstag von Wilhelm Bonacker* (Bad Godesberg: Kirschbaum, 1968), and the obituary by Karl-Heinz Meine, “Wilhelm Bonacker,” *Imago Mundi* 24 (1970): 139–44. Ruthardt Oehme’s most important work was *Die Geschichte der Kartographie des deutschen Südwestens* (Constance: Thorbecke, 1961); for a complete bibliography, see the obituary by Lothar Zögner, “Ruthardt Oehme (1901–1987),” *Imago Mundi* 40 (1988): 126–29. Ernst Zinner’s works on the history of cartography include *Geschichte und Bibliographie der astronomischen Literatur in Deutschland zur Zeit der Renaissance* (Leipzig: Hiersemann, 1941), and *Deutsche und niederländische astronomische Instrumente des 11.–18. Jahrhunderts*, 2d ed. (Munich: C. H. Beck, 1967).

28. See <<http://ikar.sbb.spk-berlin.de/>>.

29. *La cartografia dels països de parla alemanya: Alemanya, Àustria i Suïssa* (Barcelona: Institut Cartogràfic de Catalunya, 1997), with contributions by Wolfgang Scharfe, Ingrid Kretschmer, and Hans-Uli Feldmann; the texts are in English.

30. Dieter Kastner, *Die Gocher Landrolle: Ein Landerschließungsprojekt des 14. Jahrhunderts* (Kleve: Boss, 1988).

31. C. Koeman, *Geschiedenis van der kartografie van Nederland: Zes eeuwen land- en zeekarten en stadsplattegronden* (Alphen aan den Rijn: Canaletto, 1983), 29; see also H. C. Pouls, *De landmeter: Inleiding in de geschiedenis van de Nederlandse landmeetkunde van de Romeinse tot de Franse tijd* (Alphen aan den Rijn: Canaletto/Repro-Holland, 1997).

32. Koeman, *Geschiedenis van der kartografie*, 28–29, and Jozef Bossu, “Pieter van der Beke’s Map of Flanders: Before and After,” in *Von Flandern zum Niederrhein: Wirtschaft und Kultur überwinden Grenzen*, ed. Heike Frosien-Leinz, exhibition catalog (Duisburg: Kultur- und Stadthistorisches Museum, 2000), 35–40.

33. Max Kratochwill, “Zur Frage der Echtheit des ‘Albertinischen Planes’ von Wien,” *Jahrbuch des Vereines für Geschichte der Stadt Wien* 29 (1973): 7–36, and Reinhard Härtel, “Inhalt und Bedeutung des ‘Albertinischen Planes’ von Wien: Ein Beitrag zur Kartographie des Mittelalters,” *Mitteilungen des Instituts für Österreichische Geschichtsforschung* 87 (1979): 337–62. See also P. D. A. Harvey, “Local and Regional Cartography in Medieval Europe,” in *HC* 1:464–501, esp. 473–74 and fig. 20.8.

34. 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), esp. 75. The book is based on Durand’s doctoral dissertation, Harvard University, 1934.

More recent research has identified him with Friedrich Gerhart (d. 1463), a very prolific scribe and later dean of Saint Emmeran.³⁵

THE FIRST VIENNESE SCHOOL OF MATHEMATICS

An early center in cosmographical sciences developed in the late fourteenth century on the faculty of arts at Vienna University.³⁶ Astronomical and mathematical lectures were held by two of the first rectors, Albert von Sachsen and Heinrich von Langenstein. The Bohemian astronomer and mathematician Johann Schindel—who later gave lectures on Ptolemy's *Almagest* at Prague University—was active there as an academic refugee between 1407 and 1409.³⁷ His pupil was the Austrian Johannes von Gmunden, who taught in Vienna from about 1420 to 1433 and introduced the use of the Toledo tables there.³⁸ Von Gmunden was succeeded by the polymath Georg von Peurbach (Georg Aunpeck), who gave lectures at the Universities of Bologna and Padua during a sojourn in Italy from 1448 to 1451.³⁹ After Peurbach's return, he came into contact with the Vienna humanist circle around Enea Silvio de Piccolomini. He was active as a translator and held lectures on the movements of the planets (based on Ptolemy) and on sundials. Peurbach was appointed court astronomer of Emperor Friedrich III in 1457.

Peurbach's favorite pupil was Johannes Regiomontanus, who studied in Leipzig (from 1447) and Vienna (from 1450).⁴⁰ When the Greek humanist and cardinal Johannes Bessarion visited Vienna as a papal ambassador in 1460, Regiomontanus followed him to Italy to continue his studies in Rome, Venice, and Padua. From 1468 to 1471, Regiomontanus worked as an astronomer and mathematician at the court of the learned Hungarian king Matthias Corvinus in Budapest. Four very prolific years as a scholar in Nuremberg followed, financed by the merchant and amateur astronomer Bernhard Walther.⁴¹ Regiomontanus issued some calendars and his epochal *Ephemerides* (Nuremberg, 1474), lists of annual star positions for the years 1475–1506.⁴² These lists were of utmost importance for navigation; Columbus took a Venetian reprint from 1481 on his first journey.⁴³ Regiomontanus printed his books on his own press in Nuremberg.⁴⁴ A publishing program from 1474 lists twenty-two works by him and twenty-nine works by others that were supposed to have been produced in this print shop.⁴⁵ But all of Regiomontanus's plans were not realized. In 1475, he was called by Pope Sixtus IV to collaborate on calendar reform in Rome, where he died of the plague the following year.

A kind of scientific outpost of this first Viennese school of mathematics was the Augustinian canon chapter in nearby Klosterneuburg. Beginning in 1418, it became a

scholarly center with a secondary school (*Gymnasium*) and an important scriptorium under the polymath prior Georg Müstinger.⁴⁶ In 1421, Müstinger procured copies of antique works from Italy, among which might have been Ptolemy's *Geography*. Two examples of copies made by the Klosterneuburg scriptorium in 1437 and 1442—unfortunately without maps—are preserved.⁴⁷

THE KLOSTERNEUBURG FRIDERICUS MAP

The Klosterneuburg corpus includes undated cartographic annotations consisting of a list of 703 places with their polar coordinates and six sheets with accompanying river sketches.⁴⁸ These data form the basis for the recon-

35. Paul Lehmann, *Mittelalterliche Bibliothekskataloge Deutschlands und der Schweiz*, 4 vols. (Munich: C. H. Beck, 1918–62), vol. 4, pt. 1, 120–21.

36. Helmuth Grössing, *Humanistische Naturwissenschaft: Zur Geschichte der Wiener mathematischen Schulen des 15. und 16. Jahrhunderts* (Baden-Baden: V. Koerner, 1983). Supplementary information is found in Günther Hamann and Helmuth Grössing, eds., *Der Weg der Naturwissenschaft von Johannes von Gmunden zu Johannes Kepler* (Vienna: Österreichische Akademie der Wissenschaften, 1988).

37. Schindel was also active in Nuremberg between 1423 and 1438 as a physician and astronomer. See Kurt Pilz, *600 Jahre Astronomie in Nürnberg* (Nuremberg: Carl, 1977), 47–48.

38. See Grössing, *Humanistische Naturwissenschaft*, 73–78, and Paul Uiblein, "Johannes von Gmunden: Seine Tätigkeit an der Wiener Universität," in *Der Weg der Naturwissenschaft von Johannes von Gmunden zu Johannes Kepler*, ed. Günter Hamann and Helmuth Grössing (Vienna: Österreichische Akademie der Wissenschaften, 1988), 11–64.

39. On Peurbach, see Grössing, *Humanistische Naturwissenschaft*, 79–107; Friedrich Samhaber, *Der Kaiser und sein Astronom: Friedrich III. und Georg Aunpeckh von Peurbach* (Peurbach: Stadtgemeinde Peurbach, 1999); and Friedrich Samhaber, *Höhepunkte mittelalterlicher Astronomie: Begleitbuch zur Ausstellung Georg von Peurbach und die Folgen im Schloss Peurbach* (Peurbach: Stadtgemeinde Peurbach, 2000).

40. Ernst Zinner, *Leben und Wirken des Job. Müller von Königsberg, genannt Regiomontanus*, 2d ed. (Osnabrück: Zeller, 1968); idem, *Regiomontanus: His Life and Work*, trans. Ezra Brown (Amsterdam: North-Holland, 1990); Günther Hamann, ed., *Regiomontanus-Studien* (Vienna: Österreichische Akademie der Wissenschaften, 1980); and the collection of reprints in Felix Schmeidler, ed., *Joannis Regiomontani opera collectanea* (Osnabrück: Zeller, 1949, 1972).

41. Pilz, *Astronomie in Nürnberg*, 58–100.

42. Ernst Glowatzki and Helmut Götsche, *Die Tafeln des Regiomontanus: Ein Jahrhundertwerk* (Munich: Institut für Geschichte der Naturwissenschaften, 1990).

43. Rudolf Mett, "Regiomontanus und die Entdeckungsfahrten im 15. Jahrhundert," *Mitteilungen der Österreichischen Gesellschaft für Wissenschaftsgeschichte* 13 (1993): 157–74.

44. Angelika Wingen-Trennhaus, "Regiomontanus als Frühdrucker in Nürnberg," *Mitteilungen des Vereins für Geschichte der Stadt Nürnberg* 78 (1991): 17–87.

45. See also p. 1182, note 73, in this chapter.

46. Grössing, *Humanistische Naturwissenschaft*, 76–78.

47. Vienna, Österreichische Staatsbibliothek (Cod. Vind. 5266 and Cod. Vind. 3162).

48. Munich, Staatsbibliothek (Clm 14583), and Durand, *Map Corpus*, 486–501 and pl. XX.

struction of a unique cartographic representation that has come down in the literature under the name of the Klosterneuburg Fridericus map. Reconstructed, the materials result in a semicircular map that is oriented south and centered in Hallein (Austria).⁴⁹ It depicts central Europe between Lorraine (W), Cologne (N), Silesia (E), and Milan (S); further calculations suggest a radius of about 110 centimeters and a scale of about 1:500,000 at a minimum.⁵⁰ The significant feature of this map is the combination of fairly great topographical accuracy with the medieval tradition of the external form and cartographic techniques. The absence of any Ptolemaic influence leads one to assume a rather early date for the compilation. This matches notes in the account books of Klosterneuburg convent for 1420–23 that mention payments to a monk “Fridericus” for drawing a *mappa* and to a metalworker “Udalricus” for a frame.⁵¹ The identification of this scribe with the previously mentioned Friedrich Gerhart of Regensburg is possible, although not definitely proved. The lists and sketches in this Munich codex may be regarded as a kind of transportable version of the basic material that allowed the production of copies without using the large-size map drawing.

REINHARD GENSFELDER

Another learned center in southern Germany was the Benedictine cloister Reichenbach (Upper Palatinate), founded in 1118 and newly flourishing after a reform in 1440.⁵² It is well known in the history of cartography as the home convent of Nicolaus Germanus, but another interesting figure was astronomer Reinhard Gensfelder.⁵³ Born in Nuremberg around 1380–85, Gensfelder studied in Prague between 1400 and 1408 and subsequently went to Italy. He lived in Nuremberg in 1427, in Vienna around 1433, and in Salzburg from 1434 to 1436. In 1436, he joined the Reichenbach convent, from which he again made research trips to Vienna and Klosterneuburg. In 1444, he became parish priest in the nearby village of Tegernheim, where he died in the early 1450s.

As a consequence of Gensfelder’s roving life, many writings are attributed to him, including descriptions of sundials, a Nuremberg chronology (1433), a tellurium (1444), and the so-called Reinhard tables: table A, with coordinates of 80 towns in central Europe and of 11 points on the course of the Danube, and table B, with coordinates of 213 towns and 33 regions in central and western Europe.⁵⁴ Eight copies of these lists are known. The copy included in the Klosterneuburg corpus has the author’s note *rescriptas per Magistrum Reinhardum*.

The essential difference between Fridericus’s data and Gensfelder’s is that Gensfelder’s used coordinates showing Ptolemaic influence. The transformation of the lists into a cartographic form reveals the first “modern” map

of central Europe.⁵⁵ Further analyses show that Gensfelder had taken over some basic values from Ptolemy, while the bulk of his coordinates were based on contemporary measurements and calculations.⁵⁶

THE KOBLENZ MAP

The so-called Trier-Koblenz fragments are five pieces of parchment forming two map sheets: one complete sheet (56 × 40 cm) showing Ptolemaic maps of Hispania (recto) and Gallia (verso), and about one-half (one-fourth and two-eighths) of a double sheet (ca. 55 × 80 cm) showing a map of central Europe on a conic projection (recto) with a nearly illegible map of the whole of Europe in trapezoidal projection on the verso (plate 43).⁵⁷ Here we seem to have two map sheets from a highly interesting manuscript of Ptolemy’s *Geography*. There are many speculations about its origin, ranging from Klosterneuburg to Nicolaus Cusanus; however, none of them is supported by concrete evidence so far.

The map of central Europe in conic projection has an outstanding position in the early history of German cartography. While Fridericus and Gensfelder’s works have survived only as lists of coordinates, this is the first extant map of parts of Germany. Although it has a Ptolemaic graticule with meridians and parallels, the topographical entries and coordinates have nothing in common with data in the *Geography*. Moreover, detailed calculations show that the mathematical outline is based on the calculations of the circumference of the earth by Eratosthenes (250,000 *stades*), which are more exact than Ptolemy’s (180,000 *stades*).

The map’s sketchiness makes further analysis difficult. Linguistic details suggest that it was probably drawn in

49. Durand, *Map Corpus*, 174 and pl. XIX, and Ernst Bernleithner, “Die Klosterneuburger Fridericuskarte von etwa 1421,” *Mitteilungen der Geographischen Gesellschaft Wien* 98 (1956): 199–203.

50. For some new analyses, see Meurer, *Germania-Karten*, 26–29.

51. Durand, *Map Corpus*, 123–24, and Hugo Hassinger, “Über die Anfänge der Kartographie in Österreich,” *Mitteilungen der Geographischen Gesellschaft Wien* 91 (1949): 7–9.

52. Wolfgang Kaunzner, “Zum Stand von Astronomie und Naturwissenschaften im Kloster Reichenbach,” in *875 Jahre Kloster Reichenbach am Regen, 1118–1993* (Munich: Johannes von Gott, 1993), 24–45.

53. Durand, *Map Corpus*, 44–48, and Pilz, *Astronomie in Nürnberg*, 50–51.

54. Durand, *Map Corpus*, 128–44 and 346–62.

55. Durand, *Map Corpus*, pl. IV.

56. Meurer, *Germania-Karten*, 29–32.

57. The Trier-Koblenz fragments were found at the beginning of the twentieth century in bindings somewhere in the Mosel area. The fragment of central Europe discussed and illustrated here was first described by Wolkenhauer in “Die Koblenzer Fragmente.” The four other fragments are in Trier, Stadtbibliothek (Fragmente, Mapped 5). They were edited by Durand in *Map Corpus*, 145–59 and pls. VIII and IX. For a recent analysis, see Meurer, *Germania-Karten*, 33–38.

the Franconian area. A chain of towns from Cologne to Bruges is evidence that itineraries were used for the compilation. The inclusion of some minor locations such as Horneck and Mergentheim suggest an affiliation of the author with the Teutonic order. The entry of the smaller dominions of Katzenelnbogen (Hesse) and Lichtenberg (Alsace), where the proprietors changed in 1479–80, may serve as a clue to the date. But there are some traces of corrections and additions by different hands that suggest that the map was reworked about 1500.

THE LASTING MEDIEVAL TRADITION

A perfect example of the combination of traditional elements and innovation is the manuscript world map by Benedictine monk Andreas Walsperger.⁵⁸ Born in Radkersburg, Austria, he lived in the convent of Saint Peter in Salzburg from 1434 until 1442 and afterward in Constance, where he drew the map in 1448. The background of the author and his work are not certain, although there are some parallels to material in the Vienna-Klosterneuburg map corpus.⁵⁹ A map fairly closely related to the Walsperger map is found as a *tabula moderna* in the “Codex Zeitz” of 1470, a manuscript of Ptolemy’s *Geography*.⁶⁰ The Walsperger map exhibits at least four influences. First, its external appearance shows features characteristic of medieval cartography, such as the circular format with Jerusalem as the center, the outward border formed by the seven spheres, and the depiction of Paradise in the form of a town in the far east. Second, a scale with 360 degrees in the margin and a scale bar showing 1800 miles indicate that the map was constructed in a polar coordinate system similar to that of the Fridericus map. Third, although the text along the lower border refers to Ptolemy, there are no traces of Ptolemaic techniques and only hints of Ptolemaic data. Fourth, the depiction of Africa reveals knowledge of the first results of the Portuguese voyages of discovery. An interesting detail is the distinction between Christian towns (red dots) and heathen towns (black dots).

In 1475, the *Rudimentum novitorum*, a historical encyclopedia with two maps, was printed by Lucas Brandis in Lübeck.⁶¹ Like the text, both maps are still completely rooted in the medieval tradition. The circular world map is oriented to the east.⁶² The T-O (tripartite world) scheme is clearly recognizable, and the four rivers of Paradise are shown flowing into the inhabited world from the east. Various countries are represented in the form of molehills with miniatures of cities on their tops; among them is *vinland* in the northwest. The rectangular map of the Holy Land shows the area from Damascus to the Red Sea.⁶³ It cannot conceal its origins in the late medieval reports on pilgrimages; among them is an account by the German Dominican monk Burchard de Monte Sion (Burkhard von

Balby), which was printed as an appendix to the book. A striking detail is the relatively exact and emphasized depiction of the bay beside Acre, where most travelers by sea from Europe arrived to the Holy Land. The numerals that are written next to some place-names indicate the distance from Acre. As in the world map, regions and major towns are depicted in the form of molehills with miniatures on their tops. Jerusalem is located in the center and overemphasized through a schematic perspective view. Furthermore, the main roads (with small figures depicting travelers) are shown and also—in the form of miniatures of scenes—a few places where biblical events occurred, such as the revelation of God to Moses in the burning bush, the handing over of the Tables of the Law, and the Baptism and Crucifixion of Christ.

The *Rudimentum novitorum*, published in Latin, was intended only for the scholarly world, but two similar world maps had an entirely different objective. They were published as single-page woodcuts around 1480–1500 by the south German printers and woodcutters Hans Rüst and Hans Sporer.⁶⁴ The four rivers of Paradise and a T-O scheme are again recognizable. The T-O scheme is broken up by the names of numerous countries, islands,

58. Vatican City, Biblioteca Apostolica Vaticana (Pal. Lat. 1362b). See Konrad Kretschmer, “Eine neue mittelalterliche Weltkarte der vatikanischen Bibliothek,” *Zeitschrift der Gesellschaft für Erdkunde zu Berlin* 26 (1891): 371–406, reprinted in *Acta Cartographica* 6 (1969): 237–72. A facsimile was published in 1983 by the Belser AG, Zurich; the accompanying commentary never appeared. See Karl-Heinz Meine, “Zur Weltkarte des Andreas Walsperger, Konstanz 1448,” in *Kartenhistorisches Colloquium Bayreuth* ’82, ed. Wolfgang Scharfe, Hans Vollet, and Erwin Herrmann (Berlin: Reimer, 1983), 17–30.

59. Durand, *Map Corpus*, 209–13.

60. Today in the Stiftsbibliothek Zeitz; see Heinrich Winter, “A Circular Map in a Ptolemaic MS,” *Imago Mundi* 10 (1953): 15–22.

61. Tony Campbell, *The Earliest Printed Maps, 1472–1500* (London: British Library, 1987), 144–45; Anna-Dorothee von den Brincken, “Universalkartographie und geographische Schulkenntnisse im Inkunabelzeitalter (Unter besonderer Berücksichtigung des ‘Rudimentum novitorium’ und Hartmann Schedels),” in *Studien zum städtischen Bildungswesen des späten Mittelalters und der frühen Neuzeit*, ed. Bernd Moeller, Hans Patze, and Karl Stackmann (Göttingen: Vandenhoeck und Ruprecht, 1983), 398–429; and Wesley A. Brown, *The World Image Expressed in the Rudimentum novitorium* (Washington, D.C.: Geography and Map Division, Library of Congress, 2000).

62. Rodney W. Shirley, *The Mapping of the World: Early Printed World Maps, 1472–1700*, 4th ed. (Riverside, Conn.: Early World, 2001), 1–2 (no. 2).

63. Campbell, *Earliest Printed Maps*, 146; Eran Laor, comp., *Maps of the Holy Land: Cartobibliography of Printed Maps, 1475–1900* (New York: Alan R. Liss; Amsterdam: Meridian, 1986), 17 (no. 128); and Kenneth Nebenzahl, *Maps of the Holy Land: Images of Terra Sancta through Two Millennia* (New York: Abbeville Press, 1986), 60–62.

64. Campbell, *Earliest Printed Maps*, 79–84; Shirley, *Mapping of the World*, 5–8 (nos. 6–7); Leo Bagrow, “Rüst’s and Sporer’s World Maps,” *Imago Mundi* 7 (1950): 32–36; and Klaus Stopp, “The Relation between the Circular Maps of Hans Rüst and Hans Sporer,” *Imago Mundi* 18 (1964): 81.

and symbols for individual cities. Like the maps in the *Rudimentum novitorum*, the depiction is not close to topographic reality. But because the maps of Rüst and Sporer were published in German and due to their pictorial symbology, they were capable of transmitting geographical knowledge to the common man, provided he knew how to read.

A magnificent example of the lasting medieval tradition is a graded series of four circular map sketches in the *Superioris Germaniae Confoederationis descriptio* of 1479, a description of the Swiss Confederation: a cosmographical sketch with the giant Atlas and the earth as his heart; a classical T-O map indicating Asia, Africa, and Europe; the same T-O map, but with the field of Europe filled by a subordinate T-O scheme showing Gallia, Germania, and Italia divided by the Rhine, the Limmat, and the Alps; and a quartered map of Switzerland, with Mount Rigi in the center surrounded by the names of cantons.⁶⁵ The author was the Swiss humanist Albrecht von Bonstetten, a monk in the cloister of Einsiedeln who studied canon law at the University of Padua from 1471 to 1474.

The list may end with the *Peregrinatio in Terram Sanctam*, the first illustrated travelogue to be printed. It includes the account of the Mainz clergyman Bernard von Breydenbach's travel to Palestine; the original edition was published in 1486 in Mainz.⁶⁶ It is illustrated with woodcuts that have their origins in works by the artist Erhard Reuwich from the Low Countries, who accompanied Breydenbach on the trip. In addition to six views of harbors in the Levant, there is a pictorial map of the Bible Lands that reveals its author as a painter.⁶⁷ The non-metrical depiction is oriented east and shows the area between Damascus, Alexandria, and Mecca. The pilgrims leave the galleys in Acre and from there go a short distance to Jerusalem, whose oversized perspective view takes up more than a third of the entire sheet. In this city view, some details are quite realistic, as is revealed, for example, in the representation of the Dome of the Rock (Templum Salomonis). It is only on the sides that the print really turns into a map. The representation of Galilee, to which Breydenbach and Reuwich did not go, was compiled from other sources. The oversized but very detailed depictions of Cairo, Alexandria, and the Sinai massif were probably the result of sketches by Reuwich.

THE BEGINNINGS OF MAP PRINTING

Woodcutting was established in southern Germany in the middle of the fifteenth century at the latest. Around 1450, Johannes Gutenberg established in Mainz the first workshop for printing with movable lead type.⁶⁸ So it is not surprising that there were some early examples of map printing in the German lands, such as the small woodcut T-O map of the world printed in 1472 by Günter

Zainer,⁶⁹ the two woodcuts in the *Rudimentum novitorum* (1475), the maps by Rüst and Sporer, and the Ulm edition of Ptolemy's *Geography* issued by the printer Lienhart Holl in 1482.⁷⁰ The last was the first edition published outside Italy; its world map is the first map print signed by an artist, Johann Schnitzer;⁷¹ and it is the first edition with *tabulae modernae* (for Italy, Gaul, the Iberian Peninsula, Northern Europe, and Palestine) just like those in the Florentine edition that appeared in the same year. With this Ulm edition, German scholarship had easy access to the innovative techniques and data that marked the revolution in contemporary cartography. In 1462, at the harbor customs of Rome, a German merchant declared "50 sheets of painted paper, being 15 world maps."⁷² The combination of 50 sheets and 15 world maps is puzzling to reconstruct, but the shipment strongly suggests woodcut prints.

Johannes Regiomontanus established his own press during his Nuremberg years, and in 1474 he printed a program of works to be produced. In addition to two different annotated editions of Ptolemy's *Geography*, other maps were mentioned: "There will be made a description of the entire inhabited known world—which is commonly named world map [Mappam mundi]—and a special map of Germany and further maps of Italy, of Spain,

65. Claudius Sieber-Lehmann, "Albrecht von Bonstettens geographische Darstellung der Schweiz von 1479," *Cartographica Helvetica* 16 (1997): 39–46.

66. Hugh Wm. Davies, comp., *Bernhard von Breydenbach and His Journey to the Holy Land, 1483–4: A Bibliography* (London: J. and J. Leighton, 1911).

67. Ruthardt Oehme, "Die Palästina-Karte aus Bernhard von Breitenbachs Reise in das Heilige Land 1486," in *Aus der Welt des Buches: Festgabe zum 70. Geburtstag von Georg Leyh, dargebracht von Freunden und Fachgenossen* (Leipzig: O. Harrassowitz, 1950), 70–83; Campbell, *Earliest Printed Maps*, 93–95; Laor, *Cartobibliography*, 17 (no. 129); and Nebenzahl, *Maps of the Holy Land*, 63–66.

68. Albert Kapr, *Johannes Gutenberg: Persönlichkeit und Leistung* (Munich: C. H. Beck, 1987), and idem, *Johann Gutenberg: The Man and His Invention*, trans. Douglas Martin (Aldershot: Scolar Press, 1996).

69. Campbell, *Earliest Printed Maps*, 108; Shirley, *Mapping of the World*, 1 (no. 1); and see also David Woodward, "Medieval Mappae-mundi," in *HC* 1:286–370, esp. 301–2.

70. Campbell, *Earliest Printed Maps*, 135–38; Claudius Ptolemy, *Cosmographia* (Ulm, 1482), facsimile edition with a bibliographical note by R. A. Skelton (Amsterdam: Theatrum Orbis Terrarum, 1963); Karl-Heinz Meine, *Die Ulmer Geographia des Ptolemäus von 1482: Zur 500. Wiederkehr der ersten Atlasdrucklegung nördlich der Alpen*, exhibition catalog (Weissenhorn: A. H. Konrad, 1982).

71. Campbell, *Earliest Printed Maps*, 135 (no. 179), and Shirley, *Mapping of the World*, 9–11 (no. 10).

72. Arnold Esch and Doris Esch, "Die Grabplatte Martins V. und andere Importstücke in den römischen Zollregistern der Frührenaissance," *Römisches Jahrbuch für Kunstgeschichte* 17 (1978): 209–17, quotation on 217.



FIG. 42.2. FRAGMENT OF A PRINTED FIFTEENTH-CENTURY MULTISHEET WALL MAP OF THE WORLD. A modern pull from the only surviving woodblock of a multisheet circular world map (surrounded by a calendar) that was made around 1470, probably in southern Germany. The depicted lands were shown as inhabited by mythical tribes that were located by contemporary science in northern parts of Europe and Asia.

Size of the fragment: 11.5 × 20 cm. From Hans Albrecht Derschau, *Holzschmitte alter deutscher Meister in den Originalplatten*, 3 vols., ed. Rudolph Zacharias Becker (Gotha: R. Z. Becker, 1808–16), vol. 1, entry a2. Photograph courtesy of the Art Department, Free Library of Philadelphia.

of France, and of all Greece.”⁷³ The conclusion is clear: although this set of *tabulae modernae* never appeared, Regiomontanus apparently had all the technical knowledge and equipment to print such maps on a large format at least three years before the 1477 Bologna edition of the *Geography* was produced. An interesting detail is the note that such descriptions were “commonly” called *mappaemundi*. This suggests that world maps were a much more common medium in contemporary scientific life than the number of surviving examples may lead us to believe.

Also notable is a single woodblock showing a segment from the border of a circular medieval world map.⁷⁴ A surrounding three-column calendar ring has the dates from 5 to 31 March. The map fragment shows islands and part of a mainland that in medieval myths are located in the far north and east and inhabited by foreign tribes and fabulous people (fig. 42.2). A cautious reconstruction of the whole map suggests a diameter of about eighty to ninety centimeters, which may have required twenty to twenty-four woodblocks. There is no doubt that this map existed in printed form, and it would probably have been the largest printed map of the fifteenth century. The names in the calendar point to publication in southern Germany around 1470.

AN ITALIAN INTERLUDE

The cultural exchange across the Alps went in both directions. A highly important German contribution to the

early Italian Renaissance was the introduction of letterpress printing by two clergymen from the Rhineland: Konrad Sweynheim and Arnold Pannartz.⁷⁵ Probably instructed by Gutenberg’s successors at the Mainz workshop Fust-Schöffer, they established a press in the Benedictine cloister of Santa Scholastica in Subiaco (east of Rome) in 1465. In 1467, they moved to Rome, where they worked together until 1473. Sweynheim also experimented in the field of printing with copperplates. The results were the maps in the outstanding 1478 Rome edition of Ptolemy’s *Geography*.

NICOLAUS GERMANUS

The monk Nicolaus appears for the first time in the records of the cloister Reichenbach as the prior of the monastery in 1442.⁷⁶ Trained in cosmographical sciences, around 1460 he went to Italy, where he named himself Nicolaus Germanus.⁷⁷ He lived first in Florence, where he compiled astrological tables (around 1464) and in 1466 the first dated example of his revision of Ptolemy’s *Geography*. A few years later, he went to the papal court in Rome, where he made a horoscope (1471), a pair of globes, and a world map for the Vatican Library (1477). The last trace of him dates from 1488, when Conrad Celtis said he had met the “Benedictine monk Nicolaus

73. The original is reproduced in Ferdinand Geldner, *Die deutschen Inkunabeldrucker: Ein Handbuch der deutschen Buchdrucker des XV. Jahrhunderts nach Druckorten*, 2 vols. (Stuttgart: Hiersemann, 1968–70), 1:171 (no. 68). A modern transcription is given in Zinner, *Geschichte und Bibliographie*, 4–7. See also Campbell, *Earliest Printed Maps*, 215 (A6), and Leo Bagrow, “The Maps of Regiomontanus,” *Imago Mundi* 4 (1947): 31–32.

74. See Campbell, *Earliest Printed Maps*, 216 (B2), and a second example from the same block at <<http://www.maphist.nl/ill/1997626.htm>>.

75. Geldner, *Die deutschen Inkunabeldrucker*, 2:23. See also Gabriele Paolo Carosi, *Da Magonza a Subiaco: L’introduzione della stampa in Italia* (Busto Arsizio: Bramante, 1982).

76. The biography of Nicolaus Germanus is somewhat difficult to write because different Germans named Nicolaus were active in Italy at the same time. A summary of the sources is found in Józef Babicz, “Donus Nicolaus Germanus—Probleme seiner Biographie und sein Platz in der Rezeption der ptolemäischen Geographie,” in *Land- und Seekarten im Mittelalter und in der frühen Neuzeit*, ed. C. Koeman (Munich: Kraus International, 1980): 9–42; see also Robert W. Karrow, *Mapmakers of the Sixteenth Century and Their Maps: Bio-Bibliographies of the Cartographers of Abraham Ortelius, 1570* (Chicago: Published for the Newberry Library by Speculum Orbis Press, 1993), 255–65. A revised biography is given in Meurer, *Germania-Karten*, 13–14, using research by the German Benedictine Romuald Bauerreiß that has been overlooked by cartohistorical literature (for example, Romuald Bauerreiß, “War der Kosmograph Nikolaus de ‘Donis’ Benediktiner?” *Studien und Mitteilungen zur Geschichte des Benediktiner-Ordens und seiner Zweige* 55 [1937]: 265–73).

77. Established name forms such as “Donis (or ‘Donnus’) Nicolaus Germanus” or “Nicolaus Donis” are illogical. “Donis”/“donnaus” is an abbreviation for the Latin *dominus*, meaning, in this context, an ordained clergyman.

from Reichenbach” in Florence.⁷⁸ Celtis reported that the old man bitterly complained about the glory and profit that were taken by others from his work.⁷⁹

Nicolaus Germanus was the dominant figure in the reception of Ptolemy in the third quarter of the fifteenth century. It was he who gave the *Geography* the appearance that we associate with European humanism. His two important innovations were the use of dots or circles to mark the exact positions of localities and the trapezoidal projection for the twenty-six regional maps. In all, about fifteen manuscripts of the *Geography* exist that were either personally drawn by Nicolaus Germanus or immediately copied from him. They can be subdivided into three recensions: recension A (ca. 1460 to 1466), with twenty-seven Ptolemaic *tabulae antiquae* only; recension B (1466 to 1468), with twenty-seven *tabulae antiquae* and three *tabulae modernae* (for northern Europe, Spain, and France); and recension C (1468 to 1482), with twenty-seven *tabulae antiquae* and five *tabulae modernae* (for northern Europe, Spain, France, Italy, and Palestine). Except for the 1482 Florence edition, all fifteenth-century printed editions of the *Geography* were directly based on a manuscript by Nicolaus Germanus.

HENRICUS MARTELLUS

We do not have much concrete data on Henricus Martellus.⁸⁰ He was of German descent; his original name may have been Heinrich Hammer. He was active as a cartographer between about 1480 and 1496 in Florence, and his manuscript work can be divided into three groups: editions of Ptolemy’s *Geography*, of which two copies exist (the pre-1496 manuscript in Florence, with twelve highly important *tabulae modernae*, and an undated manuscript in the Vatican Library);⁸¹ the “Insularium illustratum,” an atlas of the Aegean Sea, in some copies augmented by a “Supplementum” with regional maps;⁸² and a wall map of the world of about 1490(?).⁸³

Henricus Martellus is still a much-underestimated figure in the history of early Renaissance cartography. He created innovative map images of the world by incorporating new data from recent Spanish and Portuguese expeditions. His importance in the regional cartography of Europe is based on the fact that his works have preserved information from original maps that are lost today. Martellus’s map designs were the models for some prints by the Florentine map publisher Francesco Rosselli. A manuscript from Henricus Martellus’s hand is also assumed to have been a main source for the epoch-making world map of 1507 by Martin Waldseemüller.

NICOLAUS CUSANUS AND HIS MAP OF CENTRAL EUROPE

Nicolaus Cusanus (Nikolaus of Kues, Nicolaus de Cusa; his original name was Nicholas Kryffts) was born in 1401

in Kues on the Mosel.⁸⁴ First educated at a school of the Brethren of the Common Life (probably in Deventer), he studied philosophy in Heidelberg (1416), canon law in Padua (1417–23),⁸⁵ and theology in Cologne (1425), where he also was ordained to the priesthood. A member of the Council of Basel since 1432, Cusanus entered the service of the Roman curia in 1436.⁸⁶ He was active as a papal legate in the difficult negotiations of the Holy See with the Byzantine Empire and the German sovereigns. In 1448, he was appointed cardinal, and in 1450 archbishop of Bressanone (in Tyrol), but continued his career in diplomacy. Cusanus died in 1464 in Todi (in Umbria); his

78. See Romuald Bauerreiß, “Ein Quellenverzeichnis der Schriften Aventins,” *Studien und Mitteilungen zur Geschichte des Benediktiner-Ordens und seiner Zweige* 50 (1932): 54–77 and 315–35, esp. 66 n. 144.

79. This precludes the identity of Nicolaus Germanus with the Florentine printer Niccolò Tedesco (Nicolaus Laurentii, Nicolaus Diocesis Vratislaviensis)—among his works is the 1482 Florentine edition of the *Geography*—as well as his descent from Silesia. A second argument is that just this Florentine edition does not follow the Germanus recension.

80. For a new summary, see Meurer, *Germania-Karten*, 78–80.

81. Florence, Biblioteca Nazionale (Cod. Magliab. Lat. CI.XIII.16), and Vatican City, Biblioteca Apostolica Vaticana (Cod. Vat. Lat. 7289).

82. Manuscripts of the “Insularium” only are in the BL (Cod. Add. 15750) and in Florence, Biblioteca Laurenziana (Plut. XXIX. Cod. 25). Manuscripts with the “Supplementum” added are in Chantilly, Bibliothèque du Musée Condé (MS. 698/483), and Leiden, Universiteitsbibliotheek (Cod. Voss. Lat. F. 23). A copy with texts only is in Bern, Burgerbibliothek (MS. 144/2).

83. New Haven, Yale University Library. From the exhaustive literature on this important map, see Ilaria Luzzana Caraci, “Il planisfero di Enrico Martello della Yale University Library e i fratelli Colombo,” *Rivista Geografica Italiana* 85 (1978): 132–43; Carlos Sanz, “Un mapa del mundo verdaderamente importante en la famosa Universidad de Yale,” *Boletín de la Real Sociedad Geográfica* 102 (1966): 7–46; and Alexander O. Vietor, “A Pre-Columbian Map of the World, circa 1489,” *Imago Mundi* 17 (1963): 95–96.

84. From the vast literature on Cusanus, introductory works include Gerd Heinz-Mohr and Willehad Paul Eckert, eds., *Das Werk des Nicolaus Cusanus: Eine bibliophile Einführung*, 3d ed. (Cologne: Wienand, 1981); Anton Lübke, *Nikolaus von Kues: Kirchenfürst zwischen Mittelalter und Neuzeit* (Munich: D. W. Callwey, 1968); Nikolaus Grass, ed., *Cusanus Gedächtnisschrift* (Innsbruck: Wagner, 1970); Erich Meuthen, *Nikolaus von Kues: Profil einer geschichtlichen Persönlichkeit* (Trier: Paulinus, 1994); Karl-Hermann Kandler, *Nikolaus von Kues: Denker zwischen Mittelalter und Neuzeit* (Göttingen: Vandenhoeck und Ruprecht, 1997); and Klaus Kremer, *Nikolaus von Kues (1401–1464): Einer der größten Deutschen des 15. Jahrhunderts*, 2d ed. (Trier: Paulinus, 2002). For a summary in English, see Henry Bett, *Nicholas of Cusa* (London: Methuen, 1932), and, more recently, F. Edward Cranz, *Nicholas of Cusa and the Renaissance*, ed. Thomas M. Izbicki and Gerald Christianson (Aldershot: Ashgate/Variorum, 2000). The Cusanus Institute at Trier University edits the annually issued journal *Mitteilungen und Forschungsbeiträge der Cusanus-Gesellschaft* (1961–).

85. A fellow student of Cusanus in Padua was the Florentine physician and cartographer Paolo dal Pozzo Toscanelli, the author of a lost map used by Columbus. It was a friendship for life; Toscanelli looked after Cusanus on his deathbed.

86. In Basel, Cusanus began a lifelong friendship with Enea Silvio de’ Piccolomini, later Pope Pius II.

body was buried in Rome, his heart in the Heilig-Geist-Hospital in Kues.

Besides his ecclesiastic functions, Nicolaus Cusanus was a polymath active in a wide range of humanistic learning, from philology to astronomy and from political science to Islamic studies. The core of his main philosophical work, *De docta ignorantia* of 1440, is a doctrine of the coincidence of differences that join together in infinity, that is, in God.⁸⁷ This final truth is unknowable by the human mind. Among his conclusions was, for instance, a revolutionary idea of the cosmos. Because the universe is infinite, it cannot have a center except for God; therefore, the earth cannot be the center of the universe. However, this anticipation of Copernicus's theory was based less on astronomical observations and calculations than on metaphysical speculation.⁸⁸

Cusanus also had a thorough knowledge of natural philosophy.⁸⁹ In 1434, he made a skillful proposal for a reform of the Julian calendar to the Council of Basel.⁹⁰ When he visited the imperial parliament in Nuremberg in 1444, he bought some astronomical manuscripts and three instruments, which probably originated in Prague.⁹¹ His library also included manuscripts of Ptolemy's *Geography* and of the *Itinerarium Antoninum*.⁹² His own writing on the subject, the treatise *De figura mundi* of ca. 1463, is unfortunately lost. Another main work, the *Idiota* dialogues of 1450, holds an important place in the history of the methodology of physics. It describes, for instance, experiments on the measuring of fever and pulse, on specific weights, and on the determination of atmospheric humidity with a ball of wool. At the end of the dialog, Cusanus proposed to collect physical measurements systematically and in various countries. He thought they should be "joined into the One [i.e., a book], for the hidden may become clearer."⁹³

Cusanus also has an outstanding position in the history of Western cartography as the author of the first modern map of central Europe. The characteristic feature of the Cusanus-type map is the depiction of the entire area between Flanders and the mouth of the Danube and between Jutland and the river Po. This regional concept may have been influenced by the Greek geographer Strabo, who wrote that "Celtic [i.e., Gallic and Germanic] tribes would inhabit the lands north of the Danube from the Rhine to the Dniepr." More likely, Cusanus included the Polish and Ukrainian lands because he had new geographical information on those regions.⁹⁴

Neither the original map of Cusanus nor any of his sources are known. However, very detailed analyses of map content and other related sources lead us to some definite conclusions. The genealogy of the related maps of central Europe becomes clearer if one accepts the existence of two archetypal versions: redactions A and B. Redaction A, or the Martellus redaction, begins with

three slightly differing manuscript maps revised by Henricus Martellus, and they are included as a *tabula moderna* in the Florence manuscript of Ptolemy and in the

87. For a general introduction to Cusanus's philosophy, see Kurt Flasch, *Nikolaus von Kues, Geschichte einer Entwicklung: Vorlesungen zur Einführung in seine Philosophie* (Frankfurt am Main: V. Klostermann, 1998), and Pauline Moffitt Watts, *Nicolaus Cusanus: A Fifteenth-Century Vision of Man* (Leiden: Brill, 1982). Among the standard works on selected fields are Kurt Flasch, *Die Metaphysik des Einen bei Nikolaus von Kues: Problemgeschichtliche Stellung und systematische Bedeutung* (Leiden: Brill, 1973); Hermann Schnarr, *Modi essendi: Interpretationen zu den Schriften De docta ignorantia, De coniecturis und De venatione sapientiae von Nikolaus von Kues* (Münster: Aschendorff, 1973); Paul E. Sigmund, *Nicholas of Cusa and Medieval Political Thought* (Cambridge: Harvard University Press, 1963); and Morimichi Watanabe, *The Political Ideas of Nicholas of Cusa* (Geneva: Droz, 1963).

88. Joseph Meurers, "Nikolaus von Kues und die Entwicklung des astronomischen Weltbildes," *Mitteilungen und Forschungsbeiträge der Cusanus-Gesellschaft* 4 (1964): 395–419, and Kurt Goldammer, "Nicolaus von Cues und die Überwindung des geozentrischen Weltbildes," *Beiträge zur Geschichte der Wissenschaft und Technik* 5 (1965): 25–41. There is another, somewhat mysterious and lesser known treatise by Cusanus on the subject. It includes a modified form of the Ptolemaic system, with the earth rotating around the polar axis and additionally around the equatorial axis.

89. Nicolaus Cusanus, *Die mathematischen Schriften*, trans. Josepha Hofmann, intro. and notes Joseph Ehrenfried Hofmann (Hamburg: Meiner, 1952); Rudolf Haubst, *Nikolaus von Kues und die moderne Wissenschaft* (Trier: Paulinus, 1963); Werner Schulze, *Zahl, Proportion, Analogie: Eine Untersuchung zur Metaphysik und Wissenschaftshaltung des Nikolaus von Kues* (Münster: Aschendorff, 1978); and Fritz Nagel, *Nicolaus Cusanus und die Entstehung der exakten Wissenschaften* (Münster: Aschendorff, 1984).

90. Nicolaus Cusanus, *Die Kalenderverbesserung: De correctione kalendarii*, ed. and trans. Viktor Stegemann and Bernhard Bischoff (Heidelberg: F. H. Kerle, 1955). The proposal of Cusanus included the omission of seven days in May 1439 and a reduction of the lunar cycle. The resulting decree did not pass the council.

91. The instruments are preserved with the rest of Cusanus's library in the Heilig-Geist-Hospital in Kues. In Nuremberg, Cusanus had purchased three instruments: a brass astrolabe, a torquetum, and a wooden celestial globe (diameter 27 cm) from the early fourteenth century, the oldest surviving nonantique globe of Western Christian culture. The collection in Kues also includes a brass celestial globe (diameter 16.5 cm), probably acquired by Cusanus in Italy. For detailed studies, see Johannes Hartmann, *Die astronomischen Instrumente des Kardinals Nikolaus Cusanus* (Berlin: Weidmann, 1919), and Alois Krchňák, "Die Herkunft der astronomischen Handschriften und Instrumente des Nikolaus von Kues," *Mitteilungen und Forschungsbeiträge der Cusanus-Gesellschaft* 3 (1963): 109–80.

92. About a century later, both manuscripts were used by Gerardus Mercator. Regarding Ptolemy, it seems to have been a manuscript of the *Geography* (without maps), which is today in the Vossius Collection of the Universiteitsbibliotheek in Leiden (Cod. Voss. Lat. 57). See Meurer, *Germania-Karten*, 76 and n. 35.

93. Author's translation after Nicolaus Cusanus, *Der Laie über Versuche mit der Waage*, ed. and trans. Hildegund Menzel-Rogner (Leipzig: Meiner, 1942), 45.

94. Meurer, *Germania-Karten*, 6. For a survey on older literature and research on Cusanus, see Campbell, *Earliest Printed Maps*, 35–55, and Karrow, *Mapmakers of the Sixteenth Century*, 129–37. The following is based almost entirely on new studies in Meurer, *Germania-Karten*, 71–131.



FIG. 42.3. CUSANUS MAP BY HENRICUS MARTELLUS, REDACTION A. The older version of the epoch-making map of central Europe by Nicolaus Cusanus, surviving in an adaptation by Henricus Martellus in his “*Insularium illustratum*” (Florence,

ca. 1490). Drawing with ink and watercolors on parchment. Size of the original: 33.5 × 51 cm. Musée Condé, Chantilly (MS. 698/483, fols. 127v–128r). Photograph courtesy of Réunion des Musées Nationaux / Art Resource, New York.

copies of Martellus’s “*Insularium*” in Chantilly and Leiden (fig. 42.3). Redaction B, or the Germanus redaction, is formed by the lost manuscript map that served as the model for the so-called Eichstätt map (fig. 42.4).

Excluding some additions by Martellus, redaction A was slightly earlier.⁹⁵ Cusanus probably began the compilation around 1450, at the latest, probably in Rome. Evidence suggests that the depiction of the Polish area was based on primary information by the humanist Jan Długosz, who visited the Holy See in 1449.⁹⁶ The reason the map was made was probably the inspection trip that Cusanus made by papal order through Upper and Lower Germany from December 1450 to April 1452. The fairly good depiction of Holsatia and the islands in the Baltic Sea is probably from Heinrich Pomert of Lübeck, who joined the service of Cusanus as a secretary only during that trip.⁹⁷ The map includes “*Wilsnack ad sanctum sanguinem*” in Brandenburg; the miracle of the bleeding host at Wilsnack received papal acceptance in 1453. There is also linguistic evidence: the use of an initial letter *b* instead of *w* (see the

names “*bormatia*” and “*bestfalia*” for Worms and Westphalia) is found most frequently in Bavarian and Tyrolean dialects. A scribe from Tyrol, where Cusanus lived after 1452, may have finished the original drawing of redaction A around 1455–60.⁹⁸ The major part of the topo-

95. These include additions in Flanders, Denmark, and Italy after *tabulae modernae* in contemporary editions of Ptolemy and a number of entries in Poland and Ukraine that are taken from a travel report (1473–77; printed in Venice, 1487) by the Venetian Ambassador Ambrosio Contarini. See Karol Buczek, *The History of Polish Cartography from the 15th to the 18th Century*, trans. Andrzej Potocki (1966; reprinted with new intro., notes, and bibliography Amsterdam: Meridian, 1982), 28.

96. Buczek, *Polish Cartography*, 26.

97. A first attempt toward a prosopography of the Cusanus circle is found in an appendix (“*Nachrichten über Familiaren des Nikolaus von Kues*”) to Erich Meuthen, *Die letzten Jahre des Nikolaus von Kues* (Cologne: Westdeutscher, 1958), 307–14.

98. This design was surely not drawn by Cusanus himself. Evidence is minor, but it includes significant errors, such as the entries of Lüneburger Heath (*Merica*) and the Dreieich Forest (*Hagen*) as towns.



FIG. 42.4. CUSANUS MAP BY NICOLAUS GERMANUS, REDACTION B (THE EICHSTÄTT MAP). The second, final version of the Cusanus map of central Europe. It was revised by Nicolaus Germanus and amended (especially in the north) with information from the cardinal's entourage. The engraving

of the copperplate (with all inscriptions punched) began in Rome in the 1470s, with several following stages (see fig. 42.6). The existing copies were printed in Basel from 1530 onward. Size of the original plate: ca. 40.3 × 55.2 cm. Photograph courtesy of the BL (Maps C.2.a.1).

graphical detail was undoubtedly based on the personal knowledge of Cusanus, who had traveled around the lands of the Holy Roman Empire. Immediate links to his biography are the entries of his birthplace Cusa on the Mosel and of S. Spirito, the location of Holy Ghost College of the University of Heidelberg, where Cusanus was exempt from the first year of his academic studies.

Redaction B is a compilation of other sources as well. There are not concrete parallels to maps from the first Viennese school, but Georg von Peurbach may have supplied information for the depiction of the Austrian area when he visited Rome during his sojourn in Italy from 1448 to 1451. Primary geographical information may have come from others; for instance, a certain Walter of Gouda is mentioned as having been around Cusanus in 1451; he could have provided the data for the fairly accurate depiction of the Low Countries.⁹⁹ The detailed and

somewhat oversized depiction of the lands of the Teutonic Order leads one to assume that Cusanus probably had a map of that area at his disposal.¹⁰⁰ Other evidence is the uncommon use of ecclesiastical functions instead of place-names (for example, Königsberg is labeled “Sambiensis ecclesia”). Cusanus's image of the area on the lower Danube and the Black Sea resembles that of contemporary Italian portolan charts. A distortion grid shows that this compilation of what were probably unrelated sources was quite successful (fig. 42.5).

99. Meuthen, *Die letzten Jahre*, 308.

100. The existence of such mapping is proved by sources of 1413 and 1421. See Eckhard Jäger, *Prussia-Karten, 1542–1810: Geschichte der kartographischen Darstellung Ostpreussens vom 16. bis 19. Jahrhundert* (Weissenhorn: A. H. Konrad, 1982), 28–34.

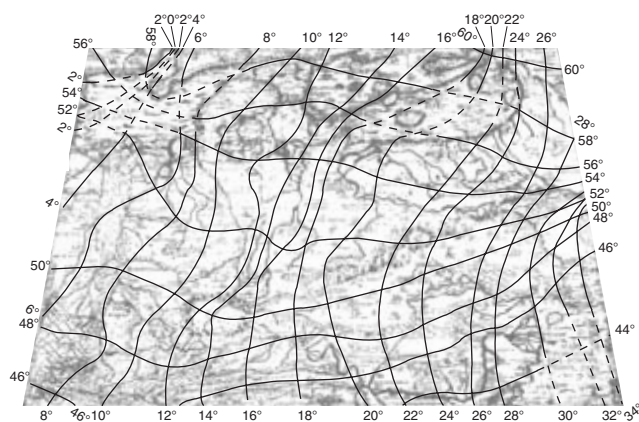


FIG. 42.5. DISTORTION GRID, CUSANUS MAP REDACTION B. Marking the modern course of meridians and parallels in the topographical image of the Eichstätt map gives an idea of the varying accuracy of the Cusanus map. The ideal form would have straight meridians and regularly curved parallels. Grave distortions are found particularly in the western and eastern parts. This is evidence for the composition of the map from different sources.

Based on Peter H. Meurer, *Corpus der älteren Germania-Karten: Ein annotierter Katalog der gedruckten Gesamtkarten des deutschen Raumes von den Anfängen bis um 1650*, text and portfolio (Alphen aan den Rijn: Canaletto, 2001), 85 (fig. 1-7).

Henricus Martellus gave the version of the map found in his “Insularium” to the Florentine publisher Francesco Rosselli to be printed around 1490.¹⁰¹ This Rosselli edition served as the model for the Schedel map and several Italian editions printed in the seventeenth century.¹⁰² An important derivative was the *tabula moderna* in the 1507 Rome edition of Ptolemy’s *Geography* by Marco Beneventano, the eastern part of which was revised by the great Polish cartographer Bernard Wapowski.¹⁰³

Redaction B has survived only in the form of a print of the Eichstätt map. Features such as the trapezoidal projection and the graticule show that the archetype was designed under the influence of Nicolaus Germanus, and we can easily imagine personal contacts with Cusanus in Italy (or perhaps just in Reichenbach). Redaction B is a development of redaction A, again using primary information. Much of it was probably collected by Cusanus during his travels in 1450–52. Other sources must have included his surroundings.¹⁰⁴ The extended depiction of Scandinavia is influenced by the *tabula moderna* based on Claudius Clavus in Germanus’s redactions of the *Geography*. Further details may have been added by Heinrich Pomert. The depicted part of Scotland corresponds to the Diocese of Dunkeld, and Thomas Levingston, the designated bishop of Dunkeld, was in the entourage of Cusanus from 1451 to 1459. A corrected, very detailed image of the area at the mouth of the Vistula could have come from Walter of Zoppot, who was the former secretary of Emperor Friedrich III and, in 1458, was men-

tioned as a chaplain of Cusanus. On the lower Rhine is shown the little town of Erkelenz, the home of Peter Wymars, the private secretary of Cusanus from about 1450 to 1464. The completion of redaction B can be dated to the first half of the 1460s.

The mysterious Eichstätt map was long regarded as the icon of incunabula map printing in Germany.¹⁰⁵ Only recent research has cleared up the true, fairly complicated history of the copperplate, which consists of the following five components: (1) an inscription stating that the scholar Konrad Peutinger from Augsburg had bought the plate and entrusted it for printing to Hans Burgkmair, (2) a hexameter text describing the map as extending from the northern lands to the mouth of the Rhône and the Peloponnesus and saying that Cusanus himself had ordered the engraving of this plate,¹⁰⁶ (3) a note on the “perfection of Eichstätt” on 21 July 1491,¹⁰⁷ (4) the map proper within the graticule, and (5) the extension of the map surface to the lower plate border (fig. 42.6).

The preparation of the copperplate was probably part of the experiments performed by Konrad Sweynheim in Rome around 1475. The same technique used for the maps in the 1478 Rome edition of Ptolemy’s *Geography* was employed: the linear elements were engraved, and the signatures of towns and all inscriptions were punched. In all, five plate states (or editions) can be reconstructed.¹⁰⁸ A first state shows only components 2 and 4, the inscription on the southern extension to Greece and the map within

101. Meurer, *Germania-Karten*, 105–6.

102. Meurer, *Germania-Karten*, 107–11 and 118–20 (including the reissue of a 1562 Bertelli plate by G. A. Remondini around 1670).

103. Meurer, *Germania-Karten*, 115–17. A detailed study of fresh copies reveals that this Marco Beneventano map was originally engraved as a very true copy of the Rosselli map. The essential corrections from Bernard Wapowski’s data were added by an exhaustive reworking of the copperplate.

104. See Meuthen, *Die letzten Jahre*.

105. Campbell, *Earliest Printed Maps*, 35–55, and Meurer, *Germania-Karten*, 90–105.

106. This is the sole concrete reference indicating that Cusanus was involved in making this map.

107. The original text reads: “EYSTAT ANNO SALVTIS 1491, XII KALENDIS AVGVSTI PERFECTVM.” This has been translated for more than a century as “Completed at Eichstätt the 12th day before the Calends of August 1491.” However, this translation would demand a locative = genitive form of “Eichstätt” that is definitely not discernible. If one regards “Eystat” as a nominative, the translation reads: “(The depiction of the territory of the bishopric of) Eichstätt was completed the 12th day before the Calends of August 1491.” This semicompletion includes the addition of abbreviations in small capital letters to some blank town symbols around Eichstätt, for instance, HER (Herrieden), GVN CZ (Gunzenhausen), PAP (Pappenheim) and S (Schwabach). For a detailed study, see Meurer, *Germania-Karten*, 97–100.

108. The first three states are not verified by extant copies. There was a sole surviving state four copy in the former Armeebibliothek in Munich, but it was lost in 1945. The five known copies are all state five; for the locations, see Campbell, *Earliest Printed Maps*, 52, and Meurer, *Germania-Karten*, 103.

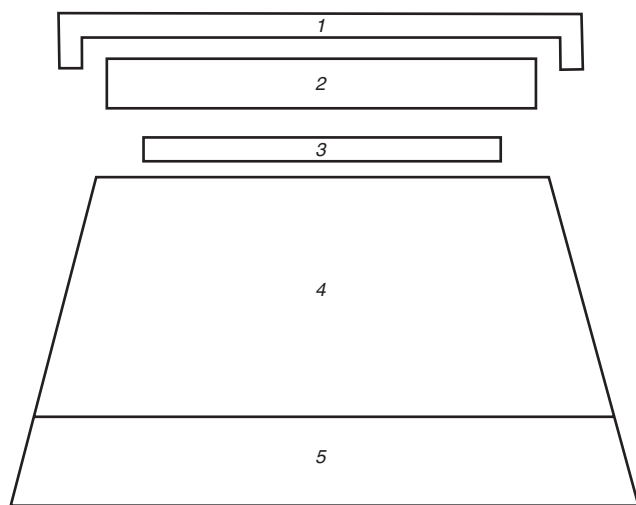


FIG. 42.6. THE COMPONENTS OF THE EICHSTÄTT MAP. Four or five stages of engraving can be distinguished with the Eichstätt map (fig. 42.4): the original trapezoidal map (1470s) (4); the extension of the map image further south beyond the graduation (1470s) (5); a hexameter text alluding to the authorship of Cusanus (together with 4) (2); an inscription on the “perfection of Eichstätt” in 1491 (3); and an inscription mentioning the purchase of the plate by Peutinger (around 1507), removed for the last impressions in 1530 (1). Based on Peter H. Meurer, *Corpus der älteren Germania-Karten: Ein annotierter Katalog der gedruckten Gesamtkarten des deutschen Raumes von den Anfängen bis um 1650*, text and portfolio (Alphen aan den Rijn: Canaletto, 2001), 91 (fig. 1-8).

the graticule, that is, the extension in the south up to Lake Geneva and the Adriatic Sea only. The names are missing from many town symbols. A second edition added component 5, an extension of the mapped surface farther south to Corsica and the Dardanelles when the difference between 2 and 4 was noticed.¹⁰⁹ In 1491, and still in Rome, the inscription that forms component 3 and the initials necessary to complete some blank signature lines in the Eichstätt area were added to a third version. Further details on this special edition are unknown. There may have been connections to the Eichstätt printer Georg Reyser or to the Eichstätt bishop Wilhelm von Reichenau, humanist and mentor to Emperor Maximilian II.¹¹⁰ A fourth edition came about in 1507 after the plate was taken from Italy to Augsburg either by the humanist Konrad Peutinger in 1491 or by the artist Hans Burgkmair.¹¹¹ In 1513–14, Peutinger and Burgkmair produced the first German edition, containing a small number of prints, as presents for humanist friends whose names appear among the sources in 1514. On this occasion, the inscription that constitutes component 1 was added. In 1530, a fifth edition, Peutinger’s plate—with this inscription again removed—was reprinted by the Basel printer Andreas Cratander. This edition was accompanied by a text by Sebastian Münster, *Germaniae atque aliarum regionum . . . descriptio . . . pro tabula Nicolai Cusae intelligenda excerpta*. The history of the plate after Peutinger’s death in

1547 is partially unclear. There is evidence that the map was still on the market around 1560.

JOHANNES RUYSCH

A later but illustrious figure was Johannes Ruysch.¹¹² He was born around 1470–75 in Utrecht, the son of a noble family, the lords of the dominion of Pijlsweerd. He studied from 1486 to 1489 at the University of Cologne. Ordained as a priest, he became a monk of the Benedictine cloister of Gross Saint Martin in Cologne and returned there in 1494. There he was active as a scribe and miniaturist. His latest known manuscript is dated 1500.¹¹³ Following this, Ruysch left the Cologne cloister. Certain sources record that he was a painter at the Vatican in Rome. He worked with Raphael at the decoration in the Stanze della Segnatura. In 1508 and 1509, Ruysch was paid for painting the papal library and other chambers.¹¹⁴

Meanwhile, the second issue of the 1507 Rome edition of Ptolemy’s *Geography* by Marco Beneventano appeared in 1508. It added a map of the world in a fan-shaped equidistant conic projection as a further *tabula moderna*.¹¹⁵ Among its innovative features were the first mapping of numerous entries on the east coast of North America, such as Terra Nova, Insula Baccalauras, and Baia de

109. However, the depiction of the Peloponnesus—which is mentioned in the hexameters at the top—also remains missing after this extension. This gives substance to a theory that there was a small second copperplate that is now lost. Such printing of the complete map on two sheets would help to explain the mysterious letters “P P I” at the very lower border of the present plate as an abbreviation of *per parallellum incidere* (cut off along the parallel).

110. Karrow has drawn attention to an engraving of the arms of Reichenau, which was probably made with the same punches (*Map-makers of the Sixteenth Century*, 134). The involvement of Reyser in this edition—probably as the co-publisher—is suggested by a miniature figure of a traveling man (i.e., *Reisender* in German).

111. Tilman Falk, *Hans Burgkmair: Studien zu Leben und Werk des Augsburger Malers* (Munich: Bruckmann, 1968).

112. The best biographical source is a contemporary necrology by the Cologne monk Hubert Holthuisen, published in Johann Hubert Kessel, *Antiquitates Monasterii S. Martini maioris Coloniensis* (Cologne: J. M. Heberle, 1862), 188–89. For more recent summaries, see A. J. van den Hoven van Genderen, “Jan Ruysch (ca. 1473–1533), monnik, schilder en ontdekkingsreiziger,” *Utrechtse biografieën* (Amsterdam: Boom, 1994–), 5:161–66, and Peter H. Meurer, “Der Maler and Kartograph Johann Ruysch (†1533),” *Geschichte in Köln* 49 (2002): 85–104.

113. Klara H. Broekhuijsen and Anne S. Korteweg, “Twee boekverluchters uit de Noordelijke Nederlanden in Duitsland,” in *Annus quadriga mundi: Opstellen over Middeleeuwse Kunst Opgedragen aan Prof. Dr. Anna C. Esmeijer*, ed. J. B. Bedaux (Zutphen: Walburg Pers, 1989), 49–76.

114. Bram Kempers, “Een pauselijke opdracht: Het proto-museum van Julius II op de derde verdieping van het Vaticaanse paleis,” in *Kunstenaars en opdrachtgevers*, ed. Harald Hendrix and Jeroen Stumpel (Amsterdam: Amsterdam University Press, 1996), 7–48.

115. Shirley, *Mapping of the World*, 25–27 (no. 25), and Carlos Sanz, *Bibliotheca Americana vetustissima: Últimas adiciones*, 2 vols. (Madrid: V. Suarez, 1960), 2:655–71.

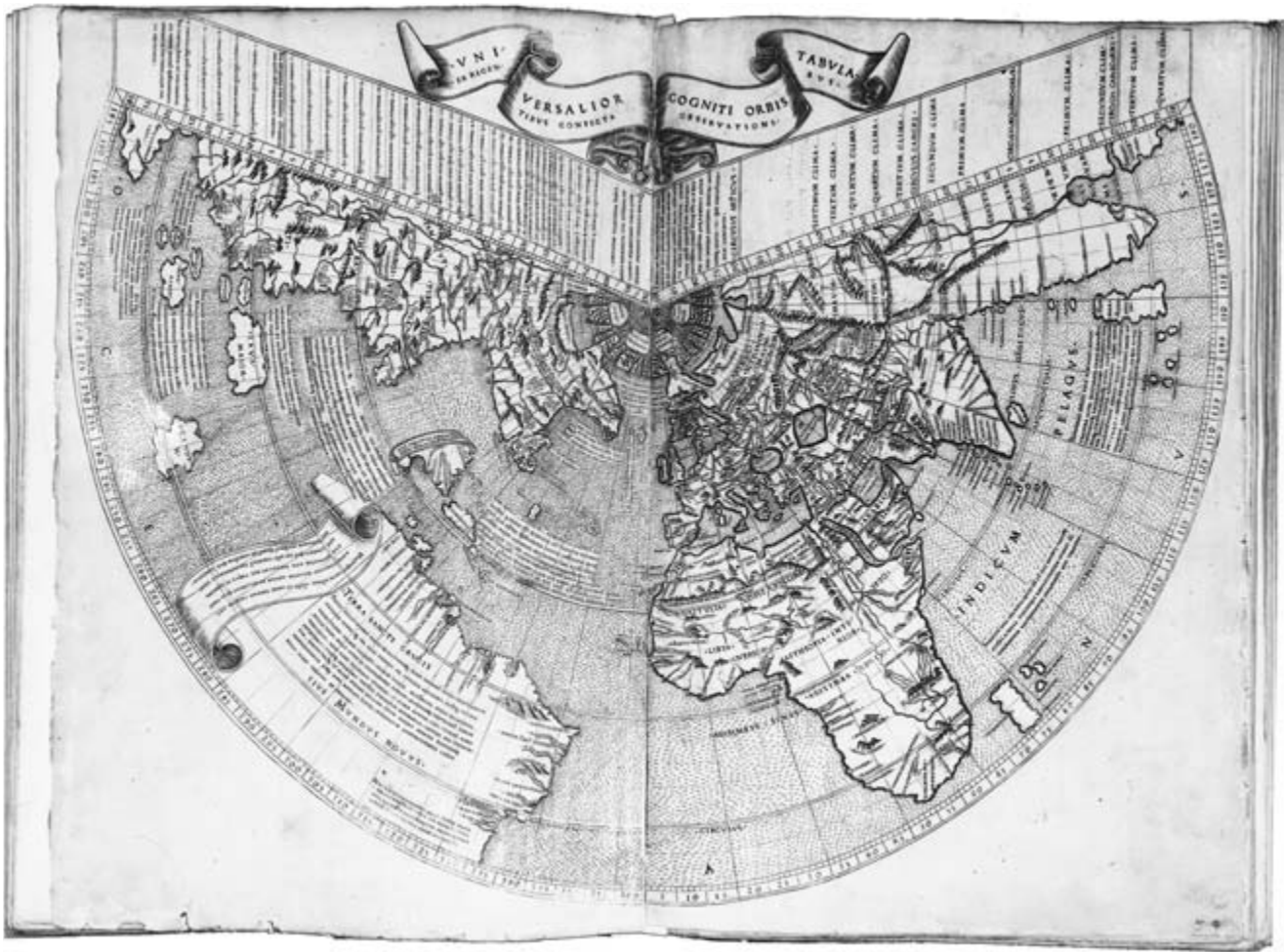


FIG. 42.7. THE RUYSCHE MAP. From the 1508 Rome edition of Ptolemy's *Geography*, this innovative world map shows the results of recent Portuguese discoveries in Asia and South America. The rather detailed depiction of New Foundland is

based on the author's own travel a few years earlier. Size of the original: ca. 41.7 × 54.1 cm. Photograph courtesy of the BL (Maps C.1.d.6).

Roccas, which was still shown as part of Asia (fig. 42.7). According to the book title, this map was elaborated by "Joannes Ruysch Germanus." It included recent results of English and Portuguese expeditions and a voyage that Ruysch himself had made from England to the west along the fifty-third parallel.

In retrospect, Ruysch must have gone from Cologne to England. There he seems to have participated in one of the somewhat mysterious Bristol expeditions in the North Atlantic that were made by English and Portuguese merchants in the first years of the sixteenth century.¹¹⁶ An ensuing sojourn in Portugal may have given Ruysch the occasion to collect further information used in the map.

Ruysch's biography after his years in Italy is unclear. He is said to have lived in Portugal again, instructing navigators in astronomy. When he was "weary of travels," he returned to Utrecht and afterward (ca. 1520–25?) to Cologne, where he reentered the monastery of Gross Saint Martin. Too frail for normal monastic life, he con-

structed "many pieces in his art," such as a planetary clockwork for the refectory.¹¹⁷ Ruysch died in 1533 of consumption. His cell with his instruments was for a long time famous in Cologne as the "Ruysch chamber." Two copies of his world map still existed in dependencies of Gross Saint Martin in the eighteenth century.

CARTOGRAPHY IN THE HEYDAY OF GERMAN HUMANISM

After Peurbach's death and Regiomontanus's departure, a certain stagnation in astronomical work took place at Vienna University. That school's role as an academic center for cosmographical studies in the German lands was

116. James Alexander Williamson, *The Cabot Voyages and Bristol Discovery under Henry VII* (Cambridge: Published for the Hakluyt Society at Cambridge University Press, 1962).

117. This report by Holthuisen in Kessel, *Antiquitates*, 188–89, has not been verified by Portuguese sources so far.



FIG. 42.8. CARTOGRAPHIC ILLUSTRATIONS IN CONRAD CELTIS'S BOOK OF LOVE POEMS. Illustrated in his *Quattuor libri amorum* (Nuremberg, 1502), this woodcut sketch gives a panoramic view of the area between the Rhine (left) and the Vistula (right) from the Danube (bottom) to the Arctic Ocean (north). Size of the original: 22 × 15 cm. Photograph courtesy of the Bildarchiv, Österreichische Nationalbibliothek, Vienna (c.p.2.c.18, fol. 57).

temporarily taken over by the University of Ingolstadt, founded in 1472 and with the first permanent lectureship at a German university from 1489.¹¹⁸ By analyzing the matriculation data, we can trace the origins of a number of subcenters back to Ingolstadt.

Of outstanding importance was the decade in which Conrad Celtis (Konrad Pickel) lectured at Ingolstadt.¹¹⁹ Celtis studied in Cologne and Heidelberg with Rudolf Agricola, and he taught poetry in Erfurt, Rostock, and Leipzig. In 1487, he was the first German poet laureate, crowned by the emperor. In 1487–89, he made a journey to Italy, afterward completing his mathematical and astronomical studies at the University of Cracow. In 1492, Celtis became a professor of poetry and rhetoric at the University of Ingolstadt. The printed version of his inau-

gural lecture there is one of the outstanding documents of the German history of ideas.¹²⁰ He presented a comprehensive national program of research and education, including a first outline of a projected “*Germania illustrata*,” a historical-geographical description in continuation of the classical writers patterned on Flavio Biondo’s “*Italia illustrata*.”¹²¹ The only result of this plan in Celtis’s lifetime was a volume printed in 1502 with the imprint of the “*Sodalitas Celtica*” in Nuremberg. It included the *Norimberga*, a poetic description of Nuremberg; the summary *Germania generalis*; and the *Quattuor libri amorum*, which contained love elegies in the form of a geographical-philosophical scheme and illustrated with four panoramas of central Europe (fig. 42.8).¹²² Such fragments make it possible to reconstruct the “*Germania illustrata*” project. Its subject was the ethnically defined “*Germania nova*,” the area in which Germanic tribes had settled. The project’s aim was a comprehensive historical, topographical, and ethnographical description to be arranged in four parts according to the four points of the compass.

In 1495, Celtis founded the “*Sodalitas Litteraria*” in Heidelberg on the model of the Florentine Academy, followed by a “*Sodalitas Augustana*” with his Augsburg humanist friend Konrad Peutinger.¹²³ Those two learned societies and further ones were regarded as parts of a “*Sodalitas Germaniae*.”¹²⁴ After Celtis’s death, the idea of a “*Germania illustrata*” as a national work on geography remained alive in German humanism. The *Brevis Germaniae descriptio* (Nuremberg 1512) by the schoolteacher Johannes Cochlaeus (Johann Dobneck) can be regarded as

118. Christoph Schöner, *Mathematik und Astronomie an der Universität Ingolstadt im 15. und 16. Jahrhundert* (Berlin: Duncker und Humblot, 1994).

119. Conrad Celtis, *Selections*, ed. and trans. and with commentary by Leonard Wilson Forster (Cambridge: Cambridge University Press, 1948), and Lewis William Spitz, *Conrad Celtis, the German Arch-Humanist* (Cambridge: Harvard University Press, 1957).

120. Conrad Celtis, *Oratio in gymnasio in Ingelstadio publice recitata cum carminibus ad orationem pertinentibus*, ed. Hans Rupprich (Leipzig: Teubner, 1932), and idem, *Selections*, 36–65.

121. Paul Joachimsmen, *Geschichtsauffassung und Geschichtsschreibung in Deutschland unter dem Einfluss des Humanismus* (Leipzig: Teubner, 1910; reprinted Aalen: Scientia, 1968), 155–95, and Meurer, *Germania-Karten*, 39–44.

122. For modern editions, see Conrad Celtis, *Quattuor libri Amorum secundum quattuor latera Germaniae: Germania generalis*, ed. Felicitas Pindter (Leipzig: Teubner, 1934); Albert Werminghoff, *Conrad Celtis und sein Buch über Nürnberg* (Freiburg: Boltze, 1921); and Oswald Dreyer-Eimbcke, “Conrad Celtis: Humanist, Poet and Cosmographer,” *Map Collector* 74 (1996): 18–21.

123. Erich König, *Peutingerstudien* (Freiburg: Herder, 1914), and Heinrich Lutz, *Conrad Peutinger: Beiträge zu einer politischen Biographie* (Augsburg: Die Brigg, 1958).

124. Tibor Klaniczay, “Celtis und die Sodalitas litteraria per Germaniam,” in *Respublica Guelpherbytana: Wolfenbütteler Beiträge zur Renaissance- und Barockforschung, Festschrift für Paul Raabe*, ed. August Buck and Martin Bircher (Amsterdam: Rodopi, 1987), 79–105.

a highly condensed version.¹²⁵ The idea and parts of the concept were more fully adopted by Sebastian Münster.¹²⁶

VIENNA: THE SECOND MATHEMATICAL
CIRCLE UP TO LAZIUS

In 1497, Celtis was called by Maximilian I to serve as professor of poetry and rhetoric at Vienna University. When he left Ingolstadt, he took some of his most capable students and collaborators with him. Among them were Johannes Stabius, a student (from 1482) and lecturer at Ingolstadt who was appointed professor of mathematics at Vienna in 1503;¹²⁷ Georg Tannstetter (Collimitius), a pupil of Celtis and Stabius in Ingolstadt (from 1497) who was made professor of astronomy in Vienna in 1503;¹²⁸ Johannes Aventinus, a student in Ingolstadt (from 1495) and in Vienna (from 1498) who later became the historiographer of the Bavarian court and author of the first map of Bavaria; and Sebastian von Rotenhan, a student in Ingolstadt (from 1496) and in Vienna (from 1502) who became a jurist and author of the first map of Franconia (1533).¹²⁹

In 1501, Celtis established the “Collegium Poetarum et Mathematicorum” at the university, the first scientific academy in the German lands and the core of what has been called the second Viennese school of mathematics.¹³⁰ Celtis himself was head of the philology and poetry class; the mathematics class was directed by Stabius. The historian Johannes Cuspinianus (Johann Spiesshaimer), affiliated with the university as a student (from 1491) and as a professor (from 1496), became a third congenial leader.¹³¹ In 1512, he was appointed imperial counselor and historiographer to Maximilian I.

During their years in Vienna in the first decade of the sixteenth century, the members of this Celtis circle were not very active in mapmaking.¹³² Celtis spent much time abroad, and Stabius’s important works appeared only during his years in Nuremberg. But other pupils and scholars were attracted and educated mainly by the engagement of Tannstetter. Several students who enrolled at Vienna University went on to earn names as cartographers. Lazarus de Stuhlweissenburg, who matriculated in 1512, may have been Lazarus Secretarius, the author of the first map of Hungary in cooperation with Cuspinianus and Tannstetter (1528). In 1513, Johann Scheubel enrolled, and from 1549 he was a professor of mathematics at Tübingen and author of a map of Württemberg (Tübingen, 1559).¹³³ Johannes Honter from Transylvania, who matriculated in 1515, was the author of the first map of Transylvania (Basel, 1532) and of the often-published schoolbook *Rudimenta cosmographica* with thirteen maps (first published in Cracow, 1530).¹³⁴ In 1519, Peter Apian enrolled; he would later take positions as printer and professor of mathematics at Ingolstadt.

The end of this second Viennese school is difficult to determine. If one includes the “Societas Collimitiana” (the circle formed by Tannstetter), its immediate influence can be traced until the 1560s. Four mapmakers can be linked with the next generation. The Tyrol-born Johann Putsch (Johannes Bucius), who studied in Italy and worked as a secretary to the later Emperor Ferdinand I,

125. Johannes Cochlaeus, *Brevis Germanie descriptio* (1512), mit der Deutschlandkarte des Erhard Etzlaub von 1512, ed., trans., and with commentary by Karl Langosch (Darmstadt: Wissenschaftliche Buchgesellschaft, 1960).

126. See p. 1211, note 249, in this chapter.

127. Grössing, *Humanistische Naturwissenschaft*, 170–74, and Helmut Grössing, “Johannes Stabius: Ein Oberösterreicher im Kreis der Humanisten um Kaiser Maximilian I.,” *Mitteilungen des Oberösterreichischen Landesarchivs*, 9 (1968): 239–64.

128. Grössing, *Humanistische Naturwissenschaft*, 181–85; Franz Stuhlhofer, “Georg Tannstetter (Collimitus): Astronom, Astrologe und Leibarzt bei Maximilian I. und Ferdinand I.,” *Jahrbuch des Vereins für Geschichte der Stadt Wien* 37 (1981): 7–49; and idem, *Humanismus zwischen Hof und Universität: Georg Tannstetter (Collimitus) und sein wissenschaftliches Umfeld im Wien des frühen 16. Jahrhunderts* (Vienna: WUV, 1996).

129. Walter M. Brod, “Frankens älteste Landkarte, ein Werk Sebastian von Rotenhan,” *Mainfränkisches Jahrbuch für Geschichte und Kunst* 11 (1959): 121–42; idem, “Opera geographica Sebastiani a Rotenhan,” *Berichte zur deutschen Landeskunde* 28 (1962): 95–122; and Karrow, *Mapmakers of the Sixteenth Century*, 453–56.

130. Grössing, *Humanistische Naturwissenschaft*, 145–70; for a general overview, see Kurt Mühlberger, “Die Universität Wien in der Zeit des Renaissance-Humanismus und der Reformation,” *Mitteilungen der Österreichischen Gesellschaft für Wissenschaftsgeschichte* 15 (1995): 13–42.

131. Hans Ankwicz-Kleehoven, *Der Wiener Humanist Johannes Cuspinian, Gelehrter und Diplomat zur Zeit Kaiser Maximilians I.* (Graz: H. Böhlau S. Nachf., 1959), and Karrow, *Mapmakers of the Sixteenth Century*, 138–41.

132. Only two students from that period are connected to the history of cartography. In 1499, Sigismund von Herberstein, imperial diplomat and author of an influential map of Russia (1546), matriculated, and in 1501 the Swiss philologist and geographer Joachim Vadianus was registered.

133. Scheubel became professor of mathematics in Tübingen in 1549. Among his works is an influential edition of Euclid’s *Elements* (first published in Augsburg in 1550); see Ulrich Reich, “Johann Scheubel (1494–1570): Geometer, Algebraiker und Kartograph,” in *Der “mathematicus”: Zur Entwicklung und Bedeutung einer neuen Berufsgruppe in der Zeit Gerhard Mercators*, ed. Irmgard Hantsche (Bochum: Brockmeyer, 1996), 151–82.

134. Honter studied in Vienna until 1525, afterward in Ingolstadt, Cracow, and Basel. He returned home to Braşov in Transylvania (today Romania), where he was active as a teacher, reformer, printer, and jurist. See Gernot Nussbächer, *Johannes Honterus: Sein Leben und Werk im Bild*, 3d ed. (Bucharest: Kriterion, 1978), and Gerhard Engelmann, *Johannes Honter als Geograph* (Cologne: Böhlau, 1982). Detailed analyses of the map of Transylvania are given in Hans Meschendörfer and Otto Mittelstrass, *Siebenbürgen auf alten Karten: Lazarus Tannstetter 1528, Johannes Honterus 1532, Wolfgang Lazius 1552/56* (Gundelshausen: Arbeitskreis für Siebenbürgische Landeskunde Heidelberg, 1996). For the *Rudimenta* editions and maps, see Meurer, *Germania-Karten*, 209–16, and Karrow, *Mapmakers of the Sixteenth Century*, 302–15. See also chapter 61 in this volume.



FIG. 42.9. EUROPE IN THE FORM OF A QUEEN, 1537. This unusual cartographic design by Johann Putsch may have had a didactic purpose. The anthropomorphic map would have helped students to memorize the situation of the different countries. Spain (the homeland of Charles V) formed the crowned head, the Italian and Danish Peninsulas were the two arms, and Bohemia (surrounded by mountains) was the heart of Europe. Size of the original: 63 × 42 cm. Photograph courtesy of the Tiroler Landesmuseum Ferdinandeum, Innsbruck.

was the author of the famous map of Europe in the form of a queen (1537) (fig. 42.9).¹³⁵ The engraver and surveyor Augustin Hirschvogel was born in Nuremberg and settled in Vienna from 1544. His works included a map of Upper Austria (1542, published only in 1584), a town plan of Vienna (1547, published in 1552), and a large map of Hungary (posthumously published in 1565).¹³⁶ The Hungarian Johannes Sambucus (János Zsámboki) began his studies in Vienna in 1543 and returned there as a professor in 1564 after decades of wanderings. He published maps of Transylvania (1566) and Hungary (1566 and 1571) in Vienna, and his maps of Friuli and Illyria appeared in the atlas of Abraham Ortelius.¹³⁷ Paul Fabricius (Paul Schmid) from Lusatia studied medicine in Vienna. An unedited atlas of map projections drawn in 1551 in Nuremberg is evidence for his early interest in

cartography. In 1553, Fabricius was appointed professor of mathematics at the University of Vienna. Among his many later, mainly astronomical, works is an archetypal map of Moravia, first published in 1569 in Vienna.¹³⁸

Wolfgang Lazius (Latz) began his studies in 1528 at Vienna University and finished them as a doctor of medicine at Ingolstadt in 1538.¹³⁹ In 1541, he was appointed professor of medicine at Vienna, and a few years later he became the personal physician of Ferdinand I. These positions made it possible for him to lead a classical humanist life with extensive traveling to collect material, mainly for the historical-geographical description of Austria and the Habsburg dynastic territories. He produced a general map of Austria printed in 1545, probably as a wall map of eight sheets,¹⁴⁰ followed by two undated separate maps showing the Habsburg lands in the Sundgau and in Bavaria¹⁴¹ and, in 1556, a wall map of Hungary.¹⁴² His main work was *Typi chorographici Provinciarum: Austriae* (Vienna, 1561), an atlas with a corresponding book, *Commentarii rerum Austriacarum*, that remained unfinished.¹⁴³ The atlas includes eleven maps probably etched by Lazius himself. Although they were based on his own regional knowledge, they were certainly not the result of exact surveys. The style of depiction is still very pictorial.

135. Karrow, *Mapmakers of the Sixteenth Century*, 447–48. *Europa Regina* maps are illustrated and described by H. A. M. van der Heijden in *De oudste gedrukte kaarten van Europa* (Alphen aan den Rijn: Canaletto, 1992), 118–35.

136. Karrow, *Mapmakers of the Sixteenth Century*, 294–301.

137. Karrow, *Mapmakers of the Sixteenth Century*, 457–63.

138. We have no detailed study of Fabricius. For a summary, see Peter H. Meurer, *Fontes cartographici Orteliani: Das "Theatrum orbis terrarum" von Abraham Ortelius und seine Kartenquellen* (Weinheim: VCH, Acta Humaniora, 1991), 142–43.

139. Lazius, *Karten der österreichischen Lande*; Hans Kinzl, "Das kartographische und historische Werk des Wolfgang Lazius über die österreichischen Lande des 16. Jahrhunderts," *Mitteilungen der Österreichischen Geographischen Gesellschaft* 116 (1974): 194–201; and Karrow, *Mapmakers of the Sixteenth Century*, 334–43.

140. The history of this work is complicated. A secondary source reports that a Lazius map of Austria and Stiria was published in 1545 in Nuremberg. Other sources mention a map of Austria only, printed the same year in Vienna. Fragments of the latter may be three map sheets in the BNF; for a short description see Marcel Destombes, "Cartes, globes et instruments scientifiques allemands du XVI^e siècle à la Bibliothèque Nationale de Paris," in *Land- und Seekarten im Mittelalter und in der frühen Neuzeit*, ed. C. Koeman (Munich: Kraus International, 1980), 43–68, esp. 50–51 (no. 26 and pls. 5–7). A later revision was posthumously edited in 1620 by the Austrian-born mathematician Matthias Bernegger in Strasbourg (*Austriae Chorographia autore Wlfg. Lazio*, 3 sheets); copies are in the BL and in Karlsruhe, Badische Landesbibliothek.

141. A detailed study is presented by Florio Banfi in "Maps of Wolfgang Lazius in the Tall Tree Library in Jenkintown," *Imago Mundi* 15 (1960): 52–65.

142. See figure 61.13.

143. Wolfgang Lazius, *Austria, Vienna 1561*, facsimile edition, intro. Ernst Bernleithner (Amsterdam: Theatrum Orbis Terrarum, 1972).

NUREMBERG AS A CENTER OF MAPMAKING
AND THE ETZLAUB MAPS

Nuremberg, one of the commercial and cultural metropolises of the Holy Roman Empire, was not an academic center in the age of humanism.¹⁴⁴ Nevertheless, there are three reasons this city became one of the great centers of mapmaking early in the German Renaissance.¹⁴⁵ First, qualified instrumentmakers lived there, practicing a long and highly developed artisan tradition. Hence, people had experience collecting and calculating astronomical data, such as for the determination of latitude. Celestial observations had been documented in Nuremberg since the middle of the fourteenth century. Second, because of Nuremberg's position as a center of commerce with far-reaching connections, a lot of geographical information reached the city. These commercial activities also demanded a great deal of information and planning media. Third, wealthy and educated merchants had humanistic-scientific interests and also sponsored the works of artists and scholars.

Thus, an independent mapmaking milieu that was largely based on local traditions developed in Nuremberg. Of course, this did not occur in complete isolation; the manuscripts and instruments bought by Nicolaus Cusanus in 1444 are evidence for the high standard and wide dissemination of cosmographical learning in the late Middle Ages. For example, Johannes Regiomontanus's sojourn with Bernhard Walther from 1471 to 1475 is evidence of a link between Nuremberg and the Viennese circle. At the beginning of the sixteenth century, there was probably no other locality in the West in which research and publishing activities covered the whole spectrum of contemporary mapmaking.

The reception of Ptolemy's *Geography* in Nuremberg can be traced back to, at the latest, the editions intended for printing by Regiomontanus in 1474. A slightly later example is the rather mysterious "German Ptolemy" (Nuremberg, ca. 1493?), a collection of excerpts from various classical writers.¹⁴⁶ It was illustrated with an early modern world map, the first printed map on a globular projection.¹⁴⁷ The Nuremberg priest and astronomer Johannes Werner, who studied in Ingolstadt from 1484 to 1492, published an annotated edition of the *Geography*—without maps—as part of an anthology (Nuremberg: Johannes Stuchs, 1514).¹⁴⁸ And the Nuremberg merchant and polymath Willibald Pirckheimer, one of the sponsors of Albrecht Dürer, worked very intensively on a new translation of the *Geography* from Greek, which became the basis for the Strasbourg edition of 1525.¹⁴⁹

The late fifteenth century saw, within one decade, three outstanding and innovative Nuremberg contributions to the description of the world. The merchant Martin Behaim, the son of a Nuremberg patrician family, lived from

1484 in Portugal, where he was associated with the Junta de Matematicos, and he also participated in several sea voyages.¹⁵⁰ In 1492–94, during a stay in his hometown, he constructed the first preserved terrestrial globe by order of the Nuremberg council. The illumination was done by the painter, woodcutter, and publisher Georg Glockendon the Elder.¹⁵¹ Behaim's pre-Columbian world was based on a Ptolemaic world map (probably that of the 1482 Ulm edition) supplemented by more recent sources. The depiction of central Europe followed the Cusanus map, details in Asia were derived from Marco Polo and John Mandeville, and entries on the west coast of Africa reflected firsthand information from Portugal.

In 1493, the *Nuremberg Chronicle* (*Liber chronicarum*), called "the greatest book project of the Dürer era,"

144. For a general overview, see *Gothic and Renaissance Art in Nuremberg, 1300–1550*, exhibition catalog (Munich: Prestel, 1986). The Nuremberg patriciate founded the *schola nobilis* in the nearby Altdorf in 1575. It became an academy in 1578 and a university only in 1623.

145. The fundamental work is Pilz, *Astronomie in Nürnberg*. See also Fritz Schnellbögl, *Dokumente zur Nürnberger Kartographie*, exhibition catalog (Nuremberg: Stadtbibliothek, 1966).

146. For an annotated reprint, see Josef Fischer, ed., *Der "Deutsche Ptolemäus" aus dem Ende des XV. Jahrhunderts (um 1490)* (Strasbourg: Heitz, 1910). The dating is discussed by Walther Matthey, "Wurde der 'Deutsche Ptolemäus' vor 1492 gedruckt?" *Gutenberg Jahrbuch* 36 (1961): 77–87.

147. Figure 9.8; Campbell, *Earliest Printed Maps*, 139–41; Shirley, *Mapping of the World*, XII and 14 (no. 16); and Erwin Rosenthal, "The German Ptolemy and Its World Map," *Bulletin of the New York Public Library* 48 (1944): 135–47.

148. Pilz, *Astronomie in Nürnberg*, 132–44, and Siegmund Günther, "Johann Werner aus Nürnberg und seine Beziehungen zur mathematischen und physischen Erdkunde," in *Studien zur Geschichte der mathematischen und physikalischen Geographie* (Halle: L. Nebert, 1879), 277–332.

149. The standard work on Pirckheimer is Willehad Paul Eckert and Christoph von Imhoff, *Willibald Pirckheimer, Dürers Freund: Im Spiegel seines Lebens, seiner Werke und seiner Umwelt*, 2d ed. (Cologne: Wienand, 1982). See also Max Weyrauther, *Konrad Peutinger und Willibald Pirckheimer in ihren Beziehungen zur Geographie* (Munich: T. Ackermann, 1907).

150. All literature is superseded by *Focus Behaim Globus*, 2 vols. (Nuremberg: Germanisches Nationalmuseum, 1992). See also Ernest George Ravenstein, *Martin Behaim: His Life and His Globe* (London: George Philip and Son, 1908).

151. The Behaim globe is today in Nuremberg, Germanisches Nationalmuseum (diameter 51 cm); see figure 6.4. On the complicated physical construction of the globe—which consists of various layers of leather, linen laminate, parchment, and paper—see Bernd Hering, "Zur Herstellungstechnik des Behaim-Globus," and on Glockendon, see Ursula Timann, "Der Illuminist Georg Glockendon, Bemaler des Behaim-Globus," both in *Focus Behaim Globus*, 2 vols. (Nuremberg: Germanisches Nationalmuseum, 1992), 1:289–300 and 1:273–78. Some hints about earlier fifteenth-century globes have been assembled by Philine Helas in "'Mundus in rotundo et pulcherrime depictus: Nunquam sistens sed continuo volvens': Ephemere Globen in den Festinszenierungen des italienischen Quattrocento," *Der Globusfreund* 45–46 (1998): 155–75.

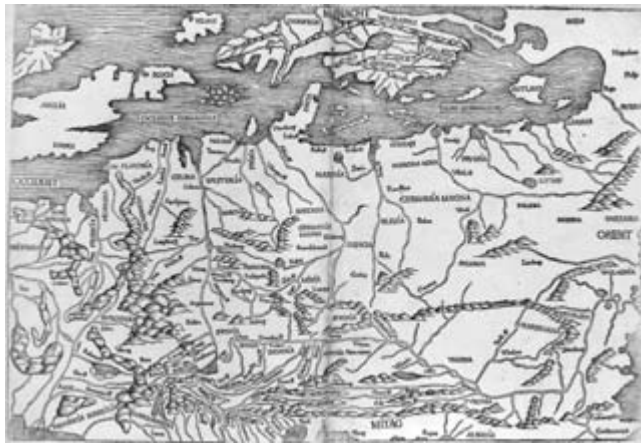


FIG. 42.10. MAP OF CENTRAL EUROPE IN THE *NUREMBERG CHRONICLE*. The authorship of this woodcut map in Hartmann Schedel's chronicle is attributed to Hieronymus Münzer. The central area was copied from an early Italian print of the Cusanus map, redaction A. The outer areas were drawn after models in the 1482 Ulm edition of Ptolemy's *Geography*.

Size of the original: ca. 39.4 × 58.4 cm. Photograph courtesy of Special Collections and Rare Books, Wilson Library, University of Minnesota, Minneapolis.

was published.¹⁵² A milestone in the history of German science and printing, it was the first historical-geographical description of the whole world, newly elaborated in the age of humanism. Its sources stretched from the Bible to contemporary leaflets. Problems in layout and printing—combining letterpress and woodcuts on the same page—were overcome for the first time. Among the illustrations were thirty-two double-sheet town views, which were fairly realistic, and eighty-four smaller views of other towns, which were more fantastic.¹⁵³ The work included two double-sheet maps: a Ptolemaic world map copied from a 1482 Venice edition of Pomponius Mela, and a map of central Europe (fig. 42.10) based on the Rosselli map after Cusanus and Martellus and enlarged in the north and the west from *tabulae antiquae* and *tabulae modernae* in the 1482 Ulm edition of the *Geography*.¹⁵⁴

The *Nuremberg Chronicle* was a collective achievement of a congenial group of Nuremberg humanists. The project was financed by the merchants Sebastian Kammermeister and Sebald Schreyer. The general editor and main author of the text was the physician and bibliophile Hartmann Schedel,¹⁵⁵ and the widely traveled physician Hieronymus Münzer is regarded as the author of the two maps.¹⁵⁶ The woodcuts were made in the workshop of Michael Wolgemut, probably in collaboration with the young Albrecht Dürer, and the work was printed in the famous shop of Anton Koberger. This lavish book appeared in both Latin and German editions the same year. Moreover, some pirate editions in reduced format were issued by the Augsburg printer Johann Schönsperger in German and Latin from 1496 onward.¹⁵⁷

Another important step toward the popularization of cartography is linked with Erhard Etzlaub.¹⁵⁸ Born in Erfurt about 1460 and educated at the university there, Etzlaub lived in Nuremberg from 1484. He was active in many professions as a maker of portable sun compasses,¹⁵⁹ surveyor, physician, and author of calendars and horoscopes. Only secondary sources mention Etzlaub as the cartographic author of printed road maps issued by the printer and publisher Georg Glockendon. Their collaboration started with a map of the environs of Nuremberg, the first printed regional map in the German area.¹⁶⁰ Its selection of towns, however, shows striking parallels with the data of the Fridericus map.¹⁶¹ Two innovative and influential maps of central Europe followed: the *Rom Weg* map, first published for the Holy Year 1500 and showing the main routes from central Europe to Rome (plate 44),¹⁶² and the *Lantstrassen* map, first pub-

152. Elisabeth Rücker, *Die Schedelsche Weltchronik: Das größte Buchunternehmen der Dürer-Zeit* (Munich: Prestel, 1973), with a much enlarged edition under the same title (Munich: Prestel, 1988), and Adrian Wilson, *The Making of the Nuremberg Chronicle* (Amsterdam: Israel, 1976).

153. For their annotated edition, see Werner Kreuer, ed., *Imago civitatis: Stadtbildsprache des Spätmittelalters* (Essen, 1993).

154. See Campbell, *Earliest Printed Maps*, 152–59 (nos. 219–20); Shirley, *Mapping of the World*, 8 and 18–19 (nos. 8 and 19); and Meurer, *Germania-Karten*, 107–11.

155. Pilz, *Astronomie in Nürnberg*, 102–3; much more than is indicated by its title is covered in Béatrice Hernad, *Die Graphiksammlung des Humanisten Hartmann Schedel*, exhibition catalog (Munich: Prestel, 1990).

156. Pilz, *Astronomie in Nürnberg*, 111–13, and Ernst Philip Goldschmidt, *Hieronymus Münzer und seine Bibliothek* (London: Warburg Institute, 1938).

157. The Schönsperger editions are treated in several articles in Stephan Füssel, ed., *500 Jahre Schedelsche Weltchronik* (Nuremberg: Carl, 1994). See also Campbell, *Earliest Printed Maps*, 154–56 (nos. 221–22), and Meurer, *Germania-Karten*, 112–14.

158. See Campbell, *Earliest Printed Maps*, 56–69; Meurer, *Germania-Karten*, 133–229; Fritz Schnellbögl, “Life and Work of the Nuremberg Cartographer Erhard Etzlaub (†1532),” *Imago Mundi* 20 (1966): 11–26; and Herbert Krüger, “Des Nürnberger Meisters Erhard Etzlaub älteste Straßenkarten von Deutschland,” *Jahrbuch für fränkische Landesforschung* 18 (1958): 1–286 and 379–407.

159. A sun compass (in Latin, *horologium*) is a combination of a sundial and a normal magnetic compass. A sundial made by Etzlaub in 1513 has an engraved map of Europe and Africa on its lid that has increasing latitudinal divisions like those of the Mercator projection of 1569. For an explanation of this pseudo-anticipation and its mathematical foundation, see Wilhelm Krücken, “Wissenschaftsgeschichtliche und -theoretische Überlegungen zur Entstehung der Mercator-Weltkarte 1569 AD USUM NAVIGANTIIUM,” *Duisburger Forschungen* 41 (1994): 1–92, esp. 22–24.

160. Campbell, *Earliest Printed Maps*, 56–58.

161. Alfred Höhn, “Franken in der Nürnberg-Karte Etzlaubs von 1492 und die Daten des Codex Latinus Monacensis 14583,” *Speculum Orbis* 3 (1987): 2–8.

162. Campbell, *Earliest Printed Maps*, 59–69 (describing two different woodblocks that may have been used at the same time); Meurer, *Germania-Karten*, 143–47; and Herbert Krüger, “Erhard Etzlaub's *Romweg* Map and Its Dating in the Holy Year of 1500,” *Imago Mundi* 8 (1951): 17–26.

lished in 1501 and showing the main trade routes in central Europe (fig. 42.11).¹⁶³

A distortion grid shows that both Etzlaub maps were constructed on an equirectangular projection (for the *Rom Weg* map, see fig. 42.12).¹⁶⁴ Moreover, two different levels of accuracy can be distinguished. Italy, France, and northern Europe were copied from the respective *tabulae modernae* in the 1482 Ulm edition of Ptolemy's *Geography*. The central parts of both maps are differently generalized versions of the same base material, the sources of which are unknown. They represent the sum of knowledge about topography and roads as it had come together over the years in the trading center of Nuremberg. The lateral scale of latitudes shows interesting interpolations between Ptolemaic coordinates and contemporary observations. The Etzlaub maps were multifunctional, and the multiple functions were explained in the text on the maps as well as on separate sheets.¹⁶⁵ More than seven hundred mapped locations are marked by circles. Additional stylized silhouettes indicate capitals and—in the *Rom Weg* map only—further places of pilgrimage. The courses of roads are marked by dotted lines, in which each interval between two dots represents one mile. Distances apart from the road system can be measured with the help of dividers and a mile scale in the lower margin. With the help of the sun compass printed below (regarding the magnetic declination) and a real sun compass, each map can be exactly oriented to the south to determine the direction of travel. This use in conjunction with a sun compass is the reason the Etzlaub maps as well as some other German map prints of the early sixteenth century are oriented south. A scale in the right margin gives the duration of daylight at the height of summer. The coloring follows language areas; territorial boundaries are disregarded.

The entirely unpolitical character of the original Etzlaub maps was abandoned by some later cartographers. For instance, the Augsburg publisher and woodcutter Georg Erlinger issued an adoption of the *Lantstrassen* map, but it was surrounded by the arms of the imperial estates.¹⁶⁶ An interesting combination of the various trends in mapmaking is the *tabula moderna* of Germany in the 1513 Waldseemüller edition of the *Geography*. Its topographical detail was taken from Etzlaub, while the latitudes, the orientation to the north, and the strict demarcation of the area (by the North and Baltic Seas, the Alps, and the rivers Maas and Vistula) were elements of the academic-humanist cartography after Ptolemy.

Scientific work in Nuremberg gained new impetus from Johannes Stabius, who lived there from 1512 to 1518 and collaborated with Albrecht Dürer and Johannes Werner.¹⁶⁷ In 1515, Dürer and Stabius published the first known printed celestial map of the West.¹⁶⁸ The two sheets show the northern and southern ecliptic hemispheres in a polar stereographic projection. The models were drawn in 1503 by the Nuremberg priest and astronomer Con-

rad Heinfogel, based on Ptolemy's *Almagest* and various fifteenth-century sources.¹⁶⁹ Also in 1515, Dürer and Stabius published an accompanying world map in a distorted globular horizontal projection; the map image is essentially a copy of the Behaim globe.¹⁷⁰ In an anthology of 1514, Werner published the treatise *Libellus de quatuor terrarum orbis in plano figurationibus* in his *Noua translatio primi libri Geographiae Cl. Ptolemæi* . . . It includes, among other things, a description of three variants of the decorative cordiform (heart-shaped) conic projection.¹⁷¹ The principles were calculated by Stabius on the basis of the second projection of Ptolemy.¹⁷² It was used for many world maps in the first half of the sixteenth century.¹⁷³

The Nuremberg tradition in globemaking was continued by Johannes Schöner.¹⁷⁴ He was originally a Catholic priest in Franconia. In 1515, his first pair of globes appeared, cut and printed with his own hands. The terrestrial globe was based on the earth view of Waldseemüller, but enriched with a circumpolar continent at the south pole. Schöner converted to Protestantism in 1526 and became a teacher of mathematics at the gymnasium in

163. Meurer, *Germania-Karten*, 148–50.

164. I doubt the assertions of Brigitte Englisch in “Erhard Etzlaub's Projection and Methods of Mapping,” *Imago Mundi* 48 (1996): 103–23. Her reconstructions result in a nonequidistant projection with a shifting scale, which does not make sense for a road map.

165. Meurer, *Germania-Karten*, 144 and 149 (figs. 2-7 and 2-9); see also Catherine Delano-Smith, “Cartographic Signs on European Maps and Their Explanation before 1700,” *Imago Mundi* 37 (1985): 9–29.

166. Meurer, *Germania-Karten*, 163–66.

167. Pilz, *Astronomie in Nürnberg*, 132–44.

168. Deborah Jean Warner, *The Sky Explored: Celestial Cartography, 1500–1800* (New York: Alan R. Liss, 1979), 71–75.

169. W. Voss, “Eine Himmelskarte vom Jahre 1503 mit den Wahrzeichen des Wiener Poetenkollegiums als Vorlage Albrecht Dürers,” *Jahrbuch der Preussischen Kunstsammlungen* 64 (1943): 89–150. The two drawings by Heinfogel are in the Germanisches Nationalmuseum, Nuremberg (Hz. 5576). On Heinfogel, see Pilz, *Astronomie in Nürnberg*, 148–55.

170. Figure 10.3; Shirley, *Mapping of the World*, 44–45 (no. 39); Günther Hamann, “Die Stabius-Dürer-Karte von 1515,” *Kartographische Nachrichten* 21 (1971): 212–23; and idem, “Der Behaim-Globus als Vorbild der Stabius-Dürer-Karte von 1515,” *Der Globusfreund* 25–27 (1978): 135–47. The woodblocks of all three Dürer maps are preserved in Vienna, Graphische Sammlung Albertina.

171. John Parr Snyder, *Flattening the Earth: Two Thousand Years of Map Projections* (Chicago: Chicago University Press, 1993), 33–38, and George Kish, “The Cosmographic Heart: Cordiform Maps of the 16th Century,” *Imago Mundi* 19 (1965): 13–21.

172. To distinguish these cordiform maps from the similar second projection of Ptolemy, note that the meridians in the Stab-Werner projection converge at both poles.

173. For example, Shirley, *Mapping of the World*, 51–53, 68–69, 72–73, 93–95, 97–98, 114–19, 123 and 126, and 129–33 (nos. 45, 63, 66, 82, 86, 101–3, 108, and 114).

174. Pilz, *Astronomie in Nürnberg*, 177–93, and Norbert Holst, *Mundus, Mirabilia, Mentalität: Weltbild und Quellen des Kartographen Johannes Schöner* (Frankfurt/Oder: Scripvaz, 1999). See also chapter 6 in this volume, esp. figure 6.6.

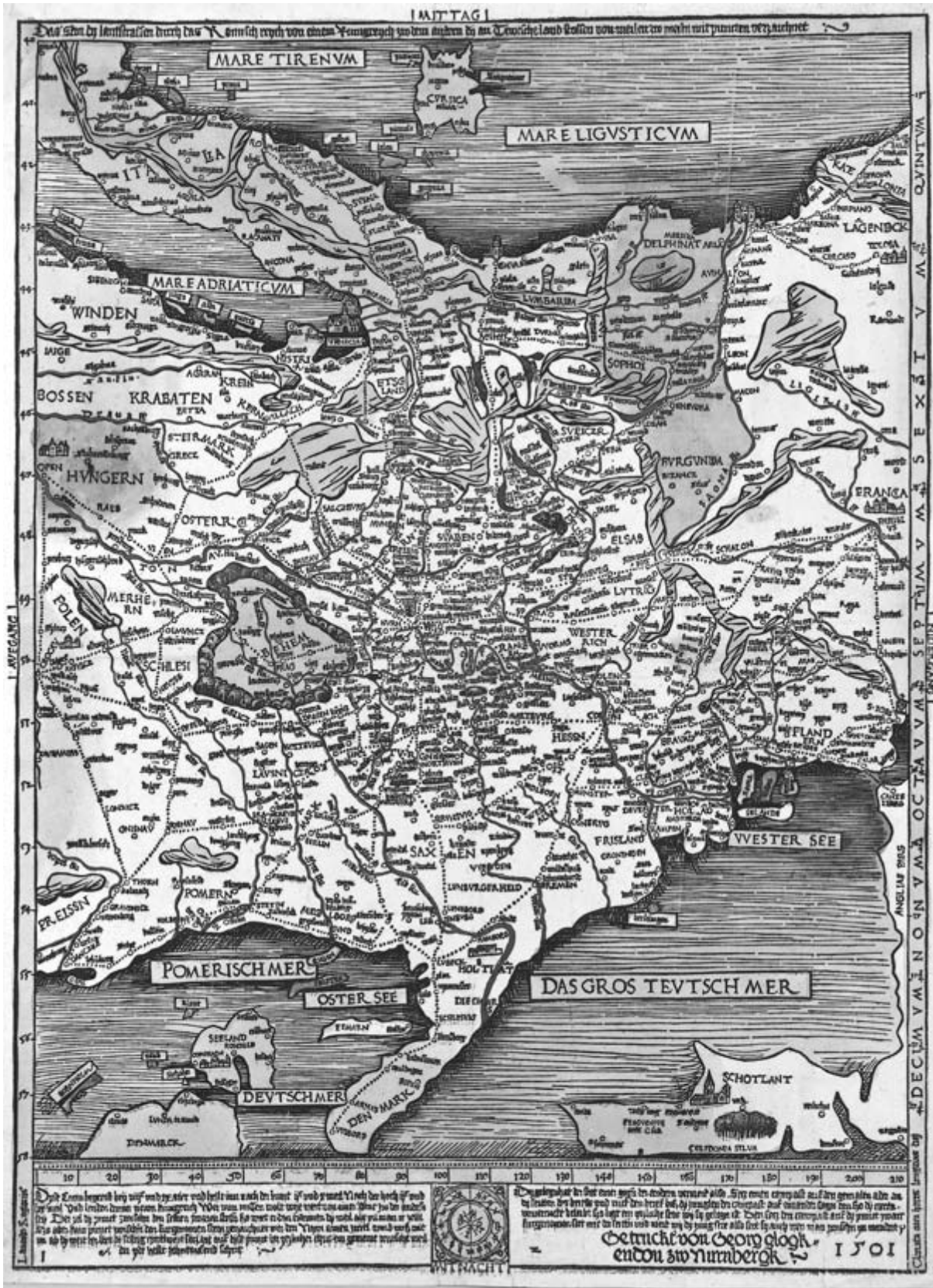


FIG. 42.11. ERHARD ETZLAUB'S LANTSTRASSEN MAP, 1501. This second road map by Etzlaub was made for wider use than the *Rom Weg* map. It shows all important trade routes in central Europe. The topographical map image was

often copied in German cartography up to the middle of the sixteenth century. Woodcut. Size of the original: 55.5 × 41 cm. By permission of Houghton Library, Harvard University (51-2478PF).



FIG. 42.12. DISTORTION GRID, ETZLAUB'S ROM WEG MAP. South is at the top (see pl. 44). The varying accuracy reveals some of Etzlaub's compilation work. The depiction of the central area was based on fairly good primary data (distances and latitudes), whereas the outer areas were mainly copied from maps in the 1482 Ulm edition of Ptolemy's *Geography*.

Based on Peter H. Meurer, *Corpus der älteren Germania-Karten: Ein annotierter Katalog der gedruckten Gesamtkarten des deutschen Raumes von den Anfängen bis um 1650*, text and portfolio (Alphen aan den Rijn: Canaletto, 2001), 137 (fig. 2-4).

Nuremberg. There he edited the unpublished works of Regiomontanus and probably continued the publication of globes.¹⁷⁵ Georg Hartmann had a similar biography. Having left the Catholic Church in 1526, he lived in Nuremberg as an astronomer, mechanic, woodcutter, and printer. Many instruments and prints from his hands have survived, including two celestial globes (of 1538 and 1547).¹⁷⁶ The attribution of several anonymous globes to him is uncertain.¹⁷⁷ Hartmann is also credited with first observing the inclination of the magnetic needle.

In 1518, the Nuremberg printer Hieronymus Hölzel, also an early supporter of the Reformation, produced a political leaflet that included the first map of Bohemia.¹⁷⁸ Its author was the Czech physician and humanist Nicolaus Claudianus (Mikolas Kulha), a member of the Bohemian Brethren. The topographically rich and accurate map was entirely based on the author's personal knowledge; technical influences of the Etzlaub maps are visible in the orientation to the south. Particular emphasis was given to a detailed differentiation between royal and feudal and between Catholic and Utraquist settlements.¹⁷⁹

Also printed in Nuremberg (in 1524) was an edition of the second letter by Hernán Cortés. It was illustrated with a woodcut map of the Gulf of Mexico and the Caribbean Sea, the first printed regional map of a region of the New World.¹⁸⁰ It has yet to be determined how the manuscript on which it was based found its way to Nuremberg.

PETER APIAN AT INGOLSTADT

Peter Apian (Bienewitz) was born in 1495 in Leisnig in Saxony.¹⁸¹ He studied in Leipzig (1516–19) and in Vienna, where he became a young member of the group around Tannstetter. When the plague broke out in Vienna in autumn 1522, Apian went to Regensburg and then in 1523 to Landshut accompanied by his brother Georg, a printer and woodcutter. In Landshut in 1524, the first edition of Apian's standard work appeared: the textbook *Cosmographicus liber*, with a particular emphasis on cartography and with an appendix containing the newly determined coordinates of 1417 places.¹⁸²

An important contact of Apian was Johannes Aventinus (Johann Turmair), a student of Celtis in Vienna.¹⁸³ He had become an educator of princes (from 1508) and court historiographer (1517) of the Bavarian dukes. His main work was the chronicle *Annales Boiorum*, which was printed in Latin in 1554, nearly two decades after his death. His *Bayrischer Chronicon kurtzer Auszug* (Nuremberg, 1522) was supplemented by the first map of Bavaria, cut in wood by Georg Apian and printed in Landshut in 1523 (fig. 42.13).¹⁸⁴ Several influences are combined in this map. The imprint of a sun compass is reminiscent of Erhard Etzlaub's maps. The orientation to

the north and the trapezoidal projection show Ptolemaic influence. The humanist background of the author is revealed by the depiction of former Roman settlements with black dots; extant settlements are depicted with circles or with silhouettes. The map vividly depicts the orographic differences between the hilly Alpine foothills, the Danube plain, and the high Alpine region. Lakes and rivers are represented quite well, but the number of settlements depicted is relatively small. One of the fundamental elements of the construction of the map was the inclusion of distances, which perhaps were collected by Aventinus by counting steps during his travels. On the other hand, the coordinates of many places have the same values as those that were listed before in *Cosmographicus liber*, implying that Apian had a role in the elaboration of this map.

On Aventinus's recommendation, Peter Apian was appointed to the University of Ingolstadt, in 1525 as a printer and in 1527 as professor of mathematics.¹⁸⁵ Apian's chief activity was the publication of maps, both his own and those of others. The maps produced in In-

175. For a summary of partially speculative attributions of unsigned globes to Schöner, see "Schöner, Johannes," in *Lexikon*, 2:711–12.

176. Pilz, *Astronomie in Nürnberg*, 169–76, and Hans Gunther Klemm, *Georg Hartmann aus Eggolsheim (1489–1564): Leben und Werk eines fränkischen Mathematikers und Ingenieurs* (Forchheim: Ehrenbürg-Gymnasium, 1990).

177. Shirley, *Mapping of the World*, 79–82 (nos. 71 and 72).

178. Meurer, *Germania-Karten*, 50 (fig. 0-28) and 51, and Karel Kuchař, *Early Maps of Bohemia, Moravia and Silesia*, trans. Zdeněk Sfařák (Prague: Ústřední Správa Geodézie a Kartografie, 1961), 11–15.

179. The prereformed sects of the Bohemian Brothers and Utraquists were different branches of the Hussites, the followers of Jan Hus, who was burned at the stake in 1415 by the Council of Constance.

180. See, for instance, Seymour I. Schwartz and Ralph E. Ehrenberg, *The Mapping of America* (New York: Abrams, 1980), 36–38 and pl. 11, and Barbara Mundy, "Mesoamerican Cartography," in *HC 2.3*: 183–256, esp. 194–95 and fig. 5.7.

181. Celebrating the quincentenary of Apian's birth was the anthology Karl Röttel, ed., *Peter Apian: Astronomie, Kosmographie und Mathematik am Beginn der Neuzeit* (Buxheim: Polygon, 1995). Still useful is Günther, *Peter und Philipp Apian*, and Fernand van Ortroij, *Bibliographie de l'oeuvre de Pierre Apian* (1902; reprinted Amsterdam: Meridian, 1963). See also Karrow, *Mapmakers of the Sixteenth Century*, 49–63.

182. There were about thirty issues of the *Cosmographicus liber* during the sixteenth century. The later editions have mostly been based on the substantially revised and augmented version by the Louvain mathematician Gemma Frisius, first published in 1529 at Antwerp.

183. Eberhard Dünninger, *Johannes Aventinus, Leben und Werk des bayerischen Geschichtsschreibers* (Rosenheim: Rosenheimer Verlagshaus, 1977), and Karrow, *Mapmakers of the Sixteenth Century*, 71–77.

184. Rüdiger Finsterwalder, "Die Genauigkeit der Kartierung Bayerns zur Zeit von Peter Apian (1495–1522)," in *Peter Apian: Astronomie, Kosmographie und Mathematik am Beginn der Neuzeit*, ed. Karl Röttel (Buxheim: Polygon, 1995), 161–68, esp. 163, and Hans Wolff, ed., *Cartographia Bavariae: Bayern im Bild der Karte*, exhibition catalog (Weißenhorn: A. H. Konrad, 1988), 32–38.

185. On Apian's work in Ingolstadt, see Schöner, *Mathematik und Astronomie*, 358–426.

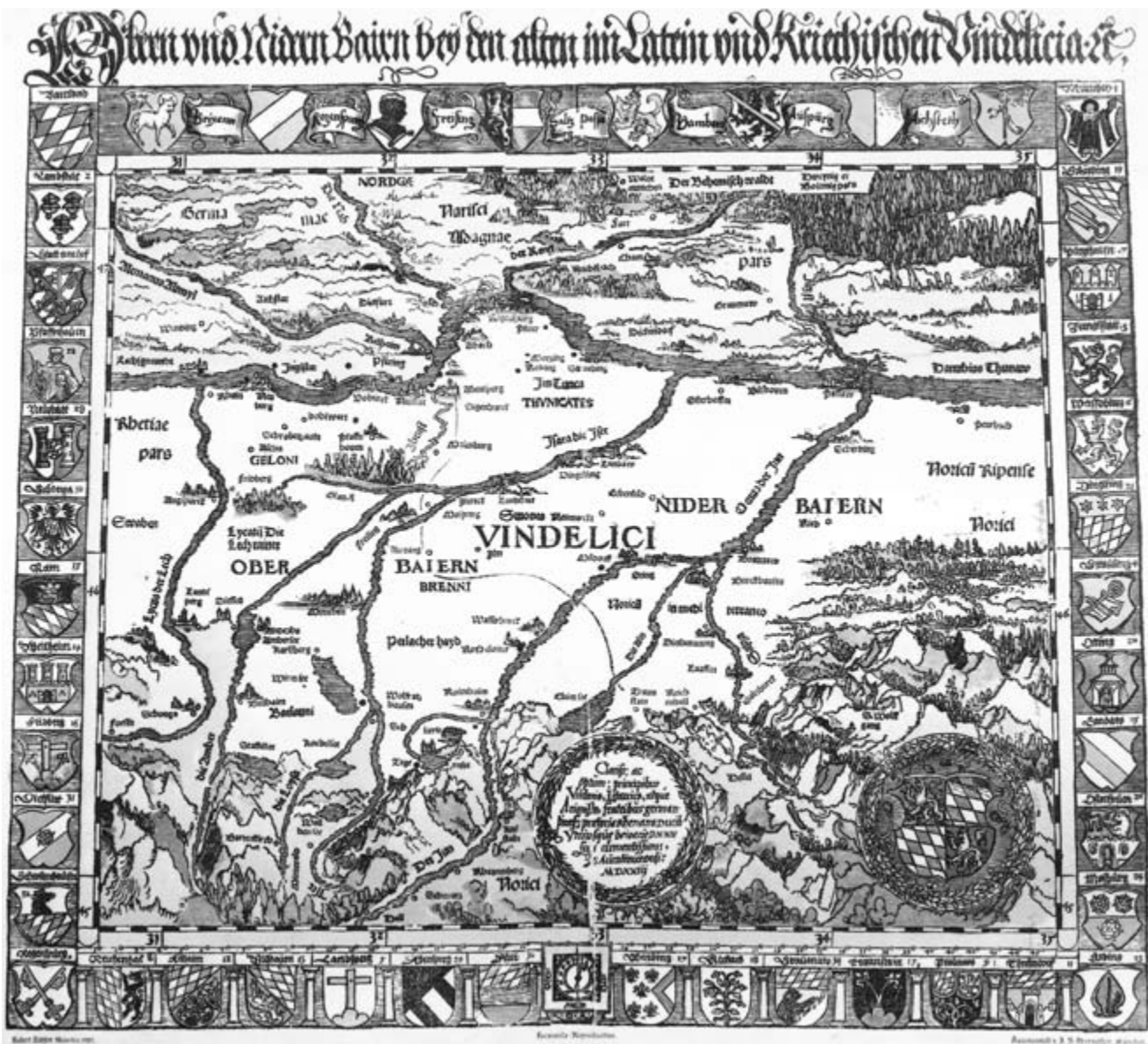


FIG. 42.13. JOHANNES AVENTINUS'S MAP OF BAVARIA, 1523. The map shows Upper and Lower Bavaria, named Vindeicia in Roman times. The border includes the coats of arms of Bavarian towns. Woodcut with letterpress (facsimile; the

original was destroyed in 1945).

Size of the original: 40 × 48 cm. Photograph courtesy of the Bayerische Staatsbibliothek, Munich (K 2.4).

golstadt included the map of Hungary prepared in Vienna in 1528 by Cuspinianus and Tannstetter on the basis of the work of Lazarus; Apian's own world map in cordiform projection, produced in 1530 (fig. 42.14); the so-called Ingolstadt globe gores, probably finished around the same time;¹⁸⁶ and the map of Franconia produced by Sebastian von Rotenhan in 1533. In Landshut in 1535, Georg Apian printed a revised edition of the Aventinus map of Bavaria.

The importance of Peter Apian as an academic teacher is somewhat difficult to determine. Only a few of his young

students worked as mapmakers, but some humanist scholars went to Ingolstadt, already advanced in their studies, to learn from Apian. Students who studied there included Lazius, who enrolled in 1538 at the end of his academic studies; Georg Gadner, the author of an important map of Württemberg (ca. 1572), who enrolled as a student of jurisprudence in 1539; Marcus Secznagel, the author of the

186. For a new discussion of its attribution and date, see Rüdiger Finsterwalder, "Peter Apian als Autor der sogenannten 'Ingolstädter Globusstreifen'?" *Der Globusfreund* 45–46 (1998): 177–86.



FIG. 42.14. APIAN WORLD MAP IN CORDIFORM PROJECTION, 1530. Apian's map in the decorative heart-shaped form is among the first to show North and South America as one continent. An interesting detail is the inclusion of the Por-

tuguese sailing route from Europe to India. Woodcut with letterpress. Size of the original: ca. 55 × 39.4 cm. Photograph courtesy of the BL (Maps C.7.c.16).

first map of the Archbishopric of Salzburg (1554), who matriculated in 1542; Johannes Sambucus, who matriculated in 1548; and Paul Fabricius, who arrived a few months before his appointment at Vienna University in 1554. One may also mention Viglius van Aytta, who was from 1537 to 1541 professor of jurisprudence in Ingolstadt and later an influential politician in the Spanish-Habsburg Netherlands. He is known in the history of cartography as an important collector of maps and a patron of cartographers.¹⁸⁷

During his twenty-five years in Ingolstadt, Apian was a very productive author. Among his many writings are an often-published textbook on arithmetic for merchants (*Kaufmanns Rechnung*, 1527), an edition of Peurbach's *Novae theoriae planetarum* (1528), a cosmographical textbook (*Cosmographiae introductio*, 1528), and a richly illustrated compendium on instruments and methods for surveying and making astronomical observations (*Instrument Buch*, 1533).¹⁸⁸ His astronomical work introduced several Arabian names of stars and constellations.¹⁸⁹ The peak of his publishing activity was the *Astronomicum Caesareum*, published in 1540 at Ingolstadt and dedicated to Emperor Charles V and King Ferdinand.¹⁹⁰ The book is a miracle of printing in folio format: most of the astronomical schemes and instruments have up to six movable parts. Apian received three thousand gold florins from the dedicatees, personal appointment as court mathematician, and his and his brother's induction as Knights of the Holy Roman Empire in 1541. Honored by the political and scientific world, Peter Apian died in 1552 in Ingolstadt. His son Philipp Apian was his successor to the Ingolstadt chair of mathematics.

SOUTHWESTERN GERMANY AND SWITZERLAND

Very early steps toward postmedieval cartography can be also traced in the southwestern part of the German lands. Surviving sketches of terrestrial and celestial maps in different projections are found in a collection of astronomical papers (with lists of coordinates) copied in 1426 by the Heidelberg lecturer Conrad von Diefenbach. They were probably compiled between 1397 and 1422 by Johannes von Wachenheim, a student in Prague (from 1377) and in 1387 the first rector of the newly founded University of Heidelberg.¹⁹¹ But these beginnings were isolated. Later activities at the universities of Basel, Freiburg, and Tübingen had other origins.

One early milestone in regional cartography was a manuscript map of Switzerland (at a scale of ca. 1:500,000) drawn in 1495–97 by Conrad Türost (fig. 42.15).¹⁹² Türost studied in Basel (from 1470), Pavia (M.D. in 1482), and Ingolstadt (1484). He worked as a town physician in Zurich from 1498, and in 1499 he became personal physician to Maximilian I. The map is a classical product of

early humanism. It is part of a historical geographical account, "De situ confœderatorum descriptio," compiled by Türost on the basis of his own travels. The text of this "Descriptio" contains detailed notes on the routes traveled by Türost and the distances in numbers of paces between the places he visited. The map was constructed mainly on the basis of these distances. In addition, Türost made astronomical observations to determine geographical positions; for example, he calculated the latitude of Bern to within six minutes. He also attempted to construct the map mathematically. From the graduated borders a trapezoidal projection results ($1^\circ = 9$ sections with $6^\circ 40'$ each), but with the map grid oriented away from north by about twenty-eight degrees. The symbols for the settlements as well as the outlines of the mountains were individually designed and realistic. It can be assumed that Türost incorporated a large number of detailed sketches that he had completed during his travels. No other depictions existed at that time in the German area that could be compared to this map. Türost may have used Italian models similar to the cartographic works of Leonardo da Vinci. Unfortunately, this map was never printed in this form, although it was the basis for a *tabula moderna* in the 1513 Strasbourg edition of Ptolemy's *Geography*. However, that somewhat schematic woodcut version does not approach the rich detail of the original.

187. [Leo Bagrow], "Old Inventories of Maps," *Imago Mundi* 5 (1948): 18–20; E. H. Waterbolk, "Viglius of Aytta, Sixteenth Century Map Collector," *Imago Mundi* 29 (1979): 45–48; and Meurer, *Germania-Karten*, 278.

188. For a reprint, see Peter Apian, *Instrument Buch*, with an epilogue by Jürgen Hamel (Leipzig: ZA-Reprint, 1990).

189. Paul Kunitzsch, "Peter Apian and 'Azophi': Arabic Constellations in Renaissance Astronomy," *Journal for the History of Astronomy* 18 (1987): 117–24.

190. For a facsimile of the 1540 Ingolstadt edition with commentary by Diedrich Wattenberg, see *Peter Apianus und sein Astronomicum Caesareum = Peter Apianus and His Astronomicum Caesareum* (Leipzig: Edition Leipzig, 1967). See also Owen Gingerich, "Apianus's *Astronomicum Caesareum* and Its Leipzig Facsimile," *Journal for the History of Astronomy* 2 (1971): 168–77, and idem, "A Survey of Apian's *Astronomicum Caesareum*," in *Peter Apian: Astronomie, Kosmographie und Mathematik am Beginn der Neuzeit*, ed. Karl Röttel (Buxheim: Polygon, 1995), 113–22.

191. Durand, *Map Corpus*, 49–50, 106–23, and pls. I–III. See also Richard Uhden, "An Equidistant and a Trapezoidal Projection of the Early Fifteenth Century," *Imago Mundi* 2 (1937): 8.

192. The Latin original from 1495–97 is kept in Vienna, Österreichische Nationalbibliothek; a German version is in Zurich, Zentralbibliothek. See Heinz Balmer, "Konrad Türost und seine Karte der Schweiz," *Gesnerus* 29 (1972): 79–102; Eduard Imhof, *Die ältesten Schweizerkarten* (Zurich: Füssli, 1939), 6–14; and Theophil Ischer, *Die ältesten Karten der Eidgenossenschaft* (Bern: Schweizer Bibliophilen Gesellschaft, 1945), 33–94. A reprint is found in Georges Grosjean and Madlena Cavelti [Hammer], *500 Jahre Schweizer Landkarten* (Zurich: Orell Füssli, 1971), pl. 1, and P. D. A. Harvey, *The History of Topographical Maps: Symbols, Pictures and Surveys* (London: Thames and Hudson, 1980), 150–52.

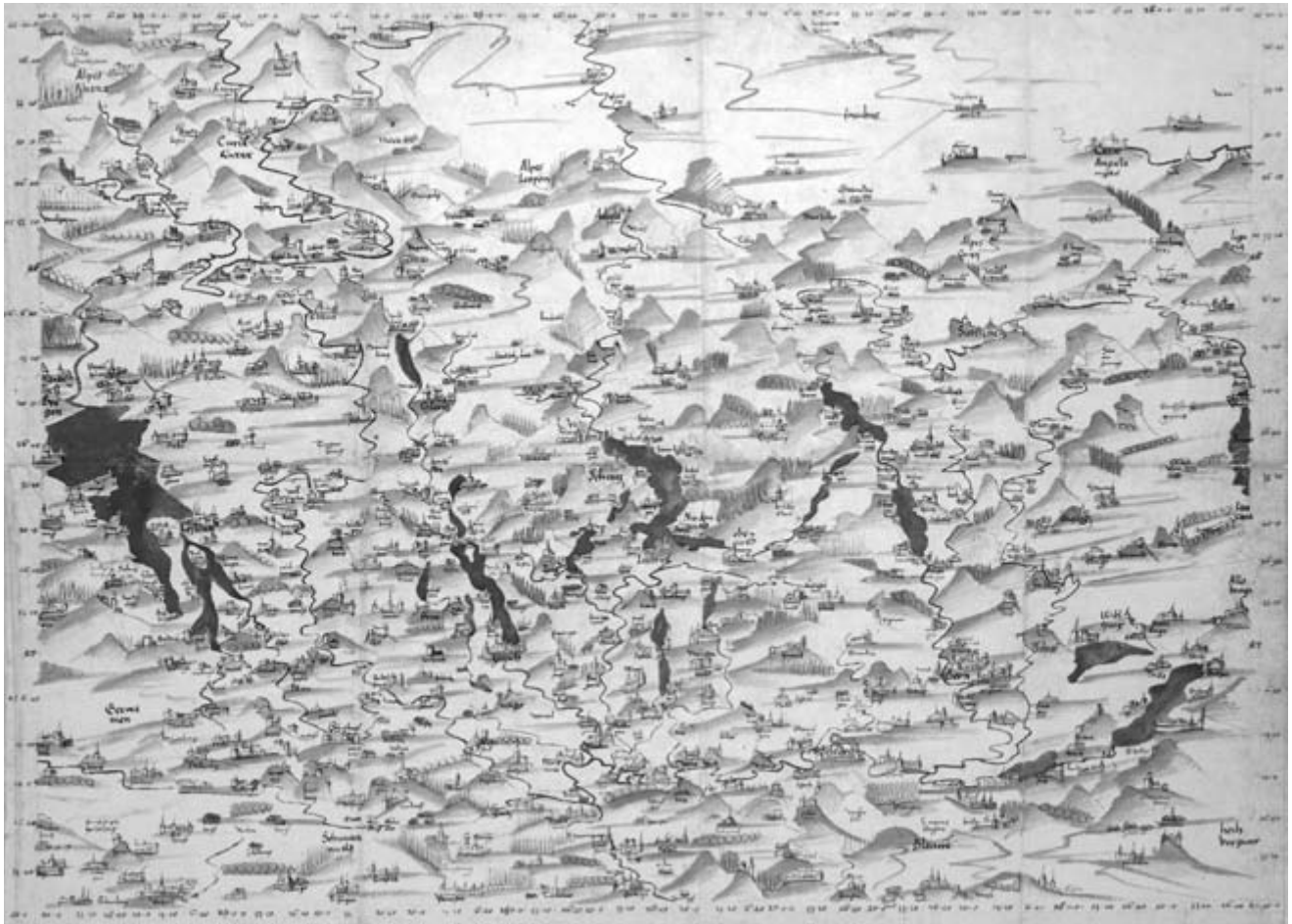


FIG. 42.15. MAP OF SWITZERLAND BY CONRAD TÜRST, CA. 1497. Drawing with ink and watercolors on parchment.

Size of the original: 42 × 57 cm. Photograph courtesy of the Zentralbibliothek, Zurich (4 Hb O1:2).

The high cartographic level of Türost's map of Switzerland becomes visible when it is compared to a contemporary publication, the so-called Bodenseekarte of the anonymous master PPW.¹⁹³ It appeared shortly after 1500 in Nuremberg and depicts the area around Lake Constance. It may have been conceived as a pictorial account or as a commemorative map of the Swabian War, in which, for example, the Nuremberg humanist Willibald Pirckheimer participated as a captain at the side of the emperor and about which he wrote a report.¹⁹⁴ The map, which consists of many individual scenes and individual miniatures, each with its own horizon, is not drawn to scale and is closer to the genre of landscape painting than to cartography.

The academic-humanist tradition in the southwest began with Gregor Reisch.¹⁹⁵ Having studied and taught at the University of Freiburg from 1487, in 1494 he enrolled at Ingolstadt as an educator of the young duke of Zollern. Around 1500, he became a Carthusian monk in Freiburg, but he continued his teaching and scholarly work. In 1510, he was appointed counselor and father confessor

to Maximilian I.¹⁹⁶ Reisch's main work was the *Margarita philosophica* (the "Pearl of philosophy"), a textbook covering the whole canon of disciplines at the faculties of the arts in universities.¹⁹⁷ It was compiled—in

193. Woodcut, six sheets (51 × 112 cm); Wilhelm Bonacker, "Die sogenannte Bodenseekarte des Meisters PW bzw. PPW vom Jahre 1505," *Die Erde* 6 (1954): 1–29, and Harvey, *Topographical Maps*, 98–101.

194. Eckert and Imhoff, *Pirckheimer*, 138–72.

195. Gustav Münzel, *Der Kartäuserprior Gregor Reisch und die Margarita philosophica* (Freiburg im Br.: Waibel, 1938), reprinted from *Zeitschrift des Freiburger Geschichtsvereins* 48 (1937); Karl Hoheisel, "Gregorius Reisch (ca. 1470–9. Mai 1525)," in *Wandlungen*, 59–67; and Lucia Andreini, *Gregor Reisch e la sua "Margarita philosophica"* (Salzburg: Institut für Anglistik und Amerikanistik, Universität Salzburg, 1997).

196. Robert Srbik, *Maximilian I. und Gregor Reisch*, ed. Alphons Lhotsky (Vienna, 1961).

197. Robert Srbik, "Die Margarita philosophica des Gregor Reisch († 1525): Ein Beitrag zur Geschichte der Naturwissenschaften in Deutschland," *Denkschriften der Akademie der Wissenschaften in Wien, mathematisch-naturwissenschaftliche Klasse* 104 (1941): 83–206, and John Ferguson, "The *Margarita philosophica* of Gregorius

question and answer format—between 1489 and 1494. The rather substantial geographical parts of the book were based on various sources. There were interesting attempts to combine biblical-medieval, classical, and modern ideas. For example, Reisch's cosmology describes the world as a land sphere swimming in a water sphere. The first editions of the *Margarita philosophica* (Freiburg, 1503) were illustrated with a world map whose immediate prototype can be found in the 1482 Ulm edition of the *Geography*.¹⁹⁸ However, two notes in the lower margins reveal that Reisch had more recent information. He wrote that Africa extended beyond 40° south and that there was no mainland in the southern part of the Indian Ocean, but rather a sea with large islands. Later editions, from 1508, include new world maps based on the models by their editor, Waldseemüller.¹⁹⁹ The 1508 revision also depicts a *polimetrum*, a precursor of the theodolite, which enabled the measurement of both horizontal and vertical angles for 360 degrees from a fixed point.

Johannes Stöffler, the son of a noble family from Justin- gen in Württemberg, was among the first students at the University of Ingolstadt in 1472.²⁰⁰ He passed the first three decades of his scientific life in his hometown as a priest and private scholar in astronomy, astrology, and instrumentmaking. Main works from that period were a manuscript celestial globe (made in 1493 for the bishop of Constance)²⁰¹ and the *Almanach nova* (Ulm 1499), following the 1474 *Ephemerides* of Regiomontanus; an illustrious detail of that writing is the prophecy of a new worldwide flood in the year 1524. In 1507, Stöffler became a professor of astronomy at Tübingen. The most influential of his later writings was the *Elucidatio fabricæ vsvsque astrolabii*, an introduction to the construction and use of the astrolabe. First published at Oppenheim in 1513, the book had sixteen editions before 1620. Some of his calendars and astronomical works were available as prints. Stöffler was a famed academic teacher; among his students were Philipp Melanchthon and Sebastian Münster. An exhaustive manuscript commentary (in the form of lecture notes) on the first and second book of Ptolemy's *Geography* has survived; it includes a map sketch showing the road from Tübingen to Rome.²⁰² Other contents of Stöffler's lectures are revealed by Münster's *Kollegienbuch*, as well as fragments of a now-lost map of southwestern Germany, drawn by Stöffler on the basis of his own data collections.

The tradition of late medieval and early modern map-making in the northern German lands is not as rich as in the southern lands. As in the case of scientific centers, the south also led regarding mapping projects of larger areas. There was only one pre-1540 printed map focusing on a region north of the river Main: the map of the Low Countries published about 1525 by the Antwerp woodcutter Jan van Hoirne.²⁰³ A fairly good depiction of northern

Germany is found in the *Caerte van Oostlant* (a map of the lands around the North and Baltic Seas) by the Amsterdam artist and mapmaker Cornelis Anthonisz., first published in 1543. These are probably fragments of early mapping of which no primary traces have survived.²⁰⁴

A striking example of this contrast between north and south can be found in the direct comparison of two large-format representations of cities that were made almost concurrently as decorative demonstrations of the importance and power of cities. In 1521, the Augsburg goldsmith Jörg Seld made a perspective plan of his hometown (fig. 42.16), which had become a center for commerce with Italy through the activities of Ulrich Fugger and Marcus Welser.²⁰⁵ Dedicated to Emperor Charles V, the map was created by the author out of "extraordinary love for the fatherland." It shows the city with buildings and streets full of people. The influences of Italian perspective plans, such as the 1500 plan of Venice by Jacopo de' Barbari, are evident. Only a few years later, the woodcutter Anton Woensam von Worms made a view of Cologne that was presented to Charles V during his visit in 1531.²⁰⁶ Even though the accompanying text contains humanist elements, the representation is still completely rooted in late Gothic tradition. It depicts the profile of the Rhine riverfront of Cologne in parallel perspective. The representation is very detailed; name plates identify the main

Reisch: A Bibliography," *Library*, 4th ser., 10 (1930): 194–216. The work is accessible in a reprint of the 1517 Basel edition: Gregor Reisch, *Margarita philosophica* (Düsseldorf: Stern, 1973).

198. Shirley, *Mapping of the World*, 20–22 (nos. 22 and 23).

199. Shirley, *Mapping of the World*, 40 and 42, 44 and 46 (nos. 36 and 40).

200. See Günther Oestmann, with contributions by Elly Dekker and Peter Schiller, *Schicksalsdeutung und Astronomie: Der Himmelsglobus des Johannes Stoeffler von 1493*, exhibition catalog (Stuttgart: Württembergisches Landesmuseum, 1993), and Karl Hoheisel, "Johannes Stöffler (1452–1531) als Geograph," in *Wandlungen*, 69–82.

201. Nuremberg, Germanisches Nationalmuseum (diameter 49 cm).

202. Tübingen, Universitätsbibliothek (Mc 28); the manuscript is still unedited. Ivan Kupčik, "Unbekannte Pilgerrouren-Karte aus der Universitätsbibliothek Tübingen," *Cartographica Helvetica* 9 (1994): 39.

203. Karrow, *Mapmakers of the Sixteenth Century*, 316. No copy of this map has survived, but the discovery of a manuscript map in the BL has allowed a reconstruction; see Peter H. Meurer, "Op het spoor van de kaart der Nederlanden van Jan van Hoirne," *Caert-Thresoor* 21 (2002): 33–40, and figure 54.8 in this volume.

204. Figure 45.10 and Karrow, *Mapmakers of the Sixteenth Century*, 42–48; for a detailed study, see Lang, *Die "Caerte van Oostlant"*. On a parallel phenomenon, see Arend W. Lang, "Traces of Lost European Sea Charts of the 15th Century," *Imago Mundi* 12 (1955): 31–44.

205. On the author, see Norbert Lieb, *Jörg Seld, Goldschmied und Bürger von Augsburg: Ein Meisterleben im Abend des Mittelalters* (Munich: Schnell und Steiner, 1947).

206. Woodcut, nine blocks (39 × 350 cm). For an edition, see Max Geisberg and Egid Beitz, *Anton Woensam, Ansicht der Stadt Köln, 1531* (Munich: Hugo Schmidt, 1929); a brilliant analysis is given by Wolfgang Braunfels in "Anton Woensams Kölnprospekt von 1531 in der Geschichte des Sehens," *Wallraf-Richartz-Jahrbuch* 22 (1960): 115–36.

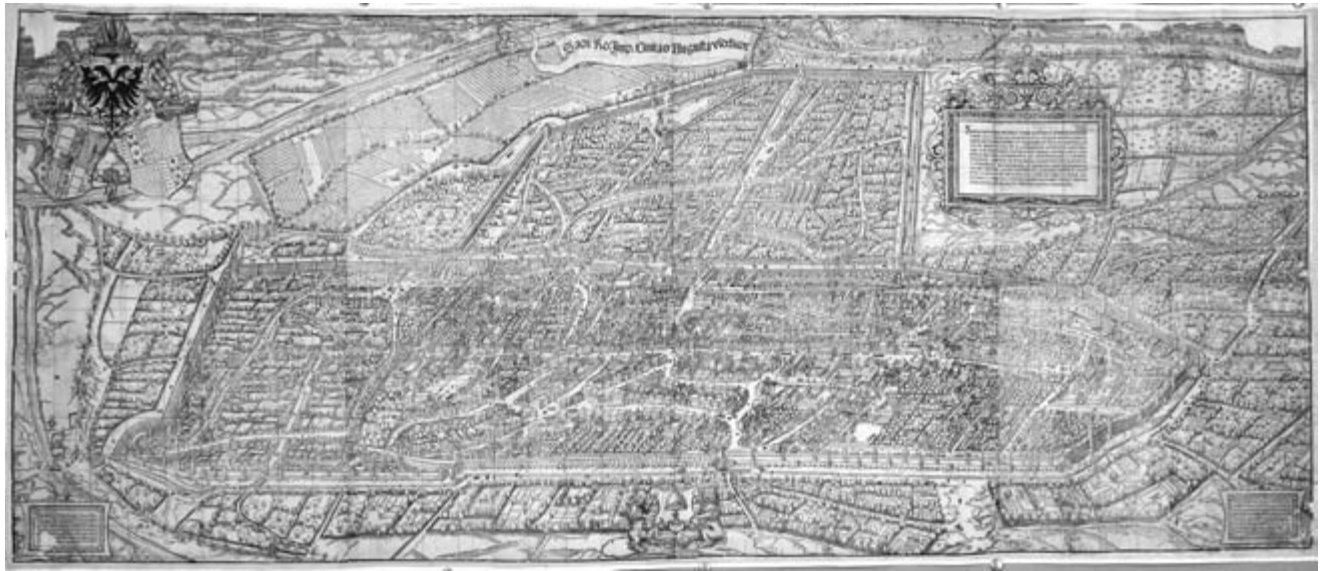


FIG. 42.16. VIEW OF AUGSBURG BY JÖRG SELD, 1521. This is a bird's-eye view of the commercial center of Augsburg from the west, based on rather detailed surveying. Woodcut

from twelve blocks.

Size of the original: 82 × 191 cm. Photograph courtesy of the BL (*Maps 30415[6]).

buildings, especially the churches. The city's patron saints hover in the clouds above the city.

THE GREAT UNIVERSALIST: MARTIN WALDSEEMÜLLER

Although Martin Waldseemüller (*Hylacomylus*) holds an outstanding position in the history of cartography, concrete data on his biography are scarce.²⁰⁷ He was born in Wolfenweiler, the son of a butcher who moved to Freiburg im Breisgau around 1480. In 1490, Waldseemüller was enrolled at the University of Freiburg, where Gregor Reisch was probably his most influential teacher. Sometime around 1500, under unknown circumstances, Waldseemüller became a member of the *Gymnasium Vosagense* in Saint-Dié in Lorraine.²⁰⁸ This humanist academy was sponsored by Duke René II of Lorraine (r. 1473–1508), was headed by his secretary, Walter Lud (*Vautrien Lud*), and included among its members the philologist Matthias Ringmann (*Philesius*).²⁰⁹ This learned community flourished for only a few years; it ended when its sponsor died. The next fixed date is 1514, when Waldseemüller became a canon at the chapter of Saint-Dié. He died before 1522; in March of that year, his canonry was newly filled.

The most emphasized (and, in principle, sole) field of work at the *Gymnasium Vosagense* was basic geographical research and its documentation in the form of maps and books. The first project was a description of the whole world. It included three parts, all published in 1507: the epochal world map, which according to its title was based on “the Ptolemaic tradition as well as the voyages by Amerigo Vespucci and others” and was drawn in

Ptolemy's second projection (see fig. 9.9);²¹⁰ the first printed terrestrial globe (see fig. 6.5);²¹¹ and an accompanying text, *Cosmographiae introductio*.²¹² Walter Lud seems to have been a general supervisor; evidence for his

207. A classic is still M. d'Avezac, *Martin Hylacomylus Waltzemüller, ses ouvrages et ses collaborateurs: Voyage d'exploration et de découvertes à travers quelques épîtres dédicatoires, préfaces et opuscules en prose et en vers du commencement du XVI^e siècle* (Paris: Challamel Aîné, 1867; reprinted Amsterdam: Meridian, 1980). The newer work is Hans Wolff, ed., *America: Das frühe Bild der Neuen Welt* (Munich: Prestel, 1992), in English, *America: Early Maps of the New World*. See also Karrow, *Mapmakers of the Sixteenth Century*, 568–83.

208. G. Save, “Vautrin Lud et le Gymnase vosgien,” *Bulletin de la Société philomatique vosgienne* 15 (1889–90): 253–98.

209. C. Schmidt, “Mathias Ringmann (*Philesius*), humaniste alsacien et lorrain,” *Mémoires de la Société d'Archéologie Lorraine*, 3d ser., 3 (1875): 165–233.

210. *Universalis cosmographia secundum Ptholomaei traditionem et Americi Vespucii aliorumque lustrationes*, woodcut with all inscriptions and naming in letterpress, printed on twelve sheets (overall size 128 × 233 cm); see Shirley, *Mapping of the World*, 28–31 (no. 26). The only copy is in the Library of Congress, Washington, D.C. The fundamental edition is by Fischer and von Wieser, *Die älteste Karte mit dem Namen Amerika*. For a typographic study, see Elizabeth M. Harris, “The Waldseemüller World Map: A Typographic Appraisal,” *Imago Mundi* 37 (1985): 30–53.

211. Woodcut, set of twelve gores (ca. 18 × 34.5 cm); see Shirley, *Mapping of the World*, 28–29 (no. 27). Copies are in Minneapolis, University of Minnesota, James Ford Bell Collection, and Munich, Bayerische Staatsbibliothek; a third copy was recently discovered in Offenburg, Stadtbibliothek; and a fourth copy was sold at auction in 2005.

212. The full title is *Cosmographiae introductio, cum quibusdam geometriae ac astronomiae principiis ad eam rem necessariis: Insuper quatuor Americi Vespucii nauigationes. Uniuersalis cosmographi[ae] descriptio tam in solido [quam] plano eis etiam insertis qu[ae]*

personal competence is his *Speculi orbis*, printed in 1507.²¹³ Matthias Ringmann is regarded as the main author of the text, probably together with Waldseemüller, who was the cartographer.²¹⁴ The text was printed on a press that was equipped by Lud in Saint-Dié.²¹⁵ His collaborator until about 1509 was probably Johannes Schott, the son of the Strasbourg incunabula printer Martin Schott.²¹⁶ Partners outside Saint-Dié were the artist Urs Graf and the printer and publisher Johann Grüninger in Strasbourg.²¹⁷ They probably produced the prints of the map and the globe in their own workshops.

Waldseemüller's world map, the first printed wall map of the West, is an aggregation of different sources. The representation of Europe, the Near East, and North Africa was mainly based on the *tabulae antiquae* and *tabulae modernae* in the 1482 Ulm edition of Ptolemy's *Geography*. There were no printed models for the representation of East and South Asia. For them, it is most likely that Waldseemüller used a copy of—or the same sources as—the manuscript world map from about 1490 by Henricus Martellus. The parallels are obvious: the representation in a modified version of the second Ptolemaic projection, the outline of Japan and the large number of small islands surrounding it, the depiction of Southeast Asia with a shape like that of a dragon's tail, and—imitating Ptolemy—the lack of an Indian Peninsula and a too-large depiction of Ceylon. Waldseemüller could have obtained an improved representation of India from another principal source that he in all likelihood also used: a manuscript world map from the very first years of the fifteenth century that was of the same type as the planispheres of Alberto Cantino and Nicolò de Caverio and probably of Italian origin.²¹⁸ The outline and settlements of the African coastal region, and mainly the depiction of the New World, were taken from this model for the representation in the 1507 world map.

In the case of the newly discovered countries west of the Atlantic, Waldseemüller showed the area around Florida, the Caribbean islands, and the northeastern coast of South America. In the east, this new land was bordered by a mountain range (in North America) and an abrupt straight line (South America), in each case with the annotation “Terra ultra incognita” (Land beyond unknown). However, it is clear that Waldseemüller did not assume that this new continent was connected with Asia. By contrast, Waldseemüller was not quite certain about the connection between North and South America. Like the maps by Cantino and Caverio, the model used by Waldseemüller probably did not show any topographic features in this area; Vicente Yáñez Pinzón reached the coast of Yucatan only in 1507. Waldseemüller left this question unanswered in his own way. On the large main map, North and South America are separated by a small passage. However, on a subsidiary map with both hemi-

spheres, he correctly depicted the connection with an isthmus. The most famous detail of the map can be found in Brazil, above the Tropic of Capricorn: the first use of the name America.²¹⁹ Waldseemüller was inspired in this by reading and studying Amerigo Vespucci's printed travelogues. Waldseemüller gave the name America to precisely the countries described by Vespucci. A corresponding name, *Parias*, is used for the fragment of the northern continent that is represented, and a reference to Columbus is included in a cartouche near Trinidad. On the subsidiary map, the noncommittal term “Terra Incognita” is used. On Waldseemüller's map, America is a name proposed only for a region in Brazil. The adoption of the name for the entire continent occurred only a few years later at the hands of copyists.²²⁰

What is the importance of this map and its author? The large world map of 1507 is a compilation from different sources, and the young Waldseemüller was a scholar working at a desk. The scientific and scholarly organization of the research site Saint-Dié, with its fund of very good, up-to-date source material—which, unfortunately, has not been preserved—is certainly admirable. The real importance of the work and the author is the fact of its publication. Waldseemüller's world map appeared in an

Ptholom[ae]o ignota a nuperis reperta sunt. The original edition has dedications to Maximilian I signed by Ringmann and Waldseemüller. At least six issues appeared before about 1517. For a facsimile with an English translation, see *The Cosmographiae Introductio of Martin Waldseemüller in Facsimile*, ed. Charles George Herbermann (1907; reprinted Freeport, N.Y.: Books for Libraries, 1969).

213. Walter Lud [Gualterius Ludd], *Speculi orbis succinctissima sed neque poenitenda, neque inelegans declaratio et canon* (Strasbourg: Johannes Grüninger, 1507); see d'Avezac, *Waldseemüller*, 60–67. This instrument has not survived; it apparently was a kind of astrolabe, printed on paper with a world map on one of the tympanes.

214. Franz Laubenberger, “Ringmann oder Waldseemüller? Eine kritische Untersuchung über den Urheber des Namens Amerika,” *Erdkunde* 13 (1959): 163–79.

215. Albert Ronsin, “L'imprimerie humaniste à Saint-Dié au XVI^e siècle,” in *Refugium animae bibliotheca: Festschrift für Albert Kolb*, ed. Emile van der Vekene (Wiesbaden: Guido Pressler, 1969), 382–425.

216. For a new summary of his rather complicated contribution, see Meurer, *Germania-Karten*, 152–53 and 160.

217. On Graf, see Frank Hieronymus, *Basler Buchillustration, 1500–1545*, exhibition catalog (Basel: Universitätsbibliothek, 1984), 571–83; on Grüninger, see Peter Amelung, “Grüninger, Johannes,” in *Lexikon des gesamten Buchwesens*, 2d ed., ed. Severin Corsten, Günther Pflug, and Friedrich Adolf Schmidt-Künsemüller (Stuttgart: Hiersemann, 1985–), 3:288–89.

218. Edward Luther Stevenson, “Martin Waldseemüller and the Early Lusitano-Germanic Cartography of the New World,” *Bulletin of the American Geographical Society* 36 (1904): 193–215; reprinted in *Acta Cartographica* 15 (1972): 315–37.

219. Albert Ronsin, *Découverte et baptême de l'Amérique* (Montreal: Le Pape, 1979), 126–89.

220. See, for instance, the 1520 world map by Peter Apian, which clearly uses *America* as the name of the entire continent; Shirley, *Mapping of the World*, 51–53 (no. 45).

edition with one thousand copies. Thus, groundbreaking new geographical knowledge was made known to a large number of scholars for the first time and was also probably used in education. The image of the 1507 terrestrial globe is a simplified version of the world map from the same year. It also uses the geographical term “America” and separates the northern and southern continents.

Waldseemüller’s second representation of the world, the *Carta marina navigatoria*, appeared in 1516 in Strasbourg.²²¹ This decorative wall map was designed in the style of the portolan charts, in rectangular projection with rhumb lines, although it was probably not suited to practical application at sea. This map follows the Caverio map more closely than the 1507 map.²²² Differences can be seen, for instance, in the improved representation of India and the absence of Japan. The western coasts of Central and South America are depicted in more detail, with the name “Terra nova” for Brazil. North America is named “Terra di Cuba Asiae partis,” that is, at least the northern part of the continent is regarded as part of Asia, and the term “America” no longer appears.

In 1508, Waldseemüller contributed a treatise on surveying and perspective to a revised edition of Gregor Reisch’s *Margarita philosophica*.²²³ The *Carta itineraria Europae*, a road map of Europe except for the far north, followed in 1511 (fig. 42.17).²²⁴ It is a compilation from various sources: the *tabulae modernae* of two editions of the *Geography* (Ulm, 1482, and Rome, 1507), the *Lantstrassen* map by Etzlaub, and many primary sources unknown today.²²⁵ The pilgrimage routes from central Europe to Santiago de Compostela were clearly adopted from the guidebook *Die walfart und straß zu sant Jacob* (Strasbourg, ca. 1501?) by the German monk Hermann König. The only surviving copy—from a second edition of 1520—was published on the occasion of the German coronation of Charles V. A decorative border shows 145 coats of arms of dominions subject to the German and Spanish crowns.

A second long-term project of the Gymnasium Vosagense was a new edition of Ptolemy’s *Geography*.²²⁶ Ringmann traveled to Italy in 1505 and 1508 to search for a reliable manuscript. Two 1507 sources indicate that the maps were prepared by Waldseemüller at that time. The work stagnated when Duke René II died in 1508. The edition appeared in 1513, printed by Johannes Schott in Strasbourg. Its editors were Jacob Aeszler and Georg Übelin, two advocates of the archiepiscopal court in Strasbourg. Ringmann is named as the editor of the text, but Waldseemüller is not mentioned anywhere. Monastic modesty alone cannot explain this. There is evidence of a certain disagreement between Waldseemüller and the group around Aeszler and Schott, during which Waldseemüller seems to have lost access to the material. Consequently, Waldseemüller published his later works in cooperation with Johann Grüninger.



FIG. 42.17. DETAIL OF THE GERMAN REGION FROM WALDSEEMÜLLER’S *CARTA ITINERARIA EUROPAE*. The topography was based on Etzlaub’s *Lantstrassen* map (fig. 42.11), but with emendations from other sources. This is from the second edition of 1520, woodcut on four sheets. Size of the entire original: 79 × 116 cm. Photograph courtesy of the Tiroler Landesmuseum Ferdinandeum, Innsbruck.

221. Woodcut with all inscriptions and naming in letterpress, printed on twelve sheets (overall size ca. 133 × 248 cm); see Shirley, *Mapping of the World*, 46–49 (no. 42). The only copy is now in the Library of Congress, Washington, D.C. See Fischer and von Wieser, *Die älteste Karte mit dem Namen Amerika*.

222. Hildegard Binder Johnson, *Carta Marina: World Geography in Strassburg, 1525* (Minneapolis: University of Minnesota Press, 1963).

223. Later editions of the *Margarita philosophica* contained a new world map derived from Waldseemüller and a depiction of the *polimetrum*; see Shirley, *Mapping of the World*, 21, 40, and 42 (no. 36), and Karrow, *Mapmakers of the Sixteenth Century*, 573.

224. The original 1511 edition (Strasbourg: Johannes Grüninger) as well as a 1527 third edition are known only by two explanatory booklets in Latin and German printed by Grüninger. For a facsimile edition, see Karl-Heinz Meine, ed., *Erläuterungen zur ersten gedruckten (Straßen-) Wandkarte von Europa, der Carta itineraria Europae der Jahre 1511 bzw. 1520 von Martin Waldseemüller* (Bonn: Kirschbaum, 1971).

225. Analyzed in detail by Meurer in *Germania-Karten*, 155–60.

226. Claudius Ptolemy, *Geographia* (Strasbourg, 1513), facsimile edition, intro. R. A. Skelton (Amsterdam: Theatrum Orbis Terrarum, 1966), and Meurer, *Germania-Karten*, 52–53.



FIG. 42.18. MAP OF LORRAINE IN WALDSEEMÜLLER'S EDITION OF PTOLEMY'S *GEOGRAPHY*, STRASBOURG 1513. The sketchy map is oriented south and shows the area on the upper reaches of the rivers Saar, Meurthe, and Mosel. The many coats of arms reflect the complicated territorial situation at the border between the empire and France. Size of the original: 36 × 26 cm. Photograph courtesy of the Lessing J. Rosenwald Collection, Library of Congress, Washington, D.C. (G113.P7 1513).

This 1513 Strasbourg edition is important in the tradition of the adoption of Ptolemy and in the history of atlases. Because contemporary mapmakers fully recognized that the *Geography* was outdated because of the new discoveries, they increased the number of *tabulae modernae* to twenty. Furthermore, these modern maps were combined into a separate appendix, *Claudii Ptolemaei supplementem*, which basically constituted the first atlas in modern times. For several reasons, the most interesting among the *tabulae modernae* is the map of Lorraine (fig. 42.18).²²⁷ Like a map of the upper Rhine area, it was probably based on surveys executed by Waldseemüller himself.²²⁸ The mixture of the marginal coats of arms indicates that it was designed to promote the territorial claims of Duke René II. Economic details, such as the production of mirror glass, copper, and salt, are represented

by special symbols. Originally printed as a separate sheet map, apparently a few years before 1513, the map reflects experiments in printing technique. It is among the very first examples of multicolor wood printing in Western cartography (see plate 15). Three colors were printed using three different woodblocks.²²⁹

In all, the twenty *tabulae modernae* were compiled from many primary and secondary sources. For instance, the *Tabula nova Heremi Helvetiorum*, the first map of the Swiss Confederation, is a printed version of the map drawn by Conrad Türost. The *Tabula moderna Germanie* is a perfect combination of various traditions. Its orientation to the north and its restriction to an area between the Maas, the Vistula, the coastline, and the Alps show Ptolemaic influences. The topographical representation is an augmented version of Etzlaub's *Lantstrassen* map.²³⁰

In 1520, Johannes Schott reissued the 1513 Strasbourg edition of the *Geography*. At the same time, the group around Grüninger and Waldseemüller prepared a competitive edition, now known by the name of its editor, the Alsatian physician and astrologer Lorenz Fries.²³¹ The first edition appeared in 1522 with twenty-three *tabulae modernae*. This set of new maps was already partly cut around 1518. It was prepared to illustrate a *Chronica mundi* on which Waldseemüller had worked until about 1517. The 1522 text by Fries had many errors. A second Grüninger edition appeared in 1525 with a text revised by the Nuremberg humanist Willibald Pirckheimer. The woodblocks were later sold to the printing family Trechsel in Lyons, where they were used for further reissues in 1535 and 1541.

GERMAN CARTOGRAPHY IN THE REFORMATION PERIOD

When Martin Luther fixed his ninety-five theses to the door of the castle church in Wittenberg in 1517, his motivation was entirely religious. But within a few years, the

227. Peter H. Köhl, "Martin Waldseemüllers Karte von Lothringen-Westrich als Dokument der Territorialpolitik," *Speculum Orbis* 4 (1988–93): 74–83.

228. E. G. R. Taylor, "A Regional Map of the Early XVIth Century," *Geographical Journal* 71 (1928): 474–79.

229. On a proof print of the *tabula antiqua* of the British Isles on which the color of the sea was printed from a woodblock, see Rodney W. Shirley, "Karte der Britischen Inseln von 1513—Eine der ersten farbig gedruckten Karten," *Cartographica Helvetica* 20 (1999): 13–17.

230. Meurer, *Germania-Karten*, 160–62.

231. Karrow, *Mapmakers of the Sixteenth Century*, 191–204; the history of this edition and biography of Fries are newly revised in Meurer, *Germania-Karten*, 170–74. Fries also wrote the texts of an explanation that accompanied four new editions of Waldseemüller's *Carta marina navigatoria* (1525, 1527, 1530, and 1531), which were printed from newly cut woodblocks. For a detailed analysis and comparison, see Meret Petrzilka, *Die Karten des Laurent Fries von 1530 und 1531 und ihre Vorlage, die "Carta Marina" aus dem Jahre 1516 von Martin Waldseemüller* (Zurich: Neue Zürcher Zeitung, 1970).

Reformation had already ceased to be only a religious phenomenon. Conflicts that had been smoldering below the surface erupted in almost all areas. For German cultural life, however, the Reformation created a productive atmosphere. The power of the Catholic Church as a conservative authority declined. Liberal thought, writing, and teaching grew—at least during the first decades.

The ideas of the Reformation also led to a completely new self-image for geography and its related disciplines. Incorporating as many sources as possible, the “Protestant” geography looked for a correspondence between the biblical theory of creation and the teachings of the classical authors from Aristotle to Ptolemy. The goal was to explain divine work and divine providence in the observation of nature. For the common man to understand Holy Scripture, he needed easily comprehensible information about the cosmos as a whole and its functions, the earth, the different countries down to the individual towns, natural conditions, and the people, their history, and their daily life. Here were the roots for the separation—and at the same time for the purposive combination—of *geographia generalis* and *geographia specialis* as well as of physical and human geography in the history of geographical theory.

The influence of this reformed thinking on contemporary mapmaking in Germany was enormous. This is not apparent with regard to purely cartographic-technical matters, such as surveying and styles of drawing. Those changed little, if at all, and in ways independent of the new thinking. The truly radical innovation in Reformation cartography was the changed attitude toward maps and mapmaking. In addition to enhancing classical-humanist scholarship and providing guidelines for immediate practical applications, cartography discovered a third use in this new intellectual atmosphere: serving as a tool for general education. The essential consequences of this were a further secularization of cartography in general and a flourishing of regional cartography.

THE WITTENBERG CIRCLE AROUND PHILIPP MELANCHTHON

The first and most important center for academic teaching based on the ideas of the Reformation became the University of Wittenberg, founded in 1502.²³² The central figure there was Philipp Melanchthon.²³³ He had studied at Tübingen, where Johannes Stöfler was one of his teachers. A professor of Hebrew and Greek at Wittenberg from 1518, he adopted the new religion under the influence of Luther. Melanchthon achieved preeminent importance in German intellectual history as the “Praeceptor Germaniae,” that is, the reformer of the educational system.²³⁴ A general outline of his ideas was presented in his inaugural lecture of 1518, and his new conception of

geography was formulated in the preface of a 1531 edition of Sacrobosco’s *Sphaera*.²³⁵

However, Melanchthon himself was not a natural scientist.²³⁶ To guarantee a high level of teaching of the cosmographical disciplines at Wittenberg, in 1536 he ap-

232. Michael Beyer and Günther Wartenberg, eds., *Humanismus und Wittenberger Reformation: Festgabe anlässlich des 500. Geburtstages des Praeceptor Germaniae Philipp Melanchthon am 16. Februar 1997* (Leipzig: Evangelische Verlagsanstalt, 1996).

233. The literature on Melanchthon is immeasurable. A bibliography of secondary literature is given by Wilhelm Hammer in *Die Melanchthonforschung im Wandel der Jahrhunderte: Ein beschreibendes Verzeichnis*, 4 vols. (Gütersloh: Mohn, 1967–96). Among the new biographies published commemorating the five hundredth anniversary of his birth is Heinz Scheible, *Melanchthon: Eine Biographie* (Munich: C. H. Beck, 1997). See also Heinz Scheible et al., eds., *Melanchthons Briefwechsel: Kritische und kommentierte Gesamtausgabe* (Stuttgart: Frommann-Holzboog, 1977–); Ralph Keen, *A Checklist of Melanchthon Imprints through 1560* (St. Louis: Center for Reformation Research, 1988); Philipp Melanchthon, *A Melanchthon Reader*, trans. Ralph Keen (New York: Lang, 1988); Scott H. Hendrix and Timothy J. Wengert, eds., *Philip Melanchthon, Then and Now (1497–1997): Essays Celebrating the 500th Anniversary of the Birth of Philip Melanchthon, Theologian, Teacher and Reformer* (Columbia, S.C.: Lutheran Theological Southern Seminary, 1999); and Karin Maag, ed., *Melanchthon in Europe: His Work and Influence beyond Wittenberg* (Carlisle: Paternoster, 1999).

234. Karl Hartfelder, *Philipp Melanchthon als Praeceptor Germaniae* (Berlin: Hofmann, 1889, reprinted Nieuwkoop: B. de Graaf, 1964 and 1972), and Reinhard Golz and Wolfgang Mayrhofer, eds., *Luther and Melanchthon in the Educational Thought of Central and Eastern Europe* (Münster: Lit, 1998).

235. Philipp Melanchthon, *Sermo habitus apud iuventutem Academiae Vuitenberg: De corrigendis adolescentiae studiis* (Wittenberg, 1518), and Johannes de Sacrobosco, *Sphaera mundi* (Wittenberg, 1531).

236. See also Manfred Büttner, “Philipp Melanchthon (1497–1560),” in *Wandlungen*, 93–110, and Uta Lindgren, “Die Bedeutung Philipp Melanchthons (1497–1560) für die Entwicklung einer naturwissenschaftlichen Geographie,” in *Mercator*, 1–12. The new standard on the subject is the anthology by Günter Frank and Stefan Rhein, eds., *Melanchthon und die Naturwissenschaften seiner Zeit* (Sigmaringen: Thorbecke, 1998), including these contributions: Eberhard Knobloch, “Melanchthon und Mercator: Kosmographie im 16. Jahrhundert” (pp. 253–72), and Uta Lindgren, “Philipp Melanchthon und die Geographie” (pp. 239–52).

There is little research on the teaching of cartography during the heyday of German humanism and especially under the influence of the Reformation. A rare and interesting source is found in the teaching guidelines for the faculty of arts at the reformed university of the territory of Braunschweig in Helmstedt; see Ernst Pitz, *Landeskulturtechnik, Markscheide- und Vermessungswesen im Herzogtum Braunschweig bis zum Ende des 18. Jahrhunderts* (Göttingen: Vandenhoeck und Ruprecht, 1967), 14–18. Cartography was taught as part of mathematics, in which two professorships were established. The “mathematicus inferior” had to teach algebra and geometry with the goal of recalculating the way years were defined in the Old Testament, calculating dates for calendars and the course of the stars, and instilling the geographical basics necessary to understand the Bible and classical history. The proposed textbooks were the works by Gemma Frisius, Ptolemy’s *Geography*, and Johannes Honter’s textbook. The map of Palestine by Tilemann Stella, the map of Greece by Nikolaos Sophianos, and the map of Europe by Gerardus Mercator were used as cartographic teaching

pointed two like-minded men, the astronomer Erasmus Reinhold and the mathematician Georg Joachim Rheticus.²³⁷ Illustrative of their importance, but even more of their pronounced involvement in the reformation of the natural sciences, is their joint contribution to the publication of the theory of the heliocentric worldview.²³⁸ Between 1539 and 1541, Rheticus lived near Nicolaus Copernicus in Frambork. The first formulation of the heliocentric theory appeared as *Narratio prima* in the appendix to a eulogy on Prussia that Rheticus authored (*Encomium Prussiae* [Danzig, 1540]). It was Rheticus who put Copernicus's complete manuscript (*De revolutionibus orbium coelestium libri VI* [Nuremberg, 1543]) in print after Copernicus's death in 1543. Reinhold ensured that the new theory was further substantiated. The numbers for his main work, a new set of tables of ephemerides (*Tabulae prutenicae* [Tübingen, 1551]), were calculated on the basis of Copernican assumptions. Under Melancthon, Reinhold, and Rheticus, the University of Wittenberg developed an importance similar to that of Vienna and Ingolstadt in earlier periods. Up to about 1560, numerous students—forming the Wittenberg school—were also active in cartography in their later careers.²³⁹ Those enrolled at Wittenberg included: in 1538, Heinrich Zell, Heinrich von Rantzau, and Johannes Criginger; in 1539, Hiob Magdeburg and Johannes Hommel; in 1542, Tilemann Stella; in 1544, Thomas Schoepf; in 1545, Johannes Sambucus; in 1546, Marcus Jordanus; in 1547, Elias Camerarius; in 1549, Carolus Clusius (Charles de l'Escluse); in 1555, Johannes Mellinger; and in 1557, Bartholomäus Scultetus.²⁴⁰

The first Wittenberg student active in mapmaking was Heinrich Zell.²⁴¹ Born in Cologne, he began his studies in 1533 in Basel, where he also discovered Protestantism. Having worked some years as a teacher in Strasbourg, he enrolled at the University of Wittenberg in 1538. From 1539 to 1541 he accompanied Rheticus during his visit to Copernicus. In 1542, the first highly influential map of Prussia appeared in Nuremberg. The four-sheet woodcut bears a dedication signed “Henricus Cellius Coloniensis.” However, Zell more likely only edited or revised it. The true author may have been Rheticus, who probably used earlier work by others (perhaps by Copernicus himself).²⁴² Around 1544—probably in Nuremberg—Zell's map of the German lands appeared; it was the first newly made general map of that area in more than forty years (fig. 42.19).²⁴³ It was compiled from pre-1542 printed maps as well as primary sources. The highly interesting decoration makes this woodcut a magnificent document of the anti-Habsburg atmosphere in contemporary Protestantism. From about 1543, Zell lived in Strasbourg as a teacher and printer. He later returned to Prussia, where he was castle librarian in Königsberg from 1557 until his death.

SEBASTIAN MÜNSTER: HIS ROLE AND WORK

One of the central figures of German geography and cartography during these times of change was Sebastian Münster, whose importance reached far beyond national boundaries.²⁴⁴ Born in Ingelheim near Mainz in 1488, he entered the Franciscan order around 1506 and was or-

aids. Furthermore, it was recommended that students study the classics, such as Strabo, Pausanias, and Pomponius Mela; the description of Africa by Leo Africanus; and descriptions—not explicitly named—of America and the “newly-discovered islands.” The subjects taught by the “mathematicus superior” included cartography, especially the astronomical-mathematical fundamentals; the teaching aids used were the works of Ptolemy, Peurbach, Regiomontanus, and Reinhold.

237. Hans-Jochen Seidel and Christian Gastgeber, “Wittenberger Humanismus im Umkreis Martin Luthers und Philipp Melancthons: Der Mathematiker Erasmus Reinhold d. Ä., sein Wirken und seine Würdigung durch Zeitgenossen,” *Biblos* 46 (1997): 19–51, and Karl Heinz Burmeister, *Georg Joachim Rhetikus, 1514–1574: Eine Biobibliographie*, 3 vols. (Wiesbaden: Pressler, 1967–68).

238. Ernst Zinner, *Entstehung und Ausbreitung der copernicanischen Lehre*, 2d ed., expanded by Heribert M. Nobis and Felix Schmeidler (Munich: C. H. Beck, 1988); see also *450 Jahre Copernicus “De revolutionibus”*: *Astronomische und mathematische Bücher aus Schweinfurter Bibliotheken*, exhibition catalog (Schweinfurt: Stadtarchiv, 1993).

239. Peter H. Meurer, “Die Wittenberger Universitätsmatrikel als kartographiegeschichtliche Quelle,” in *Geographie und ihre Didaktik: Festschrift für Walter Sperling*, 2 vols., ed. Heinz Peter Brogiato and Hans-Martin Cloß (Trier: Geographische Gesellschaft Trier, 1992), 2: 201–12.

240. Sources on these men include Meurer, *Fontes cartographici*, 124–25, 127–29, 132–33, 178–79, 193–94, 221–22, 226–27, 232–34, 244–47, and 271–72; Karrow, *Mapmakers of the Sixteenth Century*, 125–28, 159–67, 324–26, 371–75, 464–71, 500–509, and 594–99; Marion Bejshowetz-Iserhoht et al., *Heinrich Rantzau (1526–1598): Königlicher Statthalter in Schleswig und Holstein, Ein Humanist beschreibt sein Land*, exhibition catalog (Schleswig: Landesarchiv, 1999); Wolfram Dolz, “Die ‘Düringische und Meisnische Landtaffel’ von Hiob Magdeburg aus dem Jahre 1566,” *Sächsische Heimatblätter* 34 (1988): 12–14; and Eckhard Jäger, “Johannes Mellinger und die erste Landesvermessung des Fürstentums Lüneburg,” in *Mercator*, 121–36.

241. Karrow, *Mapmakers of the Sixteenth Century*, 594–99. His life and work are newly studied in Meurer, *Germania-Karten*, 231–66. There is a woodcut wall map of Europe, printed on eight sheets (84 × 122 cm) that is attributed to Heinrich Zell on the basis of the entry in Ortelius's “Catalogus auctorum” of 1570 (the sole, incomplete copy is in the Staatsbibliothek zu Berlin). However, this map appeared first in 1533, when Heinrich Zell was fifteen years old. It was issued by his relative Christoph Zell, a publisher in Nuremberg. The true author remains to be identified.

242. Jäger, *Prussia-Karten*, 44–47; Józef Babicz, “Nicolaus Copernicus und die Geographie,” *Der Globusfreund* 21–23 (1973): 61–71; and Karl Heinz Burmeister, “Georg Joachim Rheticus as a Geographer and His Contribution to the First Map of Prussia,” *Imago Mundi* 23 (1969): 73–76.

243. Meurer, *Germania-Karten*, 239–41.

244. Karl Heinz Burmeister, *Sebastian Münster: Versuch eines biographischen Gesamtbildes*, 2d ed. (Basel: Helbing und Lichtenhahn, 1969); idem, *Sebastian Münster: Eine Bibliographie* (Wiesbaden: Guido Pressler, 1964); and Karrow, *Mapmakers of the Sixteenth Century*, 410–34.

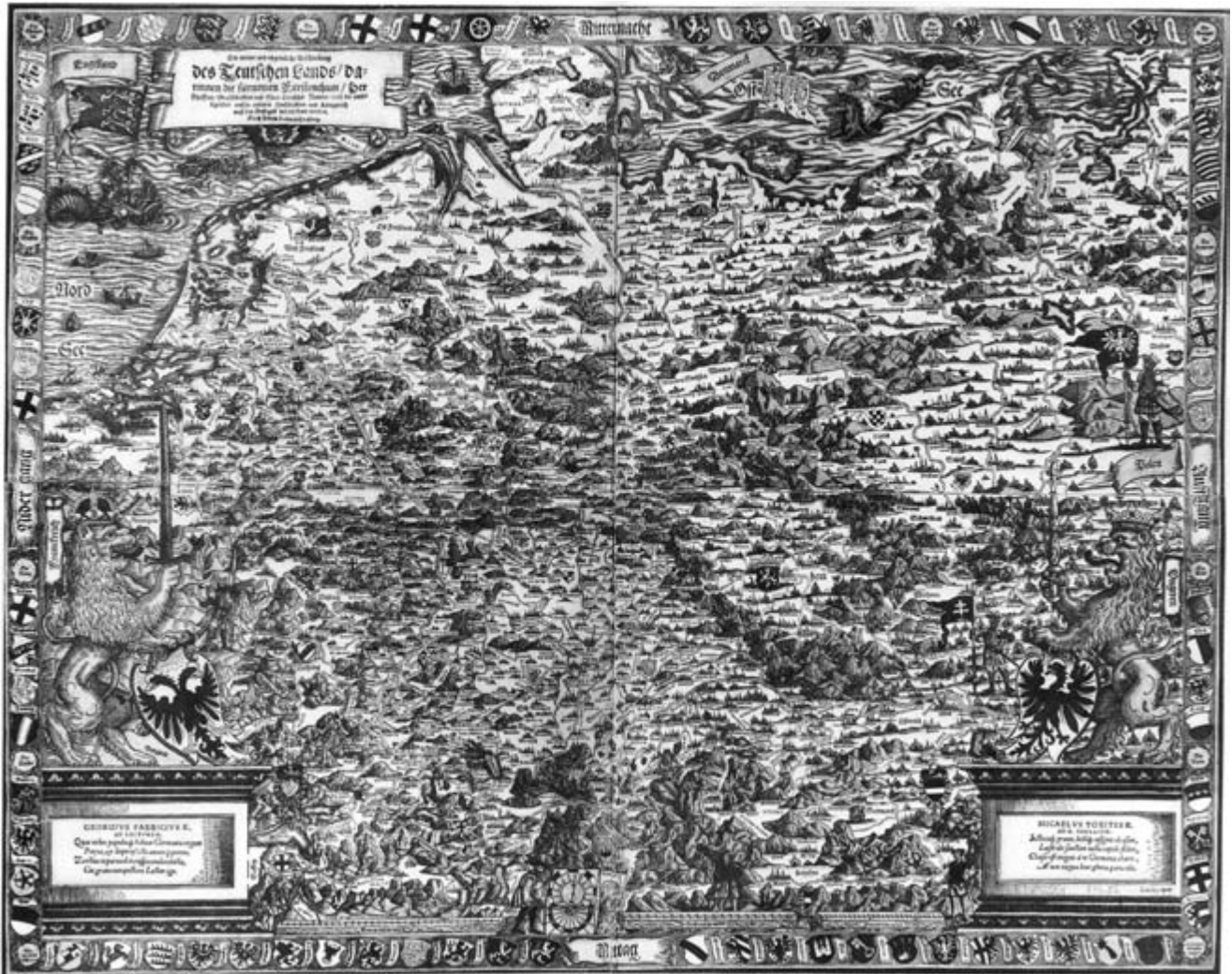


FIG. 42.19. HEINRICH ZELL'S MAP OF THE GERMAN LANDS, CA. 1544 (1560). The pictorial map is full of political insinuations in the decoration. Zell's addition of a second lion on the right representing the German king (in addition to the lion on the left that symbolized the emperor) was directed against Charles V. Knights riding on fish in the North and Baltic Seas represent the kings of England and Denmark, from whom the German Protestants hoped to receive military help.

This is a facsimile; the original, published in 1544, is not extant, and the only known original from a 1560 second edition was destroyed in 1945 in Dresden.

Size of the original: 56 × 73 cm. From Albert Herrmann, *Die ältesten Karten von Deutschland bis Gerhard Mercator* (Leipzig: K. F. Koehler, 1940). Photograph courtesy of the Newberry Library, Chicago.

dained in 1512. His early education—with particular emphasis on theology and Hebrew studies—was in Franciscan schools in Heidelberg, Freiburg, and Rouffach.²⁴⁵ From 1514 to 1518, he lectured in Hebrew at Tübingen. There he also attended lectures on geography and astronomy by Johannes Stöffler; Philipp Melancthon was among his fellow students. Münster's study book from Tübingen contains forty-four map sketches that were copied from models by Etzlaub, Waldseemüller, and the Ulm edition of Ptolemy's *Geography*.²⁴⁶ There followed his years in Basel as a lecturer in Hebrew (1518–21) and as a proofreader in the printing office of Adam Petri.²⁴⁷

His academic career continued with university chairs in Hebrew studies, from 1524 in Heidelberg and from 1529 in Basel. In 1530, Münster converted to Protestantism

245. Münster was among the rather few scholars who reached the humanist ideal of a *homo trilinguis*, the active and perfect mastery of Latin, Greek, and Hebrew.

246. Munich, Bayerische Staatsbibliothek (Cod. Lat. Monach. 10691); see Wolkenhauer, *Münsters handschriftliches Kollegienbuch*.

247. The history of this important firm was exhaustively studied by Frank Hieronymus in 1488 *Petri-Schwabe 1988: Eine traditionsreiche Basler Offizin im Spiegel ihrer frühen Drucke* (Basel: Schwabe, 1997).



FIG. 42.20. SEBASTIAN MÜNSTER'S MAP OF THE HEIDELBERG AREA, 1528. Woodcut from Münster's *Erklärung des neuen Instruments der Sinnen . . .*, drawn as an example for mapping a region by measuring distances and angles. Size of the original: 14 × 13 cm. Photograph courtesy of the Bayerische Staatsbibliothek, Munich (Hbks/Hbks R 1 c).

and married Petri's widow. In 1542, he took over the Basel professorship in Old Testament theology. Münster lived in Basel as one of the leading figures of the humanist and Reform movements until his death in 1552.

Teaching theology and Hebrew studies was Münster's profession, but the cosmographical sciences were the passion of his life.²⁴⁸ By 1524, he had a reputation in that field and had come into contact with the Alsatian humanist Beatus Rhenanus, at that time in charge of the "Germania illustrata" project.²⁴⁹ This project was transferred to Münster and grew into a completely new cosmography based on up-to-date knowledge, with its main emphasis on the representation of the German area with text and illustrations.

Münster's first geographical publication was the "sun instrument" in 1525. This single-sheet print is a map of the German lands based on Etzlaub and Waldseemüller inside a calendar ring, with four ring scales for the calculation of astronomical data in the corners. An imprinted sun compass—with the cardinal directions in Latin, Greek, Hebrew, and German—aids orientation. A detailed explanatory text, the *Erklärung des neuen Instruments der Sinnen*, appeared three years later.²⁵⁰ It had an appendix that included a call to the scholarly world and interested people to send illustrations and text materials

to Münster for the planned cosmography, and especially to initiate the production of maps of individual regions;²⁵¹ a short introduction to the techniques of topographic surveying and mapping;²⁵² the impression of a semicircular instrument for measuring angles (a goniometer), to be cut off and pasted onto a piece of cardboard by the reader; and, as a working sample, a map of the Heidelberg region, which had been surveyed by Münster himself (fig. 42.20).²⁵³

The large project took more than two decades to complete. It is interesting to observe Münster's alternation between the classical-humanist tradition and the new approach. Besides many books on Hebrew and Chaldaic studies, he published the following cartographic works:²⁵⁴ an annotated edition of the Eichstätt map by Nicolaus Cusanus (1530), the booklet *Mappa Europae* (1536),²⁵⁵ a map of the Hegau and the Black Forest produced as a further call to collaborate (1537),²⁵⁶ an edition of Pomponius

248. Manfred Büttner and Karl Heinz Burmeister, "Sebastian Münster (1488–1552)," in *Wandlungen*, 111–28; for a new summary, see Meurer, *Germania-Karten*, 177–82.

249. Münster was among the candidates considered by the Strasbourg publisher Grüninger to revise his 1522 edition of Ptolemy. Rhenanus lived as a private scholar in Sélestat (Schlettstadt). His main work is the historical-geographical description *Rerum germanicarum libri tres* (Basel, 1531), which appeared without maps. On Rhenanus, see the anthology *Annuaire 1985: Spécial 500^e anniversaire de la naissance de Beatus Rhenanus*, directed by Maurice Kubler (Sélestat: Les Amies, 1985).

250. Sebastian Münster, *Erklärung des neuen Instruments der Sinnen nach allen seinen Scheyben und Circeln: Item eyn Vermanung Sebastiani Münster an alle Liebhaber der Künstenn im Hilff zu thun zu warer unnd rechter Beschreybung Teütscher Nation* (Oppenheim: Jacob Kobel, 1528). On all aspects of this publication, see the facsimile edition, *Erklärung des neuen Sonnen-Instruments*, Oppenheim, 1528, with an accompanying text by Arthur Dürst, *Sebastian Münsters Sonneninstrument und die Deutschlandkarte von 1525* (Hochdorf: Kunst-Verlag Impuls SA, 1988), and Meurer, *Germania-Karten*, 183–90.

251. See Gerard Strauss, *Sixteenth-Century Germany: Its Topography and Topographers* (Madison: University of Wisconsin Press, 1959), 423–24.

252. On Münster's simple method for surveying a region, see pp. 484–85 in this volume.

253. Ruthard Oehme, "Sebastian Münster und Heidelberg," *Geographische Rundschau* 15 (1963): 191–202.

254. The standard work on Münster's maps is still Hantzsch, *Sebastian Münster*. Hantzsch also attempts to make statements about Münster's models, however that subject is in need of a revised edition.

255. The text is in German; for a facsimile, see Sebastian Münster, *Mappa Europae*, ed. Klaus Stopp (Wiesbaden: Pressler, 1965). The work contains three maps, one of Europe (ca. 1:18,000,000), one of the Upper Rhine (ca. 1:1,500,000), and one of Heidelberg in 1528 (ca. 1:650,000). This can be regarded as Münster's working sample to demonstrate mapping at different scales.

256. Friedrich Schilling, "Sebastian Münsters Karte des Hegaus und Schwarzwaldes von 1537: Ein Einblattdruck aus der Bibliotheca Casimiriana zu Coburg," *Jahrbuch der Coburger Landesstiftung*, 1961, 117–38, and Alfred Höhn, "Die Karte des Hegaus und des Schwarzwaldes von Sebastian Münster, 1537," *Cartographica Helvetica* 3 (1991): 15–21.



FIG. 42.21. VIEW OF TRIER FROM MÜNSTER'S COSMOGRAPHY. The maps and views in the Basel *Cosmography* are mostly based on primary sources, which were acquired by Münster through his extensive contacts. An example is this bird's-eye view of Trier, seen from the north over the Mosel. It was drawn by an unknown local artist and provided by Simon

Reichwein, the learned court physician of the archbishop of Trier. Woodcut with letterpress (stereotypes). (See figures 19.4 and 19.13 for instruments from the same work.) Size of the original: 19 × 32 cm. By permission of Houghton Library, Harvard University (Typ 565.50.584 F).

Mela's *De situ orbis* (1538),²⁵⁷ a wall map of Switzerland by Aegidius Tschudi (1538, discussed later), a single-sheet print with a perspective view of Basel and a map of the Basel region (1538),²⁵⁸ and the first issue of his edition of Ptolemy's *Geography* (1540).²⁵⁹

Like most of Münster's works, this Basel edition of the *Geography* was printed by his stepson Heinrich Petri. It had twenty-one *tabulae modernae*, among them up to ten regional maps of the German area.²⁶⁰ The woodcuts were made by the Basel artist Conrad Schnitt. All inscriptions and names were printed with inserted type; Münster's experiments with stereotype can be traced back to about 1538.

In 1544, the first edition of Sebastian Münster's cosmography appeared—in Latin. The work reached its final form with two 1550 editions in Latin and German.²⁶¹ It consisted of an atlas with double-sheet maps, followed by six books of text²⁶² illustrated with smaller maps and numerous town views in different formats (fig. 42.21). In all, about 120 informants contributed to the work with

257. Münster's contribution to this work was a small map of the area around the source of the Danube; see Ruthardt Oehme, "Sebastian Münster und die Donauquelle," *Alemannisches Jahrbuch* (1957): 159–65.

258. Frank Hieronymus, "Sebastian Münster, Conrad Schnitt und ihre Basel-Karte von 1538," *Speculum Orbis* 1, no. 2 (1985): 3–38.

259. Claudius Ptolemy, *Geographia* (Basel, 1540), facsimile edition with bibliographical note by R. A. Skelton (Amsterdam: Theatrum Orbis Terrarum, 1966).

260. On the bibliography of the folio maps in Münster's books, see Harold L. Ruland, "A Survey of the Double-Page Maps in Thirty-five Editions of the *Cosmographica Universalis* 1544–1628 of Sebastian Münster and His Editions of Ptolemy's *Geographia* 1540–1552," *Imago Mundi* 16 (1962): 84–97.

261. Sebastian Münster, *Cosmographie, Basel, 1550*, facsimile ed., intro. Ruthardt Oehme (Amsterdam: Theatrum Orbis Terrarum, 1968).

262. The number of the "foretext maps" was different; for a detailed listing, see Ruland, "Double-Page Maps." The textbooks were divided: book 1, general introduction to cosmography, geometry, etc.; book 2, Spain, England, Scotland, France, and Italy; book 3, the German lands; book 4, eastern Europe and the Ottoman empire; book 5, Asia; and book 6, Africa. A separate book on the Americas is missing from all editions.

primary text, illustrations, and map sources. They were encouraged by Münster's printed appeals as well as by requests expressed in personal correspondence.²⁶³ Münster designed the maps himself, and several were the first regional maps of their German regions. Their sources, and thus the quality of their content, vary greatly.²⁶⁴

Münster's cosmography was one of the great publishing successes of the sixteenth century. The texts and illustrations were constantly updated and completed under his successors. The work withstood competition from the atlases of Ortelius, De Jode, and Mercator. In the atlas section, in 1588 the Basel editors replaced the outdated originals by Münster with a new set of twenty-six double-sheet maps still in woodcut, but drawn based on more modern sources.²⁶⁵

The cosmography was accessible to Czechs, Germans, French, and Italians if they could read their vernacular languages. Thus, for the first time a wider public became acquainted with the way the earth looked through maps that were relatively easy to read. This corresponded precisely with the educational ideal of Melanchthon and the Reformation. Münster realized this ideal in geography and cartography.

TILEMANN STELLA

An important but less-known figure in the history of Reformation cartography in Germany was Tilemann Stella.²⁶⁶ Registered at the University of Wittenberg from 1542 to 1552, he was among Melanchthon's favorite students. In 1552, the two men presented a program of cartographic work to elaborate and publish five maps: a biblical section would have maps of Palestine, the Exodus route, and the travels of Saint Paul, and a profane section would have maps of Europe and the German lands. Unfortunately, this great vision was only partly realized. The maps of Palestine and of the Exodus route appeared in 1552 and 1557 (about them, more is said later). In 1560, a general map of Germany followed, a woodcut in imitation of the 1525 "sun instrument" by Sebastian Münster, but with the topographical depiction revised on the basis of more modern sources.²⁶⁷ The maps of the travels of Saint Paul and of Europe were never made.

Stella was sponsored from 1552 onward by Duke Johann Albrecht I of Mecklenburg-Schwerin (r. 1547–76). Only in 1560 was he employed on a regular basis, as a court mathematician and as the head of the ducal library. He made globes,²⁶⁸ maps of canals, a manuscript map of Mecklenburg,²⁶⁹ and several illustrated manuscripts on surveying²⁷⁰ and genealogy. But he also worked in other territories, such as the county of Mansfeld and the duchy of Luxembourg.²⁷¹ In 1563–64, he surveyed the districts of Zweibrücken and Kirekel in the duchy of Pfalz-Zweibrücken.²⁷² The result was seventeen maps

drawn at a scale of about 1:25,000. The topography is fairly accurate and detailed, with a sophisticated symbolism (fig. 42.22). Stella worked for different rulers on his numerous travels during the decades that followed.

The 1560 map of Germany was only the beginning of the project that dominated the second half of Stella's life: a survey of the entire Holy Roman Empire.²⁷³ Stella received an imperial privilege for its publication in 1560, which was extended in 1569.²⁷⁴ The request describes the aims of this project to Ferdinand I as follows: to praise

263. Münster's way of working has been studied in detail using the example of Trier. See Peter H. Meurer, "Der kurtrierische Beitrag zum Kosmographie-Projekt Sebastian Münsters," *Kurtrierisches Jahrbuch* 35 (1995): 189–225.

264. For example, the map of Silesia is the original work of an unknown author, the map of Saxony is a section of Pyramius's 1547 map of the Holy Roman Empire, the map of Franconia is a copy after Rotenhan, the map of the course of the Rhine (two versions in three and five parts) is Münster's own work, and the map of the British Isles is very similar to the representation on the Gough map.

265. Peter H. Meurer, "Der neue Kartensatz von 1588 in der Kosmographie Sebastian Münsters," *Cartographica Helvetica* 7 (1993): 11–20.

266. A new biobibliography of Stella is given in Meurer, *Germania-Karten*, 296–301; see also Karrow, *Mapmakers of the Sixteenth Century*, 500–509.

267. The respect for Münster as the icon of Reformed geography is visible in the map title: *Die gemeine Landtaffel des Deutschen Landes, Etwan durch Herrn Sebastianum Münsterum geordnet, nun aber vernewert und gebessert, Durch Tilemannum Stellam von Sigen*. The woodcut was accompanied by a booklet, *Kurtzer und klarer Bericht vom Gebrauch und Nutz der neuen Landtaffeln*. The map and text had various editions; see Meurer, *Germania-Karten*, 307–14.

268. Alois Fauser, "Ein Tilemann Stella-Himmelsglobus in Weisenburg in Bayern," *Der Globusfreund* 21–23 (1973): 150–55.

269. The 1553 map has survived in the form of a copy made in 1623. An edition is missing; see Gyula Pápay, "Aufnahmehethodik und Kartierungsgenauigkeit der ersten Karte Mecklenburgs von Tilemann Stella (1525–1589) aus dem Jahre 1552 und sein Plan zur Kartierung der deutschen Länder," *Petermanns Geographische Mitteilungen* 132 (1988): 209–16.

270. Described by Hans Brichzin in "Der Kartograph Tilemann Stella (1525–1589): Seine Beziehungen zu Sachsen und zu Kurfürst August anhand neuer Quellenfunde," *Archivmitteilungen* 42 (1993): 211–28.

271. The surveys of 1555 and 1561 in Mansfeld were printed in 1570; see Helmut Arnhold, "Die Karten der Grafschaft Mansfeld," *Petermanns Geographische Mitteilungen* 120 (1976): 242–55. The mapping in Luxembourg is lost; see Brichzin, "Tilemann Stella," 225.

272. Tilemann Stella, *Landesaufnahme der Ämter Zweibrücken und Kirekel des Herzogtums Pfalz-Zweibrücken*, 1564, facsimile ed. with an accompanying monograph by Ruthardt Oehme and Lothar Zögner, *Tilemann Stella (1525–1589): Der Kartograph der Ämter Zweibrücken und Kirekel des Herzogtums Pfalz-Zweibrücken. Leben und Werk zwischen Wittenberg, Mecklenburg und Zweibrücken* (Lüneburg: Nordostdeutsches Kulturwerk, 1989). For an annotated edition of the accompanying text, see Tilemann Stella, *Gründliche und wahrhaftige beschreibung der baider ambter Zweibrücken und Kirekel, wie dieselbigen gelegen*, 1564, ed. Eginhard Scharf (Zweibrücken: Historischer Verein, 1993).

273. Meurer, *Germania-Karten*, 304–6.

274. The texts of the privileges for the project, which was "particularly approved and substituted by Our Imperial Authority," are printed



FIG. 42.22. DETAIL FROM TILEMANN STELLA'S MAP OF ZWEIBRÜCKEN-KIRKEL, 1564. Drawing with ink and watercolor on paper (part of sheet 11). Size of the entire original: 162 × 160 cm; size of the detail: ca. 40.5 × 20 cm. Photograph courtesy of the Kungliga Biblioteket, Sveriges Nationalbiblioteket, Stockholm (KoB H.vol.1_11).

God and the creation, to glorify the German nation as the head of Christianity and the home of many heroes and craftsmen, and to aid the understanding of German history. More detailed information is found in a printed treatise.²⁷⁵ Combining the various sources, we can discern the following details of this project. The plan called for the

publication of a general map and nearly one hundred regional maps in different sizes and at different scales. The topography was to be depicted so large that all pictorial elements and inscriptions could be distinguished. Additionally, all maps were to have exact coordinates and a multipart scale bar to allow for comparison of the different kinds of miles. Different symbols were to be used for great towns, small towns (with further specification of imperial towns, Hanseatic towns, and seats of rulers and bishops), villages, castles, baths, and mines. Linear signatures were to mark the secular and ecclesiastical subdivisions, identified by entries of coats of arms. The maps were to be supplemented by a text corpus with nine sections on subjects including older maps and their value, the *geographia generalis* of the entire region, the *geographia specialis* of the various parts,²⁷⁶ and special examinations of the area's mountains, rivers, and history. Appendixes were also proposed on military history and science, German proper names and their etymologies, German proverbs and their parallels in other languages, and German words derived from Hebrew, Greek, Latin, and French.

Like Münster, Stella planned his giant venture as a collaboration of numerous contributors. But nothing was published. Stella left the Mecklenburg court after the death of his sponsor and returned to the service of Pfalz-Zweibrücken. A request for subvention from the imperial court was never answered. Stella worked on the project until his death in 1589. A list of the papers in his estate shows that it never came close to completion.²⁷⁷

SWISS CARTOGRAPHY IN THE EARLY SIXTEENTH CENTURY

The works and endeavors of Sebastian Münster were only part of the altogether quite sizable cartographic activities

in Meurer, *Germania-Karten*, 330–31. They give an interesting insight into contemporary copyright. The privileges were for fifteen years in the Holy Roman Empire and all other lands subjected to Ferdinand I. They prohibited all printers, publishers, and book traders from printing or selling the prepared work without Stella's permission. The punishment for violation included, by law, the confiscation of all illegal copies and the payment of ten Marks (ca. 2.34 kg) in gold to both Stella and the imperial purse. The court was to receive free copies of every publication. Otherwise, the privilege would lose its legal force.

275. *Tilemanni Stellae Sigenis methodus, quae in chorographica et historica totius Germaniae descriptione observabitur* (Rostock, 1564); for a German translation, see Meurer, *Germania-Karten*, 332–33.

276. The mapped area is defined by Calais (W), Kolding (N), Königsberg and Vienna (E), and Venice and Trento (S). Interesting is Stella's general subdivision of Germany into Germania inferior (west of the Rhine, north of the Mosel), Germania superior (south of a line from the Mosel to the Carpathian Mountains), and Saxonia (east of the Rhine, north of the line just mentioned). To hold the balance between Upper Germany and Lower Germany, Stella created the somewhat artificial—in this context—area of Saxony.

277. See Oehme and Zögner, *Tilemann Stella*, 91–92. Stella's papers were lost in the conquest of Zweibrücken by French troops in 1676.

of the humanist milieu in contemporary Switzerland, an early stronghold of the Reformation. Some important figures, however, did not convert in spite of their sympathy for the new movement. For instance, Henricus Glareanus (Heinrich Loriti) left Basel for the University of Freiburg in 1529 after the Reformation.²⁷⁸ He is known for some manuscript world maps, among which is the first equidistant polar projection.²⁷⁹ His oft-printed textbook *De geographia* (first published in Basel, 1527) combined theoretical concepts of Ptolemy and Strabo with new data from Apian, Waldseemüller, and others.²⁸⁰ The work is interesting for its very early descriptions of magnetic declination and the construction of globe gores.

Aegidius Tschudi, a pupil of the reformer Ulrich Zwingli and a friend of Sebastian Münster, also remained Catholic.²⁸¹ A statesman and wealthy private scholar, he started a collection of historical and geographical material on Switzerland in 1524. The cartographic results were published with Münster's assistance in 1538 in Basel. Tschudi's nine-sheet wall map *Nova Rhaetia atque totius Helvetiae descriptio* became the most influential map of the Swiss Confederation in the sixteenth century.²⁸² It was based mainly on route surveys, apparently without use of noteworthy trigonometrical and astronomical measurements. Consequently, the distortions are enormous. Tschudi worked for the rest of his life on an improved edition, but none was ever printed.²⁸³

Basel was one of the most important centers of European map printing during this time. In addition to the works of Münster and his circle, other maps were published: maps of Transylvania by Johannes Honter (1532), of Greece by Nikolaos Sophianos (1545), and of Poland-Lithuania by Waclaw Grodecki (around 1560).²⁸⁴ However, a decline after the death of Münster cannot be overlooked.

A second Swiss publishing center in cartography was Zurich, with the famous printing house of the Protestant Christoph Froschauer (the Elder).²⁸⁵ His publications included the Froschauer Bible, a German edition of Luther's translation of the Old Testament of 1525 and the first printed Bible illustrated with a map;²⁸⁶ the *Epitome trium terrae partium* (first issued in 1534), a geography explaining the travels of Saint Paul by the St. Gallen physician, reformer, and humanist Joachim Vadianus (Joachim von Watt), a student at Vienna (from 1501) and successor of Celtis to the chair of poetry and rhetoric (1512–18);²⁸⁷ and the most important edition of *Rudimenta cosmographica*, a textbook with thirteen maps by Johannes Honter, with sixteen issues between 1546 and 1602.²⁸⁸ Froschauer's successor, Christoph Froschauer (the Younger), published the large pictorial maps of the canton (1568) and the city (1576) of Zurich by Jos Murer.²⁸⁹

Another author whose works Froschauer published was the historiographer and Reformed clergyman Jo-

hannes Stumpf, a friend of Tschudi and a competitor of Münster.²⁹⁰ His main work was the chronicle *Gemeiner loblicher Eydnoschafft Stetten, Landen und Völckeren Chronick*, first printed in 1548. Among its more than three thousand illustrations is a map of Switzerland during the Roman period—the oldest known archaeological map of the German area—as well as the following twelve

278. Rudolf Aschmann et al., *Der Humanist Heinrich Loriti, genannt Glarean, 1488–1563: Beiträge zu seinem Leben und Werk* (Glarus: Baeschlin, 1983), and Hans-Hubert Mack, *Humanistische Geisteshaltung und Bildungsbemühungen: Am Beispiel von Heinrich Loriti Glarean (1488–1563)* (Bad Heilbrunn: Klinkhardt, 1992).

279. Bonn, Universitätsbibliothek, and Munich, Universitätsbibliothek; see Edward Heawood, "Glareanus: His Geography and Maps," *Geographical Journal* 25 (1905): 647–54.

280. On Glareanus as a geographer, see Karl Hoheisel, "Henricus Glareanus (1488–1563)," in *Wandlungen*, 83–90.

281. Karrow, *Mapmakers of the Sixteenth Century*, 547–57, and the new standard work by Katharina Koller-Weiss and Christian Sieber, eds., *Aegidius Tschudi und seine Zeit* (Basel: Krebs, 2002).

282. No copy of the 1538 original edition is known; its existence is proved by explanatory texts in German (*Die uralt warhaftig Alpisch Rhetia*) and Latin (*De prisca ac vera Alpina Rhaetia*), both printed in 1538 by Michael Isingrin in Basel. Two editions, from 1560 and 1614, have survived. The basic study on the map is Heinz Balmer, "Die Schweizerkarte des Aegidius Tschudi von 1538," *Gesnerus* 30 (1973): 7–22; for a facsimile, see Aegidius Tschudi, *Nova Rhaetiae atque totius Helvetiae descriptio* (Zurich: Matthieu, 1962). A bibliography of early Italian reprints is given by Franchino Giudicetti in *Die italienischen Nachzeichnungen der Schweizer Karte des Aegidius Tschudi, 1555–1598* (Bern: Cartographica Helvetica, 1993).

283. Tschudi's manuscript estate is today in St. Gallen, Stiftsbibliothek; see the exhibition catalog by Peter Ochsenbein and Kurt Schmuki, *Bibliophiles Sammeln und historisches Forschen: Der Schweizer Polyhistor Aegidius Tschudi, 1505–1572, und sein Nachlass in der Stiftsbibliothek St. Gallen* (St. Gallen: Verlag am Klosterhof, 1991), and, for an overview of the maps, see Walter Blumer, "The Map Drawings of Aegidius Tschudi (1505–1572)," *Imago Mundi* 10 (1953): 57–60.

284. Karrow, *Mapmakers of the Sixteenth Century*, 280–82, 302–15, and 495–99; for an extensive treatment of the publishing history of the map of Greece, see Hieronymus, *Basler Buchillustration*, 541–47.

285. Paul Leemann-Van Elck, *Die Offizin Froschauer, Zürichs berühmte Druckerei im 16. Jahrhundert: Ein Beitrag zur Geschichte der Buchdruckerkunst anlässlich der Halbjahrtausendfeier ihrer Erfindung* (Zurich: Orell Füssli, 1940).

286. Catherine Delano-Smith and Elizabeth Morley Ingram, *Maps in Bibles, 1500–1600: An Illustrated Catalogue* (Geneva: Librairie Droz, 1991), no. 2.1. The map is a reduced copy of the Cranach map (fig. 42.24).

287. Werner Näf, *Vadian und seine Stadt St. Gallen*, 2 vols. (St. Gallen: Fehr, 1944–57). From recent literature, see Ernst Gerhard Rüschi, *Vadian 1484–1984: Drei Beiträge* (St. Gallen: VGS Verlagsgemeinschaft, 1985), and Peter Wegelin, ed., *Vadian und St. Gallen: Ausstellung zum 500. Geburtstag im Waaghaus St. Gallen*, exhibition catalog (St. Gallen: Kantonsbibliothek [Vadiana], 1984).

288. For a survey of the many editions, see Karrow, *Mapmakers of the Sixteenth Century*, 307–13.

289. Meurer, *Fontes cartographici Orteliani*, 205–6.

290. Atilio Bonomo, *Johannes Stumpf: Der Reformator und Geschichtsschreiber* (Genoa: Stab. Tipografico Angelo Pagano, 1923); Hans Müller, *Der Geschichtsschreiber Johann Stumpf: Eine Untersuchung über sein Weltbild* (Zurich: Leemann, 1945); and Karrow, *Mapmakers of the Sixteenth Century*, 510–16.



FIG. 42.23. MAP OF THE ZÜRICH AREA FROM JOHANNES STUMPF'S ATLAS OF SWITZERLAND, *LANDTAFELN*, 1548. The depiction of Das Zürichgow is oriented south and gives a fairly correct map image of the lake area around the Vierwaldstätter See and the Zürich See.

Woodcut and letterpress.

Size of the original: 28 × 41 cm. From Stumpf's *Gemeiner loblicher Eydenoschafft Stetten, Landen und Völckeren Chronick* (Zürich, 1548). Photograph courtesy of the Zentralbibliothek, Zürich (PAS 1064).

folio maps: maps of Europe, France, Germany, and Switzerland and eight maps of Swiss regions (fig. 42.23), which are mainly based on Münster and Tschudi, with additions from Stumpf's own knowledge.²⁹¹ These twelve maps also appeared in a separate printing with the title *Landtafeln* in 1548.²⁹² Considering the de facto separation of Switzerland from the Holy Roman Empire, Stumpf's work must be regarded as an expression of national feeling in the original sense of the word.²⁹³ Older literature on the history of cartography was right to consider the *Landtafeln* the first national atlas.

EARLY GERMAN MAPS OF THE HOLY LAND

Bible study was a part of the daily life of a Reformed Christian more than had ever been the case under Catholicism. The use of maps to accompany and illustrate Bible readings brought a new flourish of maps with reli-

gious subjects. A dominant German tradition in this field—also a consequence of many travels and pilgrim-

291. Two versions of the original designs are preserved in Zürich, Zentralbibliothek (MSS. A67 and P128); see Meurer, *Germania-Karten*, 198–201.

292. Facsimile edition, Johannes Stumpf, *Landtafeln: Der älteste Atlas der Schweiz*, with an accompanying text by Arthur Dürst, *Die Landkarten des Johannes Stumpf* (Langnau: Dorfpresse Gattikon, 1975).

293. It is interesting to read Stumpf's reasons for the inclusion in his work of a general map of the Holy Roman Empire. On this subject, he writes in the introduction to chap. 2 of his chronicle: "Because a greater part of the Helvetian Lands and the Helvetians, which belong today to the Confederation, use German language, customs, and way of life, and because they mostly originate from Germans, and because they were ruled for a long time by German emperors, kings, and princes, and commonly belonged to the Holy Roman Empire; therefore I held it to be useful to regard 'Germany or the German Nation' first and more detailed and exhaustively than the other provinces of Europe" (Stumpf, *Landtafeln*).

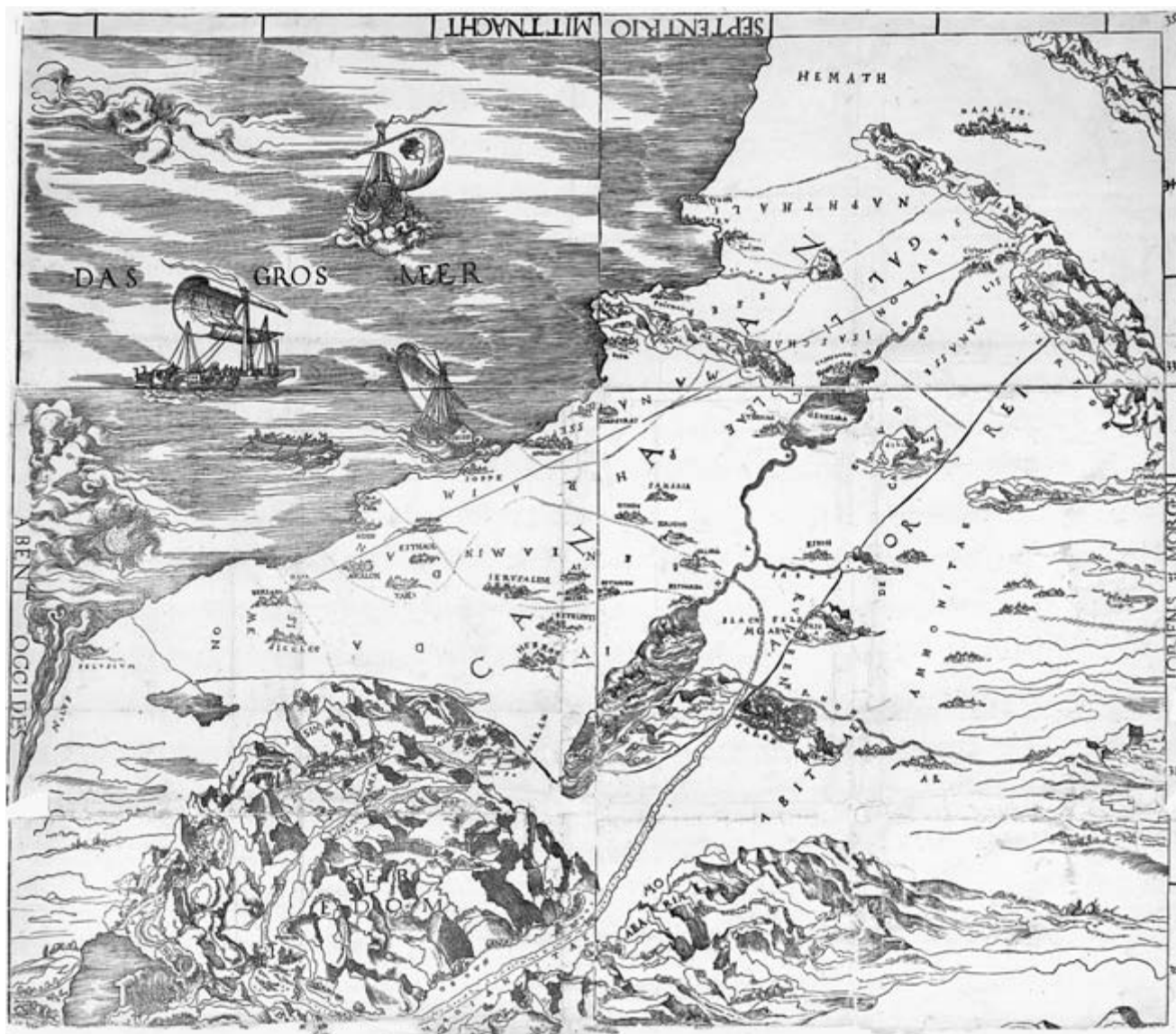


FIG. 42.24. LUCAS CRANACH'S MAP OF THE HOLY LAND, CA. 1515. This is the sole surviving complete copy. Woodcut on six sheets.

Size of the original: 54 × 60.5 cm. Photograph courtesy of the Eran Laor Cartographic Collection, Jewish National and University Library, Jerusalem (Pal 1059).

ages—goes back to the times of incunabula printing.²⁹⁴ Three early examples of maps of religious subjects are the depiction of Palestine in the *Rudimentum novitiorum* of 1475, the *tabula moderna* of Palestine in the 1482 Ulm edition of Ptolemy's *Geography* (a printed version of the map by Marino Sanuto and Pietro Vesconte), and the panorama map of Palestine and view of Jerusalem by Erhard Reuwich in Breydenbach's *Peregrinatio in Terram Sanctam* of 1486.²⁹⁵ All three maps, although schematic, were based on personal knowledge of the Holy Land.

The so-called Cranach map, a six-sheet wall map (fig. 42.24), was an outstanding milestone in the history of mapping the Holy Land and in early German human-

ism.²⁹⁶ The topographical information was probably collected on a pilgrimage made in 1493 by the Saxonian Elector Friedrich III (r. 1486–1525). The woodcutting is

294. The standard work on this subject is still Titus Tobler, *Bibliographia geographica Palaestinae: Kritische Uebersicht gedruckter und ungedruckter Beschreibungen der Reisen ins Heilige Land* (1867; reprinted Amsterdam: Meridian, 1964).

295. See figure 53.1; Nebenzahl, *Maps of the Holy Land*, 42–45 (pl. 15), 60–62 (pl. 20), and 63–67 (pl. 21); and Laor, *Cartobibliography*, 17–19 (nos. 128 and 129) and 86 (no. 603).

296. Laor, *Cartobibliography*, 28 (no. 226), and Arthur Dürst, "Zur Wiederauffindung der Heiligland-Karte von ca. 1515 von Lucas Cranach dem Älteren," *Cartographica Helvetica* 3 (1991): 22–27.

attributed to Lucas Cranach the Elder, who entered the service of the Saxonian court in 1505.²⁹⁷ The exact date of the publication—sometime between 1510 and 1525—and the identity of the cartographer are still largely unknown.²⁹⁸ The pictorial representations are restricted to a panorama of the Sinai massif and the shipping traffic to the harbor of Jaffa. What is striking for the period is the degree of topographic-metric precision. A somewhat pronounced deviation of the coastline and the axis of the Jordan River from north are apparently from the *Tabula Asiae IV*, the map of Palestine in Ptolemy's *Geography*. Boundaries, the names of the tribes, the route of the Exodus, and a determinedly nonemphasized representation of Jerusalem are included.

The first author of maps of the Holy Land associated with the Reformation was the geographer Jacob Ziegler, a fairly restless personality.²⁹⁹ His studies began with Celtis in Ingolstadt (from 1491) and Vienna (from 1504). After two decades of wandering, he lived from 1531 in the reformed Strasbourg. In 1532, an anthology of his work appeared with writings on the geography of the Near East and northern Europe.³⁰⁰ This work was the only printed part of the great project of Ziegler's life: a never completed "new Ptolemy."³⁰¹ The anthology included a series of seven maps showing the Holy Land and its parts.³⁰² Their mathematical construction was based on Ptolemy, the topography on various classical and biblical sources. Distinctive features are the dogleg shape of the Dead Sea and rhumb lines indicating directions and distances from Palestine to cities in Europe and the Middle East. However, Ziegler broke with the Reformation and lived as a professor of Old Testament theology in Vienna (1541–43) and as a private scholar at the episcopal court in Passau.

Ziegler served as a source for some important wall maps during the next decades. The first was the *Amplissima Terrae Sanctae descriptio ad utriusque testamenti intelligentiam* by Gerardus Mercator.³⁰³ In this 1537 wall map, the semi-Protestant Mercator accumulated Ziegler's separate maps into one general map, slightly revised based on other sources. The wall map *Descriptio Palaestinae nova* by Reformed preacher and theology professor Wolfgang Wissemburg of Basel, a pupil of Glareanus, appeared in Strasbourg in 1538 (fig. 42.25).³⁰⁴ This work assembled the separate maps by Ziegler, probably with the author's knowledge and permission as a personal friend.³⁰⁵ An innovative element is the inclusion of many roads. Other distinctive features are the adjusted shape of the Dead Sea and the depiction of the Exodus in a broad band of successive camp scenes. The map's dedication to Thomas Cranmer, archbishop of Canterbury and promoter of the new religious thinking in England, is an illustrative example of the close links between European reformers. As parts of the publishing program of Melanchthon and Stella, wall maps

of the Holy Land (1552) and of the Exodus route (1557) appeared in Wittenberg.³⁰⁶ The topographic image of both

297. Johannes Jahn, 1472–1552, *Lucas Cranach d.Ä.: Das gesamte graphische Werk* (Munich: Rogner und Bernhard, 1972), 290 and 420–21, describing and illustrating the two upper sheets only (today in Cambridge, Harvard University, Houghton Library), and Armin Kunz, "Zur Wiederauffindung der beiden verschollenen Fragmente aus der ehemaligen Hauslab-Liechtensteinischen Graphik-Sammlung," *Cartographica Helvetica* 9 (1994): 42. Copies of the two lower sheets are in Amsterdam, Bibliotheek van de Vrije Universiteit; see Lida Ruitinga, "Die Heiligland-Karte von Lucas Cranach dem Älteren: Das älteste Kartenfragment aus der Kartensammlung der Bibliothek der Freien Universität in Amsterdam," *Cartographica Helvetica* 9 (1994): 40–41.

298. A date of around 1522–23 is proposed by Armin Kunz in "Cranach as Cartographer: The Rediscovered Map of the Holy Land," *Print Quarterly* 12 (1995): 123–44. For a study on the map sources, see Peter H. Meurer, "Analysen zur sogenannten 'Cranach-Karte' des Heiligen Landes und die Frage nach ihrem Autor," in *Geographia spiritualis: Festschrift für Hanno Beck*, ed. Detlef Haberland (Frankfurt am Main: Peter Lang, 1993), 165–75. My hypothesis attributes the cartographic authorship to the Silesian humanist Barthel Stein. He must have become acquainted with Ptolemy during his studies in Cracow (starting in 1595) and Vienna (1505–6). From 1509 to about 1512, he held a professorship in Wittenberg, which can be regarded as the first chair in geography at a German university. Stein's interest in biblical lands is also shown by his posthumously published treatise *Ducum, iudicum, regum Israelitici populi cum ex sacris tum prophanis literis hystorica methodus* (Nuremberg, 1523).

299. Günther, *Jakob Ziegler*; Karl Schottenloher, "Jakob Ziegler aus Landau an der Isar," *Reformationsgeschichtliche Studien und Texte*, vols. 8–10 (1910); and Karrow, *Mapmakers of the Sixteenth Century*, 603–11.

300. Jacob Ziegler, *Quae intus continentur. Syria, ad Ptolomaici operis rationem. Praeterea Strabone, Plinio, & Antonio auctoribus locupletata. Palestina, iisdem auctoribus. Praeterea historia sacra, & Iosepho, et diuo Hieronymo locupletata. Arabia Petreaea, siue, Itinera filiorum Israel per desertum, iisdem auctoribus. Aegyptus, iisdem auctoribus. Praeterea Ioanne Leone arabe grammatico, secundum recentiorum locorum situm, illustrata. Schondia, tradita ab auctoribus, qui in eius operis prologe memorantur . . . Regionum superiorum, singulae tabulae geographicae* (Strasbourg: Petrum Opilionem, 1532). On this subject and Ziegler's manuscript, see Kristian Nissen, "Jacob Ziegler's Palestine Schondia Manuscript, University Library Oslo, MS 917-4°," *Imago Mundi* 13 (1956): 45–52.

301. "Ptolemy" is used here as a generic term for an encyclopedic cosmography with maps.

302. Laor, *Cartobibliography*, 117–18 (nos. 866–70), and Nebenzahl, *Maps of the Holy Land*, 70–71.

303. Nebenzahl, *Maps of the Holy Land*, 72–73.

304. Nebenzahl, *Maps of the Holy Land*, 74–75. The place and date of publication can be derived from two versions of a commentary text, in Latin (*Declaratio tabulae quae descriptionem Terrae Sanctae continet*) and German (*Erklärung der Tafel über das Heilig Land*), printed in 1538 by Wendel Rihel in Strasbourg. On Wissemburg, see Karrow, *Mapmakers of the Sixteenth Century*, 587–90.

305. Ziegler stayed in Basel several times, for instance, in 1529 and 1530. A second edition of his previously mentioned anthology (Strasbourg, 1536) has as an appendix list of biblical place-names by Wissemburg (*Terrae Sanctae descriptio ordinem alphabeti*).

306. Although six hundred copies of the map of the Holy Land were printed in 1552 by Johannes Crato in Wittenberg, no complete exemplar of the map has been traced. Recently discovered was a hitherto unedited fragment, which can be identified as a part from the lower half of this

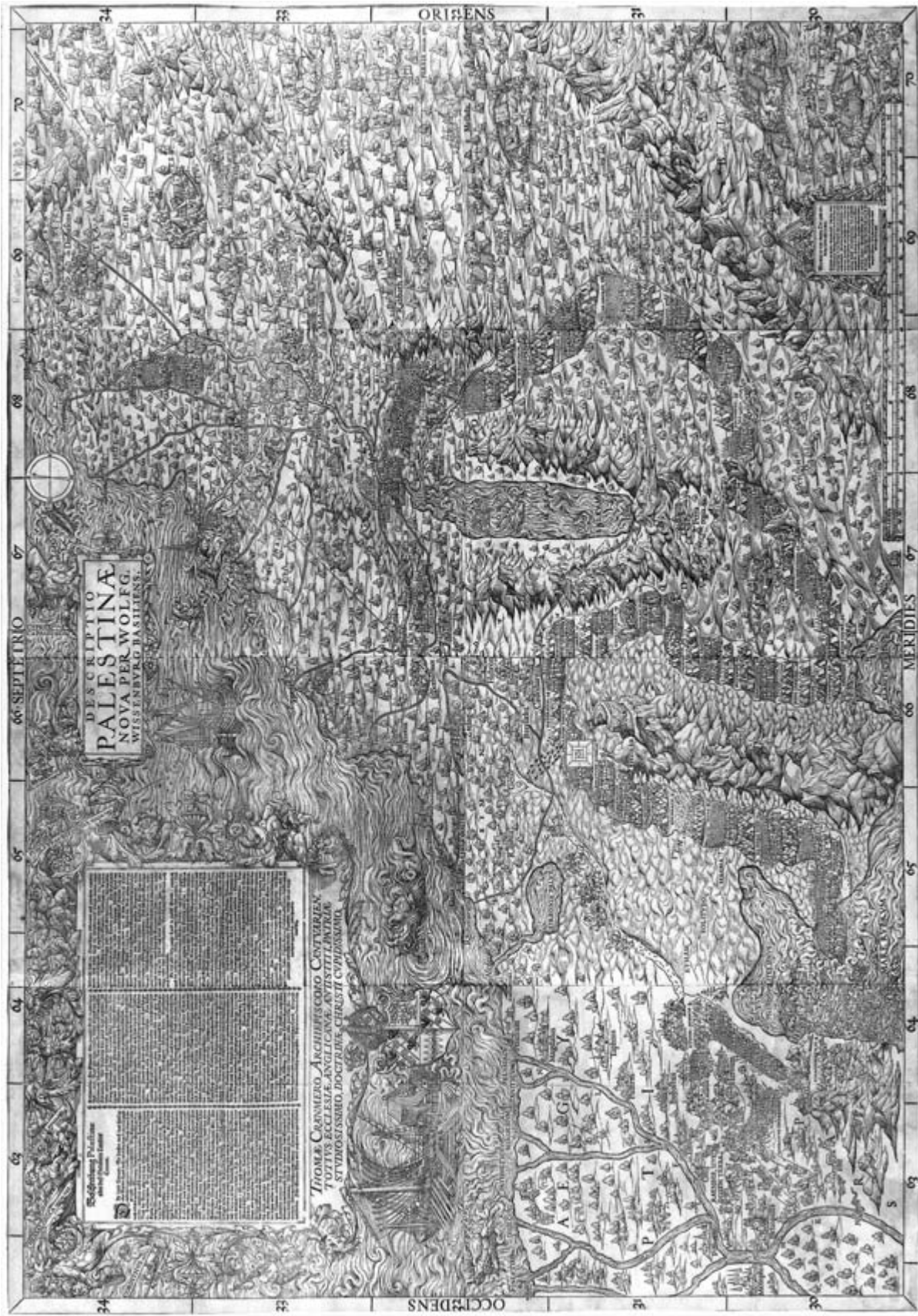


FIG. 42.25. WOLFGANG WISSENBURG'S MAP OF THE HOLY LAND. Titled *Descriptio Palaestinae nova*. Woodcut with inserted texts in letterpress, printed on eight sheets. Size of the original: 74.5 × 105 cm. Photograph courtesy of the BNF (Réf. Ge DD 2987 [10402] B).

maps was adopted from Ziegler's, with amendments from written sources. The importance of Stella's design lies in its adoption by Ortelius and De Jode in their early atlases.

All the maps from Ziegler's to Stella's have a common characteristic: they were not based on any firsthand experience or observation. The first map of sixteenth-century German humanism that could make essential use of primary information was, in fact, made in the Catholic milieu. In 1570, the Antwerp publisher Hieronymus Cock issued the *Nova descriptio amplissimae Terrae Sanctae* by Christiaan Sgrooten, the court geographer of the Spanish King Philip II in the Netherlands.³⁰⁷ It was based mainly on the material collected by a relatively unknown "astronomer," Peter Laicksteen, during his travels in 1556.³⁰⁸ Outstanding features of this map are the many contemporary place-names and the very good depiction of the river systems; however, the scales of Lake Gennesaret and the Dead Sea are exaggerated. Biblical and ancient names may have been added by Sgrooten.

"CATHOLIC CARTOGRAPHY" IN THE AGE OF REFORMATION

Although we have stressed the intensive and stimulating influence of the ideas of the Reformation on contemporary mapmaking, this does not mean that Catholics were not active as cartographers in the German lands during this period. However, on the whole, it appears that Catholic scholars remained rooted in the tradition of classic humanism much longer than their Protestant counterparts. Probably the most important difference was that many Protestant mapmakers had close personal ties with one another. There were no active circles of like-minded individuals, such as those around Münster and Melancthon, among Catholic cartographers in the later sixteenth century. The Catholic mapmaking milieu was made up of individual scholars who worked independently.

A highlight of cartography in political Catholicism—and a counterpart of the 1544 map by Heinrich Zell—is a wall map titled *Germania* published in 1547, most probably in Antwerp, with a dedication signed in Brussels.³⁰⁹ It was compiled on the basis of pre-1545 printed maps, but also using manuscript material, especially for the western and northern parts. In all, this map is nothing but a glorification of the Holy Roman Empire and the emperorship of Charles V (after his victory in the Schmalkaldic War, the year 1547 marked the peak of his power). This is not surprising, for Austrian Christophorus Pyramius (Christoph Kegel), who wrote the preface and the dedication, served Charles as a soldier and secretary from his youth.

An altogether monolithic figure in German cartography around the middle of the sixteenth century was Caspar Vopel, a professor of mathematics on the faculty of

arts at the strongly Catholic University of Cologne.³¹⁰ He started his career shortly after 1530 with the production of globes and astronomical instruments.³¹¹ For the period that followed, there are some gaps in his biography; we do know that his father-in-law, the printer Arend van Aich from Cologne, had some connections to Reformation circles. In 1545, Vopel published a wall map of the world.³¹² Its content was compiled—not always with the greatest care—from different text and map sources. For example, Vopel was not sure whether America and Asia had a land bridge, and as a result we find names on the North American landmass such as "Sinarum R.," "Thebeth," and "Asia Magna." The cordiform projection and especially the decorative elements, such as the figures of Ptolemy and Vespucci, clearly reveal that it is entirely rooted in the humanist tradition of Waldseemüller's world map of 1507. In 1555, Vopel published a wall map

Stella map. A reconstruction results in an eight-sheet map (overall size ca. 76 × 75 cm). The original title was *Typus chorographicus celeberrimorum locorum in Regno Iuda et Regno Israel, ad lectionem sacrum librorum excusa*. The map showing the Exodus route, *Itinera Israelitarum ex Aegypto loca et insignia miracula diversorum locorum et patefactionum divinorum descripta a Tilemano Stella Sigensis ut lectio librorum propheticorum sit illustrior*, is woodcut with inserted texts in letterpress, printed on nine sheets (overall size 86 × 101 cm). The inscription "so that a reading of the prophetic books might be clearer" reflects its function as an aid to Bible study. The only copy of the original Wittenberg edition is in Basel, Universitätsbibliothek. There is a nearly perfect copy, made in 1559 by the Antwerp woodcutter and publisher Bernard van den Putte, at the BNF; see Nebenzahl, *Maps of the Holy Land*, 76–77.

307. Copperplate engraving, printed on nine sheets (overall size ca. 103 × 108 cm). The only copy of the original Antwerp edition is in the BL; see Nebenzahl, *Maps of the Holy Land*, 82–83.

308. Karrow, *Mapmakers of the Sixteenth Century*, 329–31; he is called an astronomer on his map of the Holy Land.

309. Copperplate engraving, printed on twelve sheets (overall size ca. 127 × 143 cm). The only copy is in Wolfenbüttel, Herzog August Bibliothek; see Karrow, *Mapmakers of the Sixteenth Century*, 449–50, and, for a new study, see Meurer, *Germania-Karten*, 279–82.

310. The standard biography is Herbert Koch, *Caspar Vopelius, Kartograph in Köln, 1511–1561* (Jena: B. Vopelius, 1937). See also Karrow, *Mapmakers of the Sixteenth Century*, 558–67 (with some errors regarding the locations).

311. On Vopel's globes and armillaries, see appendix 6.1. The only copy of a printed astrolabe was recently acquired by the Kölnisches Stadtmuseum, Cologne. A new census of Vopel's instruments is in preparation.

312. *Nova et integra universalisque orbis totius iuxta germanam neotericorum traditionem descriptio*; see Walther Ruge, "Die Weltkarte des Kölner Kartographen Caspar Vopel," in *Zu Friedrich Ratzels Gedächtnis: Geplant als Festschrift zum 60. Geburtstage, nun als Grabspende dargebracht* (Leipzig, 1904), 303–18, reprinted in *Acta Cartographica* 20 (1975): 392–405. No copy of the original has survived. We know of reprints by Giovanni Andrea Valvassore (Venice, 1558) in Cambridge, Harvard University, Houghton Library (a woodcut, printed on twelve sheets, 112 × 194 cm; see Shirley, *Mapping of the World*, 115, 117–18 [no. 102]), and by Bernard van den Putte (Antwerp, 1570) in Wolfenbüttel, Herzog August Bibliothek (a woodcut, printed on twelve sheets, 105 × 193 cm; see Shirley, *Mapping of the World*, 146 and 148–49 [no. 123]).



FIG. 42.26. DETAIL FROM CASPAR VOPEL'S MAP OF THE RHINE, 1555. Titled *Recens et germana bicornis a vidi Rheni omnium Germaniae annuum celeberrimi descriptio*. Woodcut, printed on three sheets.

Size of the entire original: 37.5 × 150 cm. Photograph courtesy of the Herzog August Bibliothek, Wolfenbüttel (Map Collection R 9).

of Europe, which was also compiled from secondary sources.³¹³ Also in 1555, the first edition of his archetypal map of the Rhine area appeared, oriented to the west (fig. 42.26).³¹⁴ For this work, Vopel also used existing maps to some degree; for example, the influences of Tschudi's map of Switzerland and Jacob van Deventer's provincial maps of the Low Countries are recognizable. However, the entire middle part of the map is based on primary sources, and the rivers are represented especially well and are very detailed. It can be assumed that Vopel made his own surveys. This Vopel map was copied re-

peatedly—with some modifications—until the end of the seventeenth century.³¹⁵

THE PERIOD OF THE FIRST SURVEYS

Shortly after the middle of the sixteenth century, a new phase in the history of German cartography began. Although it can be clearly recognized, its end cannot be precisely determined. There were three decisive factors in this epoch: the increasing political power of regional rulers, and thus the increasing formation of the individual territories in the Holy Roman Empire; the growing need of regional administrations for accurate data on property issues for fiscal, legal, and military purposes; and the presence of specially trained surveyors who were increasingly working full time. It was on this basis that the first more or less reliable topographic surveys were conducted in several German territories in the ensuing period, although not all regional rulers recognized the value of accurate maps and data for the purposes of their administrations. In other territories the collection of statistical and descriptive data in noncartographic form was considered sufficient.

Around 1550, there was sufficient technical knowledge for mapping projects in the German area. By then, enough surveying textbooks were available in German, written on a relatively simplistic level.³¹⁶ Simple geometric procedures with measurements of distances and angles

313. *Europae primae et potentissimae tertiae terrae partis recens descriptio* (woodcut). No copy of the 1555 first edition has been traced. There was a 1597 reprint made using the original blocks by the Cologne publisher Wilhelm Lützenkirchen, accompanied by a book, *Supplementum Europae Vopeliana. Das ist: Ein weiter Zusatz und Erklärung der Tafel Europae . . .*, by Matthias Quad. The only complete copy of this edition (a woodcut, printed on twelve sheets, ca. 94 × 135 cm) is in Chicago, Newberry Library; three separate sheets are in Darmstadt, Hessischen Landesbibliothek. This Vopel map was also copied by Bernard van den Putte in Antwerp (a woodcut, printed on twelve sheets, ca. 93 × 134 cm). We know editions of 1566 (BNF) and 1572 (Wolfenbüttel, Herzog August Bibliothek).

314. H. Michow, "Caspar Vopel und seine Rheinkarte vom Jahre 1558," *Mitteilungen der Geographischen Gesellschaft in Hamburg* 19 (1903): 217–41, reprinted in *Acta Cartographica* 6 (1969): 311–35, and Caspar Vopel, *Recens et germana bicornis ac vidi Rheni omnium Germaniae annuum celeberrimi descriptio*, facsimile accompanied by Traudl Seifert, *Caspar Vopelius: Rheinkarte von 1555* (Stuttgart: Müller and Schindler, 1982). There are known copies of the 1555 first edition (e.g., fig. 42.26) and reprints from the original woodblocks of 1558 (Schwerin, Landesbibliothek Mecklenburg-Vorpommern) and 1560 (Bonn, Collection Fritz Hellwig).

315. Klaus Stopp, *Die monumentalen Rheinflaufkarten aus der Blütezeit der Kartographie* (Wiesbaden: Kalle Aktienges., [1969]).

316. In addition to books by Albrecht Dürer and Sebastian Münster, there were these textbooks: Jakob Köbel, *Geometrei, vom künstlichem Messen vnd Absehen allerhand Höhe . . .* (Frankfurt, 1536), and Walther Hermann Ryff (Gualterius Rivius), *Perspectiva*, published as part of his *Der furnembsten, notwendigsten, der ganzen Architec-*

and the graphic transformation of collected data were part of the education of artisans such as master builders or painters. It can be assumed that these skills were generally known in local cartography; there are documented examples in nearly all parts of the German region from the middle of the sixteenth century.³¹⁷ However, there was no permanent tradition of estate mapping in this period. Sixteenth-century large-scale manuscript maps in the German area were made mainly for concrete purposes such as the settlement of legal disputes or as the basis for planning.³¹⁸ An exception was town maps, most of which were officially commissioned to demonstrate a town's glory and importance.³¹⁹ There also remained great variety in the way the three-dimensional world was transformed into a two-dimensional cartographic image. All types of representation—orthographic maps, perspective representations, and oblique sketches—continued to co-exist. *Landtafeln*, large-sized pictorial maps, mostly of relatively small regions (plate 45), were made by painters as a *unicum* for certain occasions as well as for purely decorative purposes.³²⁰

At the same time, there was a change in the professional image of the cartographer. The humanist universalist disappeared almost completely from the milieu. Local and regional surveying became the work of professionals with nonacademic backgrounds. The map of the Bavarian Palatinate printed in 1540 in Nuremberg represents a dividing line between the humanist traditions of scholarly mapmaking and a new cartographic craftsmanship. This map was made by Erhard Reich, a Tyrolean master builder in the service of the bishop of Eichstätt and of the Count Palatine court.³²¹ The execution of a fairly exact survey of a larger territory demanded specialists who could, probably in addition to other related tasks, undertake this project full time. Thus developed the early *mathematici*, *geometrici*, and *cosmographici* at the German courts. Tilemann Stella was probably the first cartographer of this new genre.

The qualifications and availability of such suitable specialists often determined whether a topographic survey would be undertaken in a German territory. An illustrative example is that of Godfried Mascop from Emmerich on the lower Rhine.³²² Renowned for a map of West-

tur . . . (Nuremberg, 1547). A good survey on the subject is given by Wolfram Dolz in "Vermessungsmethoden und Feldmeßinstrumente zur Zeit Gerard Mercators," in *Mercator*, 13–38. For a bibliography, see Klaus Grewe, *Bibliographie zur Geschichte des Vermessungswesens* (Stuttgart: Wittwer, 1984).

317. It is impossible to provide a complete treatment of this subject here. The reader is referred to regional surveys and exhibition catalogs such as Oehme, *Kartographie des deutschen Südwestens*; Schnellbögl, *Nürnberger Kartographie*; Meinrad Pizzinini, *Tirol im Kartenbild bis 1800* (Innsbruck: Tiroler Landesmuseum Ferdinandeum, 1975); Günter Tiggesbäumker, *Mittelfranken in alten Landkarten: Ausstellung der Staatlichen Bibliothek Ansbach* (Ansbach: Historischer Verein für Mittelfranken, 1984); Heiko Leerhoff, *Niedersachsen in alten Karten: Eine*

Auswahl von Karten des 16. bis 18. Jahrhunderts aus den niedersächsischen Staatsarchiven (Neumünster: Wachholtz, 1985); Hans-Joachim Behr and Franz-Josef Heyen, eds., *Geschichte in Karten: Historische Ansichten aus den Rheinlanden und Westfalen* (Düsseldorf: Schwann, 1985); Jürgen Hagel, *Stuttgart im Spiegel alter Karten und Pläne: Ausstellung des Hauptstaatsarchivs Stuttgart* (Stuttgart: Hauptstaatsarchiv, 1984); Heinz Musall et al., *Landkarten aus vier Jahrhunderten: Katalog zur Ausstellung des Generallandesarchivs Karlsruhe, Mai 1986* (Karlsruhe: Fachhochschule Karlsruhe, 1986); Fritz Wolff, *Karten im Archiv*, exhibition catalog (Marburg: Archivschule Marburg, 1987), mostly on maps of Hesse; and Gerhard Leidel and Monika Ruth Franz, *Altbayerische Flußlandschaften an Donau, Lech, Isar und Inn: Handgezeichnete Karten des 16. bis 18. Jahrhunderts aus dem Bayerischen Hauptstaatsarchiv* (Weissenhorn: A. H. Konrad, 1998).

318. An interesting group of sources on legal cartography are the maps that were made for reference in settling disputes at the Reichskammergericht, the Imperial Court of Justice. They are today scattered in many regional archives.

319. For an overview, see the anthology by Wolfgang Behringer and Bernd Roeck, eds., *Das Bild der Stadt in der Neuzeit, 1400–1800* (Munich: C. H. Beck, 1999).

320. The term *Landtafel* is problematic. In sixteenth-century contemporary usage, *Landtafel* was the most frequently used synonym for *Landkarte* (map). For present-day use, I propose that use of the term be restricted to objects that fulfill two criteria: first, they are drawn or painted representations, as a rule in a larger format, for example, to be used as a representative wall decoration; and second, although the works could be based on surveys, the representation is always in perspective, presented in the manner of a panorama. Little has been contributed to this discussion by the history of cartography. Very interesting aspects from the viewpoint of art history are offered by Gustav Solar in *Das Panorama und seine Vorentwicklung bis zu Hans Conrad Escher von der Linth* (Zurich: Orell Füssli, 1979), 68–75. An exhaustive study of *Landtafeln* (with a catalog) would be an interesting area for future research. A sizable number of *Landtafeln* exist, including the following.

- The perspective view of the area of the imperial city of Rothenburg ob der Tauber (1537) by Wilhelm Ziegler (Nuremberg, Germanisches Nationalmuseum, 158 × 165 cm); see Walter M. Brod, "Fränkische Hof- und Stadtmaler als Kartographen," in *Kartengeschichte und Kartenbearbeitung: Festschrift zum 80. Geburtstag von Wilhelm Bonacker*, ed. Karl-Heinz Meine (Bad Godesberg: Kirschbaum, 1968), 49–57.
- The map of the lower reaches of the Elbe River (1568) by Melchior Lorichs (Hamburg, Staatsarchiv, 44 sheets, total size 109 × 1215 cm); see Jürgen Bolland, *Die Hamburger Elbkarte aus dem Jahre 1568, gezeichnet von Melchior Lorichs*, 3d ed. (Hamburg: H. Christians, 1985).
- The *Landtafel* of Pinneberg in Holstein (1588) by Daniel Frese (Bückeburg, Schloßmuseum, 450 × 500 cm); see Lorenz Petersen, "Daniel Freses 'Landtafel' der Grafschaft Holstein (Pinneberg) aus dem Jahre 1588," *Zeitschrift der Gesellschaft für Schleswig-Holsteinische Geschichte* 70–71 (1943): 224–46.
- The map of the Upper Danube region by Philipp Renlin the Elder (Stuttgart, Landesmuseum, 112 × 265 cm); see Oehme, *Kartographie des deutschen Südwestens*, 98–99 and pl. 111.

The most important author of *Landtafeln* in southern Germany was Johann Andreas Rauch; see Oehme, *Kartographie des deutschen Südwestens*, 89–94, and Ruthardt Oehme, "Johann Andreas Rauch and His Plan of Rickenbach," *Imago Mundi* 9 (1952): 105–7.

321. Karrow, *Mapmakers of the Sixteenth Century*, 451–52.

322. Peter H. Meurer, "Godfried Mascop: Ein deutscher Regional-kartograph des 16. Jahrhunderts," *Kartographische Nachrichten* 32 (1982): 184–92, and Karrow, *Mapmakers of the Sixteenth Century*, 367–70.

phalia printed in 1568, he joined the service of Duke Julius of Braunschweig in Wolfenbüttel in 1572.³²³ His many duties included teaching at the ducal gymnasium in Gandersheim two hours per day, making globes and instruments for the ducal library in Wolfenbüttel, making a map of the duchy of Braunschweig, and completing his own project, the *Opus descriptionis Germaniae*.³²⁴ However, Mascop left this position after one year; the first exact survey of the duchy of Braunschweig had to wait nearly fifty years.³²⁵ From 1575 to 1577, Mascop was in the service of the archbishop of Mainz as *cosmographus*. His large-scale map of the survey of that territory remained a fragment, probably because of the author's death.³²⁶ A complete mapping of the Archbishopric of Mayence was not done until a century later.³²⁷

In general, the execution and quality of a topographic survey depended on the degree to which the particular authorities were personally involved. When German rulers recognized the value and benefits of cartography and became open-minded patrons, excellent work was possible. Some of the most important projects are presented individually in the sections that follow. The descriptions illustrate that the results of officially executed surveys were part of the knowledge controlled by the ruling administration. The ruler alone decided whether such maps were published.

PHILIPP APIAN'S SURVEY OF BAVARIA

Philipp Apian, the son of Peter Apian, began his studies of mathematics in 1542 at the University of Ingolstadt.³²⁸ He completed his education in studies of law and mathematics at Strasbourg, Paris, and Bourges. After returning to Ingolstadt in 1552, he took over his father's professorial chair in mathematics at the university. Two years later, he received an order from Duke Albrecht V to make a comprehensive topographic survey of Bavaria. Apian carried out the fieldwork with two assistants during seven summers from 1554 to 1561. The surveying scale was about 1:45,000. The first product was a manuscript completed in 1563 in the form of a *Landtafel* with a format of about five by five meters.³²⁹ At the duke's express order, Apian prepared the work for printing. The re-drawing to a scale of about 1:135,000 was completed in 1566. The woodblocks were cut by the artist Jost Amman, a native of Zurich.³³⁰ In 1568, the first printing of the *Bairische Landtafeln XXIII* was carried out in Apian's print shop in Ingolstadt. It appeared as an atlas containing a title page, a general overview map, and a main map consisting of twenty-four sections that could be assembled to form a wall map with a format of about 171 by 169 centimeters (fig. 42.27).³³¹

Philipp Apian's work was the first undertaking of its kind that was definitively made at official request. Mathematically and cartographically, it was more accurate

than any other regional map of the period. The average error in latitude was only about 1.5 minutes, and the average error in longitude about 1.4 minutes. The map was the result of astronomical calculations for localities, measurements of angles, measurements of distances with the help of itineraries, and detailed on-site cartographic drawings. It was probably the first German cartographic work that used triangulation based on the new technique

323. Details on Mascops's duties in Wolfenbüttel are known from a certificate of appointment, edited by Peter H. Meurer in "Der Kartograph Godfried Mascop und die junge Wolfenbütteler Bibliothek," *Wolfenbütteler Notizen zur Buchgeschichte* 23 (1998): 79–86.

324. As a particular aspect of the mapping of the duchy, the duke demanded a detailed stocktaking of natural resources: hydrography (for the building of mills), forests (with specification of kinds and ages of trees), and kinds and deposits of minerals and earth. On the *Opus descriptionis Germaniae*, see Meurer, *Germania-Karten*, 272–73. This project was very similar to that of Stella. Mascop had the idea brought to Wolfenbüttel; it called for the creation of a general map of the Holy Roman Empire, regional maps of every territory, and particular maps of the singular *Ämter* (the *Amt* was the lowest unit in German administrative subdivisions). In return for his sponsorship, Duke Julius claimed all rights to the project, especially the right of publication with a pre-viewed dedication to the Imperial Court of Justice. However, no traces of this ambitious mapping project have survived.

325. The map by Caspar Dauthendey, surveyor and building supervisor at the Braunschweig court, appeared around 1630; see Fritz Hellwig, "Caspar Dauthendey und seine Karte von Braunschweig," *Speculum Orbis* 2 (1986): 25–33.

326. A manuscript atlas with fifteen district maps and three town maps is kept in the Staatsarchiv Würzburg (Mainzer Pläne, Wandgestell 10); they were studied by Gottfried Kneib in "Der Kurmainzer Kartograph Gottfried Mascop," *Mainzer Zeitschrift* 87–88 (1992–93): 209–68.

327. Around 1680, the atlas *Novae Archiepiscopatus Moguntini tabulae* was published by the cartographer, publisher, and engraver Nicolas Person; see Helmut Häuser, "Zum kartographischen Werk des Mainzer Kupferstechers und Ingenieurs Nikolaus Person," in *Festschrift für Josef Benzing zum sechzigsten Geburtstag*, ed. Elisabeth Geck and Guido Pressler (Wiesbaden: Pressler, 1964), 170–86, and idem, "Der Mainzer Atlas von Nikolaus Person," *Lebendiges Rheinland-Pfalz* 13 (1976): 21–25.

328. The fundamental work on Philipp Apian is Hans Wolff et al., *Philipp Apian und die Kartographie der Renaissance*, exhibition catalog (Weißenhorn: Anton H. Konrad, 1989). See also Karrow, *Map-makers of the Sixteenth Century*, 64–70. Apian enrolled in the university at the age of eleven together with his older brothers Theodor and Timotheus. The *matricula* notes that the brothers were exempted from the matriculation fee "because of the excellence of their father" (Peter Apian).

329. It was destroyed in 1792. A copy on forty sheets of paper that was made in 1756 was lost in 1945.

330. This Apian map is among the specimens of woodcut and stereotyped lettering combined in map printing. The original printing blocks are kept at the Bayerisches Nationalmuseum in Munich. See figure 22.11 and David Woodward, "The Woodcut Technique," in *Five Centuries of Map Printing*, ed. David Woodward (Chicago: University of Chicago Press, 1975), 25–50, esp. 46–47 and fig. 2.5.

331. Wolff's *Philipp Apian* includes reduced reproductions of all maps. There are several facsimile editions of the original size by private and public publishers; a good commentary is provided in Philipp Apian, *Bairische Landtafeln XIII*, with introductions by Gertrud Stetter and Alois Fauser (Munich: Süddeutscher, 1966).

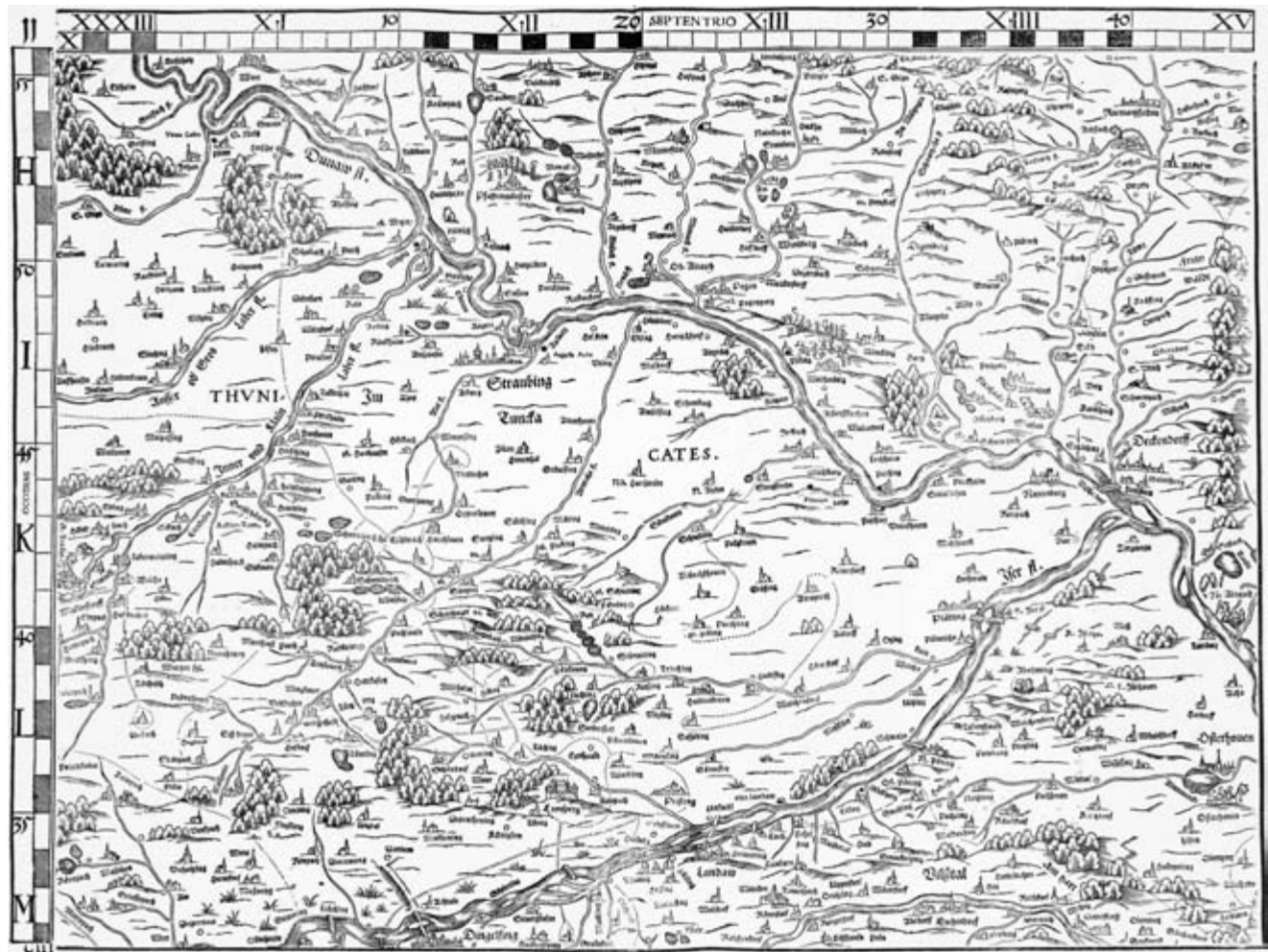


FIG. 42.27. ONE SHEET FROM PHILIPP APIAN'S SURVEY OF BAVARIA, 1568.

Size of sheet: 39 × 51 cm. Photograph courtesy of the Newberry Library, Chicago (Ayer *f7 A71 1568, sheet 11).

of Gemma Frisius, which should have been particularly well known to the Apians. The topographic content of the map was overwhelming. A total of more than one thousand settlements were mapped. The representation was strictly orthographic, with realistically designed miniatures for settlements in silhouette and equally realistic pictorial depictions of mountains, forests, and river meadows. Even unique elements such as salt pans, spas, road crossings, and locations of battles were shown. However, there were no roads or paths.

Philipp Apian's topographic survey of Bavaria was printed. Clearly the secrecy that was imposed in other territories—probably for military reasons—was not practiced in Bavaria. Duke Albrecht V was a liberal, enlightened Renaissance prince. He considered the wide dissemination of the survey for practical application in all areas of the territory the greater asset. The map was also a piece of art, decoratively designed by one of the best woodcutters of the period, and therefore a demonstration

of the greatness and wealth of the region and of the duke. Philipp Apian also authored a corresponding regional description, *Declaratio sive descriptione Bavariae*. It was supposed to have been published as an accompanying book, and the woodblocks for the town views that were intended to be included were finished by Jost Amman. But publication did not take place due to Apian's conflict with the Catholic court over his sympathy for the Reformation. In 1569, he was appointed professor of geometry and astronomy at the regional university of the reformed duchy of Württemberg in Tübingen, where he lived for the remainder of his life. He took his private property with him—including the woodblocks for the *Landtafeln*—when he left Ingolstadt. To be independent from Apian in the future, Duke Albrecht V made a copper-engraved version of the map in 1579. There were many further editions of both versions. Nearly all maps of Bavaria until the end of the eighteenth century were more or less based on Apian's outstanding archetype.

SURVEYS IN WÜRTTEMBERG

Philipp Apian did not work as a cartographer in the Duchy of Württemberg, probably out of loyalty to Duke Albrecht of Bavaria. But even without him, this territory became one of the best-mapped German regions in the late sixteenth century.³³² The driving force was mainly the interest of regional rulers in obtaining reliable geographical data, particularly for mercantile purposes. Three cartographic works were made in this context. First, a 1575 atlas with fifty-one district maps at a scale of around 1:150,000 was made by the ducal notary Heinrich Schweickher.³³³ Second, an atlas of the administrative areas of Württemberg (*Chorographia Ducatus Wirtenbergici*) with twenty maps at a scale of around 1:80,000 was produced between 1572 and 1596 by the jurist and engineer Georg Gadner, an Ingolstadt student of Peter Apian (fig. 42.28).³³⁴ Third, an atlas with maps of thirty Württemberg lakes and ponds was compiled by the surveyor Jakob Ramminger in 1596.³³⁵ In technical terms, all three atlases were inferior to Apian's map of Bavaria. The methods on which they were based were probably restricted to simple measurements of paces and on-site mapping. The style of the drawings also seems antiquated; the close relation to landscape paintings is still very apparent in the orthogonal perspective representations.

None of these three projects was ever officially published. The Gadner material, however, served as the basis for a highly influential map of Württemberg published by Abraham Ortelius in his *Theatrum orbis terrarum* from 1572 onward. This is an example of piracy in sixteenth-century German cartography, for Gadner asserted throughout his life that this publication was issued without his approval.

ARNOLDUS MERCATOR'S SURVEY OF
THE ARCHBISHOPRIC OF TRIER

Arnoldus Mercator, the oldest son of Gerardus Mercator, is an underestimated figure in the history of cartography.³³⁶ One reason is that his masterpiece has survived in a very complicated way. In 1558, the territory of the Imperial Abbey of Prüm (in the southern part of the Eifel) was incorporated into the Archbishopric and Electorate of Trier. To survey this new acquisition, Archbishop Johann von der Leyen (r. 1556–67) employed the young Arnoldus Mercator. When this task was finished in 1560,³³⁷ the order was expanded to a survey of the entire Trier territory. Nearly all secondary sources on this project were unfortunately lost. One must assume that the enlightened elector suddenly realized the usefulness of detailed maps for the various purposes of his administration. The immediate background could have been an attempt under the Calvinist evangelist Caspar Olevian,

from 1559 onward, to introduce the Reformation in Trier. The success of this mission would have had lasting consequences for the balance of the Holy Roman Empire.

Arnoldus Mercator's survey of Trier, at scales of between 1:55,000 and 1:87,000, was finished around 1567.³³⁸ The original 1567 manuscript map of the *Oberstift* (i.e., the northeastern part of Trier) has survived (plate 46); the mapping of the southern part exists only in the form of an eighteenth-century manuscript copied from the 1566 Mercator original by the surveyor Peter Balthasar in 1776,³³⁹ and the *Niederstift* (i.e., the north-eastern part) is shown on an engraved wall map bearing a dated imprint of 1669 by Nicolas Person.³⁴⁰ Research reveals that this engraving was finished in 1602 by the Cologne cartographer Matthias Quad, by order of the newly elected Archbishop Lothar von Metternich (r. 1599–1623). An official publication was never made, but Arnoldus Mercator's work found its way into printed cartography. A detailed study shows that it was used around 1570 to compile the first manuscript atlas by

332. For an overview, see Oehme, *Kartographie des deutschen Südwestens*, and Hagel, *Stuttgart*.

333. Stuttgart, Württembergische Landesbibliothek (Cod. Hist. 4°102); see Heinrich Schweickher, *Der Atlas des Herzogtums Württemberg vom Jahre 1575*, ed. Wolfgang Irtenkauf, facsimile with introduction (Stuttgart: Müller und Schindler, 1979).

334. Oehme, *Kartographie des deutschen Südwestens*, 36–40 and pl. IV; Hagel, *Stuttgart*, no. 2; Margareta Bull-Reichenmiller et al., "Beritten, beschrieben und gerissen": *Georg Gadner und sein kartographisches Werk, 1559–1602* (Stuttgart: Hauptstaatsarchiv, 1996); for a facsimile, see Roland Haberlein, ed., *Chorographia Ducatus Wirtenbergici: Forstkartenwerk von Georg Gadner (1585–1596) und Johannes Oettinger (1609–1612)* (Stuttgart: Landesvermessungsamt Baden-Württemberg, 1992–).

335. Stuttgart, Württembergische Landesbibliothek (Cod. Hist. Fol. 261); see Hagel, *Stuttgart*, no. 3 with ill. 3, and Julius Hartmann, "Jakob Rammingers Seebuch," *Württembergische Jahrbücher für Statistik und Landeskunde*, 1895, 1–22.

336. The following is based on material collected by the author for a monograph on Arnoldus Mercator. For a preliminary summary, see Peter H. Meurer, "Les fils et petits-fils de Mercator," in *Gérard Mercator cosmographe: Le temps et l'espace*, ed. Marcel Watelet (Antwerp: Fonds Mercator Paribas, 1994), 370–85.

337. This mapping has survived in the form of a manuscript copy (62 × 123.5 cm) made in 1761 by the Trier surveyor Stephan Haack (Stadtarchiv Trier, Kt 3/44).

338. Fritz Hellwig, "Zur älteren Kartographie der Saargegend," *Jahrbuch für westdeutsche Landesgeschichte* 3 (1977): 193–228, and Jürgen Hartmann, "Die Moselaufnahme des Arnold Mercator: Anmerkungen zu zwei Karten des Landeshauptarchivs Koblenz," *Jahrbuch für westdeutsche Landesgeschichte* 5 (1979): 91–102.

339. Colored manuscript (89 × 117 cm), Staatsbibliothek zu Berlin (Kart N 35860); see Roland Geiger, "Die Ämter des Erzbistums Trier zwischen Mosel und Blies: Eine Kartenaufnahme von Arnold Mercator aus dem Jahre 1566 in einer 'Kopie' von Peter Balthasar von 1776," *Heimatbuch des Landkreises St. Wendel* 26 (1994): 125–30.

340. Engraving, printed on eight sheets (overall size 92.5 × 132 cm). Copies are in the Staatsbibliothek zu Berlin; at the BL; and at the Landeshauptarchiv Koblenz (among other places).

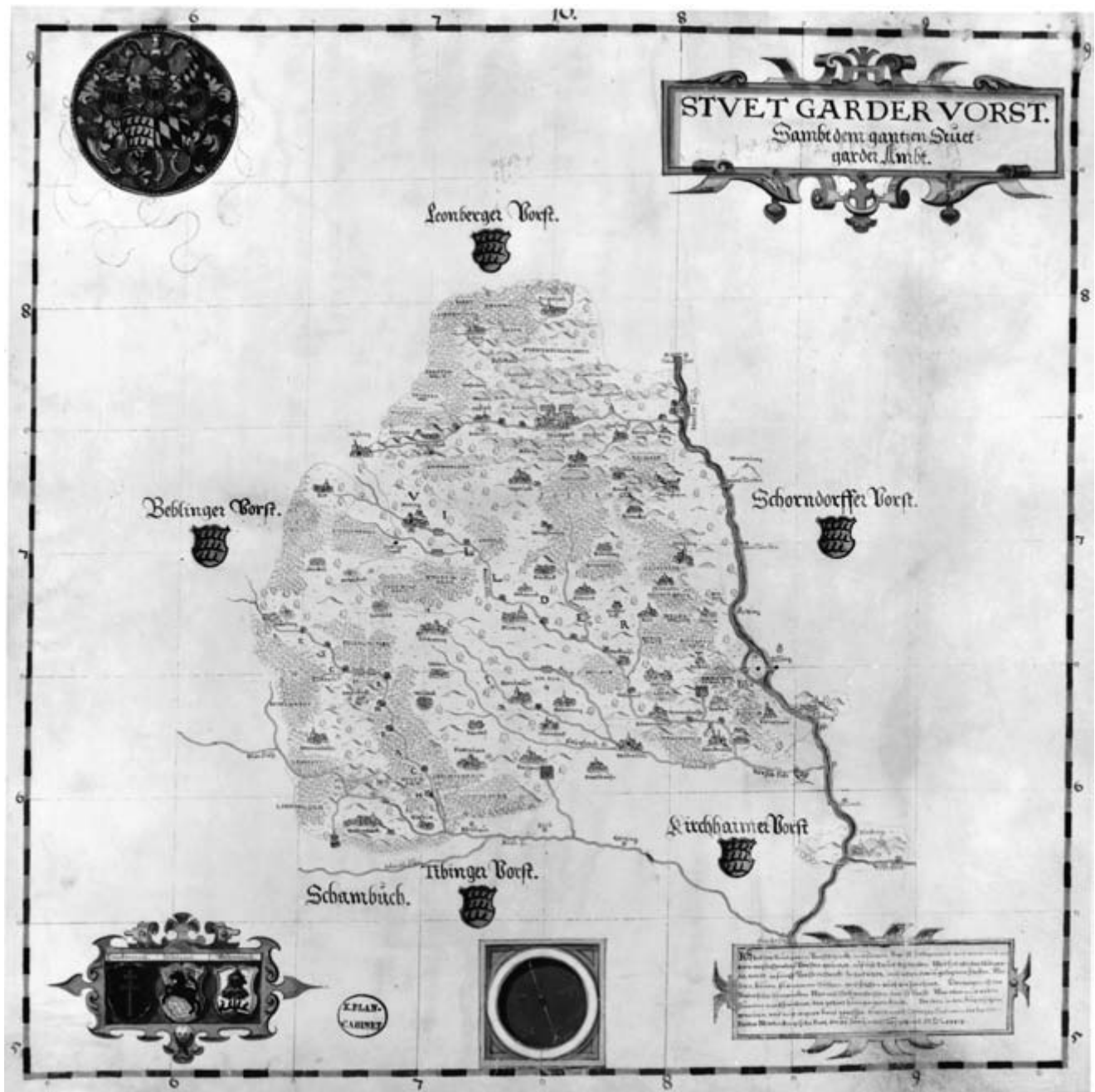


FIG. 42.28. ONE SHEET FROM GEORGE GADNER'S SURVEY OF WÜRTTEMBERG. Drawing with ink and watercolors on parchment; sheet 14 titled *Stuetgarder Vorst. Sambt*

dem gantzen Stuetgarder Amte.

Size of the original: 40.5 × 41.5 cm. Photograph courtesy of the Hauptstaatsarchiv Stuttgart (N 3 Nr. 1, Blatt 14).

Christiaan Sgrooten. It may have been Sgrooten, too, who gave the material to the Antwerp publisher Gerard de Jode, whose 1578 atlas includes the first printed map of the Archbishopric of Trier, for whatever reason signed by the engineer and surveyor Jan van Schilde.³⁴¹

The result of Mercator's seven years of fieldwork can compete in all respects with the Apian map of Bavaria. The metrical accuracy is great, and the measurements

were surely based on modern triangulations. Conventional signs differentiate between towns and villages with

341. Peter H. Meurer, "Die 'Trevirensis Episcopatus exactissima descriptio' des Jan van Schilde: Analysen zur ältesten gedruckten Karte von Kurtrier," in *Aktuelle Forschungen aus dem Fachbereich VI Geographie/Geowissenschaften*, ed. Roland Baumhauer (Trier: Geographische Gesellschaft Trier, 1997), 285–300.

castles, monasteries, mills, iron melts, and places where executions were carried out; the individually designed miniatures in many cases represent local features. Different linear signs mark the district borders and the main roads. While forests, rivers, and streams are mapped in much detail, the orographical elements are nearly disregarded.

An interesting detail on the 1567 original drawing is a decorative depiction of the so-called Column of Igel, the greatest surviving Roman grave monument north of the Alps.³⁴² This illustrates that although Arnoldus Mercator was a technically educated surveyor, he was also deeply rooted in humanist tradition. Such interests become more obvious in his next great task: the production of a large-scale map of the town of Cologne with detailed isometric representations of all buildings, resulting again from extensive surveys.³⁴³ The entire true and idealized size of the commercial metropolis as well as its pride in its long history is revealed in the decorative margins. They show Roman antiquities from the city district of the old *Colonia Claudi Augusta Agrippinensium*. Arnoldus Mercator also studied the “Codex Argenteus,” a unique biblical manuscript in Gothic language that was discovered in 1554 in the Abbey of Werden near Duisburg.³⁴⁴

CARTOGRAPHY AT THE HESSIAN COURT IN KASSEL

The value of good regional maps was recognized very early at the court of Hesse in Kassel.³⁴⁵ By 1528, Landgrave Philipp had paid for tools and materials for an overview map of the territory.³⁴⁶ Cartography and its related disciplines, such as astronomy and mathematics, advanced enormously in Hesse under the patronage of Landgrave Wilhelm IV (the Wise, r. 1567–92), who himself had been educated as an astronomer and architect. In 1560, he established an observatory in the castle in Kassel where Tycho Brahe, among other scholars, made a working visit.³⁴⁷ Jost Bürgi, a mathematician, astronomer, and instrument-maker who was a native of Switzerland, was made its director in 1579. Bürgi made numerous astronomical instruments in Kassel, among them mechanical celestial globes. He started a Kassel star catalog, but it was never completed. Bürgi is also important as a co-inventor of logarithms, contemporaneous to but independent of John Napier.

Permanently employed surveyors are documented at the court in Kassel from 1567. The most prolific among them was Joist Moers.³⁴⁸ He made numerous manuscript maps of Hessian lands, which, with the exception of a map of the county of Waldeck, were never printed. In 1585, Wilhelm IV commissioned Arnoldus Mercator to make the first complete topographic survey of the entire territory of Hesse.³⁴⁹ After Mercator’s death, the work was continued by his son Johannes Mercator until 1592,

but the project was never finished. Only a map of the southern parts of Hesse has been preserved; it is of the same quality as the Mercator survey of Trier.³⁵⁰

In 1593, Landgrave Moritz hired Wilhelm Dilich, one of the most able regional cartographers of the period. Dilich started a new topographic survey of Hesse in 1607. The plan was to prepare an atlas with a total of 170 sheets at scales of between about 1:8,000 and 1:22,000. However, Dilich underestimated the magnitude of this undertaking. He managed to complete thirty manuscript maps before 1617 based on very exact trigonometrical surveys.³⁵¹ The representation, which is very detailed because of the large scale, is orthometric, but the skillful coloration still produced a realistic image. After quarrels with Moritz, Dilich entered the service of the elector of

342. On the many depictions of this monument, see Jacques Mersch, *La Colonne d'Igel: Essai historique et iconographique = Das Denkmal von Igel: Historisch-ikonographische Studie* (Luxembourg: Publications Mosellanes, 1985).

343. The original drawing of 1570 (108 × 170 cm) is in Cologne, Historisches Archiv der Stadt Köln. Copper-engraved editions, printed on sixteen sheets (113 × 175 cm) were published in 1571 by Mercator and in 1642 by Hondius in Amsterdam (from the original plates); see Joseph Hansen, “Arnold Mercator und die wiederentdeckten Kölner Stadtpläne von 1571 und 1642,” *Mitteilungen aus dem Stadtarchiv von Köln* 11 (1899): 141–58, and Reiner Dieckhoff, “Zu Arnold Mercators Ansicht der Stadt Köln aus der Vogelschau von 1570/71,” in *Die räumliche Entwicklung der Stadt Köln von der Römerzeit bis in unsere Tage: Die Vogelschauansicht des Arnold Mercator aus dem Jahre 1570/71 und ein jemölicher Verzäil zum Stadtmodell im Kölnischen Stadtmuseum*, ed. Werner Schäfke (Cologne: Kölnisches Stadtmuseum, 1986), 28–40.

344. It was taken to Sweden in 1648 and is now in the Uppsala Universitetsbibliothek. See R. van de Velde, “Mercator, Arnold, cartograaf, landmeter, bouwkundige, wiskundige en filoloog,” in *Nationaal biografisch woordenboek* (Brussels: Paleis der Academiën, 1964–), 2:562–65, with additional literature.

345. We do not have an exhaustive study of the interesting history of cartography in Hesse. The best treatment is Wolff, *Karten im Archiv*.

346. Nothing from this work has been preserved. It is possible that its author was the Marburg professor of medicine Johannes Dryander. Manuscripts in his hand served as the models for printed maps of Hesse in Münster’s cosmography and in the atlas of Ortelius.

347. Ludolf von Mackensen, *Die erste Sternwarte Europas mit ihren Instrumenten und Uhren: 400 Jahre Jost Bürgi in Kassel*, 2d enl. ed. (Munich: Callwey, 1982).

348. Karl Schäfer, “Leben und Werk des Korbacher Kartographen Joist Moers,” *Geschichtsblätter für Waldeck* 67 (1979): 123–77, and Werner Engel, “Joist Moers im Dienste des Landgrafen Moritz von Hessen,” *Hessisches Jahrbuch für Landesgeschichte* 32 (1982): 165–73.

349. Kurt Köster, “Die Beziehungen der Geographenfamilie Mercator zu Hessen,” *Hessisches Jahrbuch für Landesgeschichte* 1 (1951): 171–92.

350. Colored manuscript drawing without title (138 × 173.5 cm, ca. 1:54,000), Marburg, Hessisches Staatsarchiv (Karten R II Nr. 28).

351. The originals are in several collections; on these maps and on Dilich in general, see Edmund E. Stengel, ed., *Wilhelm Dilichs Landtafeln hessischer Ämter zwischen Rhein und Weser* (Marburg: Elwert, 1927). There are twenty-one manuscript maps of Hessian districts that also may be works of Dilich in Rotenburg an der Fulda, Heimatmuseum; for a preliminary description see Wolff, *Karten im Archiv*, 61–63.

Saxony in 1627. Numerous town views and plans of fortifications of the Saxonian region have been preserved from his activities there.³⁵²

The extensive mapping activities in Hesse, where the territorial situation was rather complicated, had their own peculiar background. The dynastic family was fragmented into different lines, and there were disputes about the legal status of individual parts of the region. Hence, Wilhelm IV probably had only one intention behind the map projects he pursued: to fix the territorial situation. The use of the maps for mercantile or military purposes probably did not play a noteworthy role; consequently, none of the mapping projects was ever published.

THE TOPOGRAPHIC SURVEY OF THE ELECTORATE OF SAXONY

The origins of the most extensive mapping enterprise in the German region, which lasted until the middle of the eighteenth century, go back to the middle of the sixteenth century.³⁵³ In Protestant Saxony, cartography experienced an enormous boost under the elector August I (r. 1553–86). He could lean on a regional tradition of mine surveying; mining maps had been known in Saxony from the early sixteenth century. August originated all initiatives himself. He had experience as a surveyor and cartographer; in 1575, he drew a sketch of his travel route to the meeting of electors in Regensburg on a roll of parchment illustrated with pasted-on copper engravings. Johannes Hommel, a professor of mathematics at Leipzig University and another student in the Wittenberg circle around Melancthon, prepared a topographic survey of the electorate of Saxony at August's request from 1551. Only fragments of that work survive; they are planimetric maps with perspective elements. Hiob Magdeburg, a theologian and educator of princes, made a large general map of Saxony and Thuringia in 1566.³⁵⁴ It was designed in the form and style of a *Landtafel* and was not based on exact surveys.

The systematic topographic survey of Saxony got started only under August's successor, Christian I (r. 1586–91).³⁵⁵ The mining surveyors Georg Öder and his son Matthias had been in the service of the electorate since about 1560. From 1586 on, Matthias—accompanied by his nephew Balthasar Zimmermann—worked by official order on the survey of the electorate of Saxony. The original survey maps were drawn at a scale of 1:13,333, the fair copies were reduced to 1:53,333, and special maps exist at scales of between 1:3,333 and 1:213,000. The maps by Öder and Zimmermann are oriented to the south; the lateral margin of the sheets follows magnetic north. The surveying was based on linear measurements made with the help of the compass and the measuring rope, without a large-meshed triangulation net and without astronomical place determinations. The map

drawings show settlements (in realistic miniatures), paths, land cover and land use, property lines, rivers, and countless special features including inns, mines, brickworks, bridges, mills (with the number of mill courses), and gallows (fig. 42.29). The text lists the names of places and village holdings, the number of inhabitants of the settlements, the names of property owners, and much more.

There is nothing from the German area during the period that could be compared to these maps based on the topographic surveys of the electorate of Saxony by Öder and Zimmermann. Their whole design was completely different from that of works such as the map of Bavaria by Apian or the surveys by Mercator in Trier and Hesse. They were an early version of cadastral mapping and close to the estate map. In their conception, the maps of the topographic survey of the electorate of Saxony were never intended for publication but rather for administrative purposes. They were kept under lock and key in Dresden, where they were used until the eighteenth century.

INFLUENCES OF THE FLEMISH SCHOOL IN THE GERMAN AREA

The dominions in the area that is now Belgium and the Netherlands had been part of the Holy Roman Empire since the Middle Ages. Under Maximilian I and Charles V, the various duchies and counties were acquired by the house of Habsburg. The constitutional problems began when they came into the possession of the Spanish Habsburgs in 1556. The rigid politics of Philip II resulted in the division of the Low Countries and their partial dissociation from the empire. Parallel events in the history of cartography included the flourishing of the Louvain school of cartography from about 1525, the rise of Antwerp as the main center of mapmaking north of the Alps from about 1550, and the transition of this

352. Paul Emil Richter and Christian Krollmann, eds., *Wilhelm Dilichs Federzeichnungen kursächsischer und meißnischer Ortschaften aus den Jahren 1626–1629* (Dresden, 1907).

353. The standard work on the older history of cartography in Saxony is the anthology by Fritz Bönisch et al., *Kursächsische Kartographie bis zum Dreißigjährigen Krieg* (Berlin: Deutscher Verlag der Wissenschaften, 1990–), vol. 1.

354. Pen and ink drawing with watercolors (119 × 151 cm, ca. 1:220,000); the severely damaged original is in Dresden, Sächsische Landesbibliothek (Sax. A 90). See Rainer Gebhardt, ed., *Hiob Magdeburg und die Anfänge der Kartographie in Sachsen* (Annaberg: Buchholz, 1995), and Dolz, “Die ‘Düringische und Meisnische Landtaffel.’”

355. Sophus Ruge, *Die erste Landesvermessung des Kurstaates Sachsen, auf Befehl des Kurfürsten Christian I. ausgeführt von Matthias Öder (1586–1607)* (Dresden: Stengel und Markert, 1889), and Fritz Bönisch, *Genauigkeitsuntersuchungen am Öderschen Kartenwerk von Kursachsen* (Berlin: Akademie, 1970). A facsimile edition with exhaustive commentary, “Die erste Landesaufnahme des Kurfürstentums Sachsen, 1586–1633,” was prepared by the Sächsisches Hauptstaatsarchiv, Dresden. However, this valuable project has been on hold since 1990.

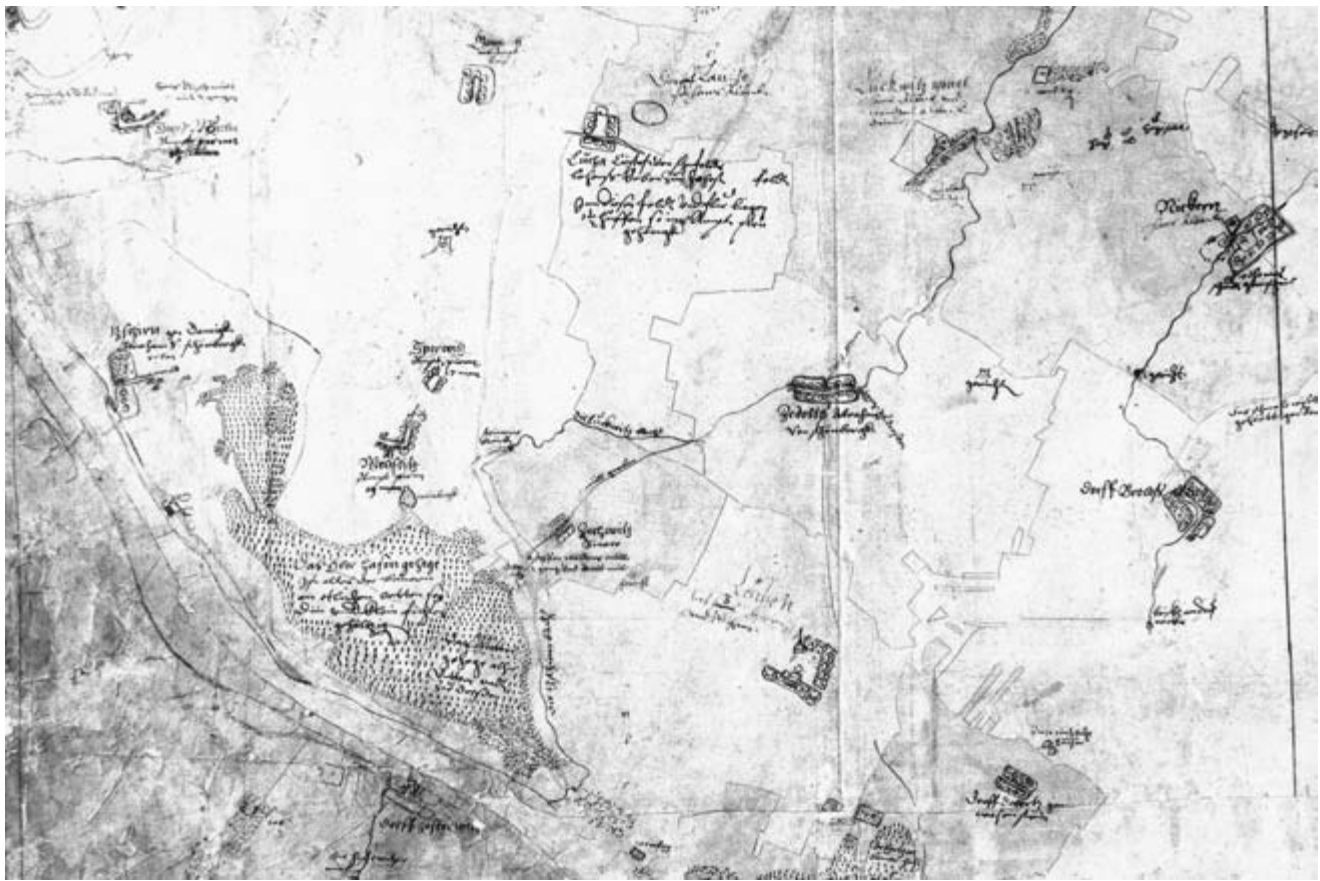


FIG. 42.29. THE AREA AROUND DRESDEN FROM THE SURVEY OF SAXONY BY ÖDER AND ZIMMERMANN. Drawing with ink and watercolors on paper.

Photograph courtesy of the Hauptstaatsarchiv Dresden (Schr. R, F. 1, Nr. 803 [Ur-Öder]).

leadership role from Antwerp to Amsterdam around 1600. However, the relations between these new centers and the remainder of the German lands were close in contemporary cartography. For instance, reprints of the textbooks by Peter Apian and Johannes Honter as well as editions of the maps by Stella and Vopel were published in Antwerp. The first editions of maps of several German regions, such as Württemberg (1575), Hesse (1579), and Oldenburg (1583), appeared in the *Theatrum orbis terrarum* by Ortelius. Other maps of German regions had a circulation, through copies in Ortelius's work, that could never have been achieved through their original editions. The translated version, *Theatrum oder Schauplatz des Erdbodens* (1572 and later) was the first modern world atlas in the German language.³⁵⁶

The advances of Flemish mapmaking affected cartography in many areas in the rest of the Holy Roman Empire. The technology and publishing innovations made their way indirectly by the transport of ideas as well as directly by emigration.³⁵⁷ This was especially true for the western part of Germany, which was connected to three important figures in the history of cartography: Gerardus Mercator, Christiaan Sgroten, and Frans Hogenberg.

GERARDUS MERCATOR IN DUISBURG

A superfluous claim for national heritage has determined the research on Gerardus Mercator (Gerhard Kremer) in Belgium and Germany for a century.³⁵⁸ Mercator's training and activity as a mapmaker and instrumentmaker

356. The original German-language edition from Antwerp was in competition with a German print. In 1572, the printer Johann Koler of Nuremberg published a collection of maps by Ortelius. He obtained regular copies of the Latin Antwerp edition to which he added separate sheets with his own texts in German. See Leo Bagrow, "The First German Ortelius," *Imago Mundi* 2 (1937): 74, and Konrad Kratzsch, "Eine wiedergefundene Ortelius-Übersetzung von 1572," *Marginalien* 62 (1976): 43–50.

357. I am preparing a reference work on Dutch mapmakers working in the German lands.

358. Modern research on Mercator started with two books published in 1869: Jean van Raemdonck, *Gérard Mercator: Sa vie et ses œuvres* (St. Nicolas: Dalschaert-Praet, 1869), and Arthur Breusing, *Gerhard Kremer, gen. Mercator, der deutsche Geograph* (Duisburg: F. H. Nieten, 1869). The most recent biography is Nicholas Crane, *Mercator: The Man Who Mapped the Planet* (London: Weidenfeld and Nicolson, 2002). For the literature in general, see the treatment of Mercator in chapter 44 in this volume. The following footnotes are restricted to literature on specific topics.

were entirely rooted in the Flemish school. His first works appeared in Louvain: maps of the Holy Land (1537), the world (1538), and Flanders (1540); a treatise on the use of italics in the lettering of maps (1540); a pair of globes (1541/51); and a disk instrument for astronomical calculations (1552). Mercator was an experienced and highly recommended scientist when he left Louvain for Duisburg in 1552.

Mercator's move from the strongly Catholic Louvain to the lands of the liberal Duke Wilhelm V of Jülich-Kleve-Berg (r. 1539–92) was later the subject of much speculation. A recently rediscovered letter of 1554 to Philipp Melanchthon is further evidence of Mercator's secret sympathy for the Reformation.³⁵⁹ At that time, the court of Kleve was preparing the foundation for a reformed university in Duisburg.³⁶⁰ Among the ducal counselors were some friends of Mercator. It may be suggested that he changed his residence in the hope of taking part in this planning and obtaining a professorship in mathematics or cosmography.

A university was not founded in Duisburg, but Mercator remained in the lower Rhine region. He taught mathematics at the Duisburg gymnasium. Around 1560, Duke Wilhelm V appointed him court cosmographer; this was a merely honorary title, without a noteworthy income or function. In Duisburg, Gerardus Mercator earned his living as he had in Louvain—as an independent entrepreneur. He was the author, designer, engraver, printer, and publisher of his maps. His production during his two decades in Duisburg included multisheet maps of Europe (1554, reissued 1572) and the British Isles (1564) and an epoch-making wall map of the world for navigators (1569), drawn in the cylindrical Mercator projection.³⁶¹ He was also active as a surveyor in Lorraine (1563–64)³⁶² and in several places in Jülich-Kleve-Berg.

From the early 1560s at the latest, Mercator worked on the great project of his life: an all-embracing cosmography including geographical, historical, philosophical, and theological aspects. Early results were the publication of the *Chronologia* (1569) and an edition of Ptolemy's *Geography* (1578). In 1585, the first installment of the section on modern geography was published, a volume with three parts: *Galliae tabulae geographicae* (16 maps), *Belgii inferioris geographicae tabulae* (9 maps), and *Germaniae tabulae geographicae* (26 maps)—the first modern set of maps of the Holy Roman Empire. The maps are critical and creative compilations from a multitude of sources: printed maps, unpublished material from various authors, coordinate tables, books on history, and other primary information. The results are highly innovative.³⁶³ All maps are designed in a nonpictorial style, with standardized symbols and a uniform coordinate system. With this style, Mercator set the standard for decades (fig. 42.30).

In all, Mercator's idea of a comprehensive new cosmography was close to the tradition of classical German humanism. In its basic conception, his project was not unlike that of Sebastian Münster. But Mercator's work was a much more well-founded contribution to scholarship and lacked the intent to educate the common man. Mercator's *Atlas* was an elitist product for clients from the educated classes in many countries; Mercator himself probably never intended to publish it in any language other than Latin.³⁶⁴ It was also used as a teaching aid in upper-level schools of the period, as is proved by the provenance of some of the preserved copies. Because the maps lacked roads, they could serve as an aid for planning travels only when used with additional tools such as itineraries.³⁶⁵

Beyond its scientific importance, Gerardus Mercator's workshop in Duisburg was organized in the form of a traditional trade. This included the involvement of his three sons. The multitasking Arnoldus Mercator was educated as and intended to be his father's scientific successor. Bartholomäus Mercator assisted his father as a teacher of mathematics in Duisburg and as a surveyor in Lorraine.

359. The letter mainly reports Mercator's visit on 3 May 1554, when he gave a manuscript globe to Charles V in Brussels. It was part of a planetary clock made by Giovanni Gianelli (Gianello della Torre) from Cremona; see Peter H. Meurer, "Ein Mercator-Brief an Philipp Melanchthon über seine Globuslieferung an Kaiser Karl V. im Jahre 1554," *Der Globusfreund* 45–46 (1997–98): 187–96. The letter was also printed as an appendix to Knobloch, "Melanchthon und Mercator," 271–72.

360. See Eckehart Stöve, "Ein gescheiterter Gründungsversuch im Spannungsfeld von Humanismus und Gegenreformation," in *Zur Geschichte der Universität: Das "Gelehrte Duisburg" im Rahmen der allgemeinen Universitätsentwicklung*, ed. Irmgard Hantsche (Bochum: Brockmeyer, 1997), 23–46.

361. See figure 10.12. For a detailed study, see Krücken, "Wissenschaftsgeschichtliche und -theoretische Überlegungen." A useful annotated reprint of the map, reduced in size, is found in Wilhelm Krücken and Joseph Milz, eds., *Gerhard Mercator Weltkarte ad usum navigantium, Duisburg 1569* (Duisburg: Mercator, 1994).

362. Fritz Hellwig, "Gerhard Mercator und das Herzogtum Lothringen," *Jahrbuch für westdeutsche Landesgeschichte* 25 (1999): 219–54.

363. Meurer, *Germania-Karten*, 367–74, and Günter Schilder, *Monumenta cartographica Neerlandica* (Alphen aan den Rijn: Canaletto, 1986–), 5:252–56. One can suggest that Mercator himself was aware of the variable authenticity of his atlas maps. A recent observation is that some innovatively mapped areas (e.g., Lombardy, Lorraine, Scotland, Switzerland, and Westfalia) were engraved on two, three, or four sheets that could be joined together; see Dirk de Vries, "Die Helvetia-Wandkarte von Gerhard Mercator," *Cartographica Helvetica* 5 (1992): 3–10. Such multisheet maps were probably also sold separately; however, an old mounted copy has not been traced.

364. There are only separate editions of single installments with the title page (not the texts) in other languages.

365. There appeared, for instance, the *Kromm und Außbündt aller Wegweiser* (Cologne: Lambert Andreae, 1597), a detailed itinerary for the whole of Europe. The title and many notes in the text refer *expressis verbis* to the respective maps by Gerardus Mercator. See Peter H. Meurer, *Atlantes Colonienses: Die Kölner Schule der Atlaskartographie, 1570–1610* (Bad Neustadt an der Saale: Pfahler, 1988), 142–47.

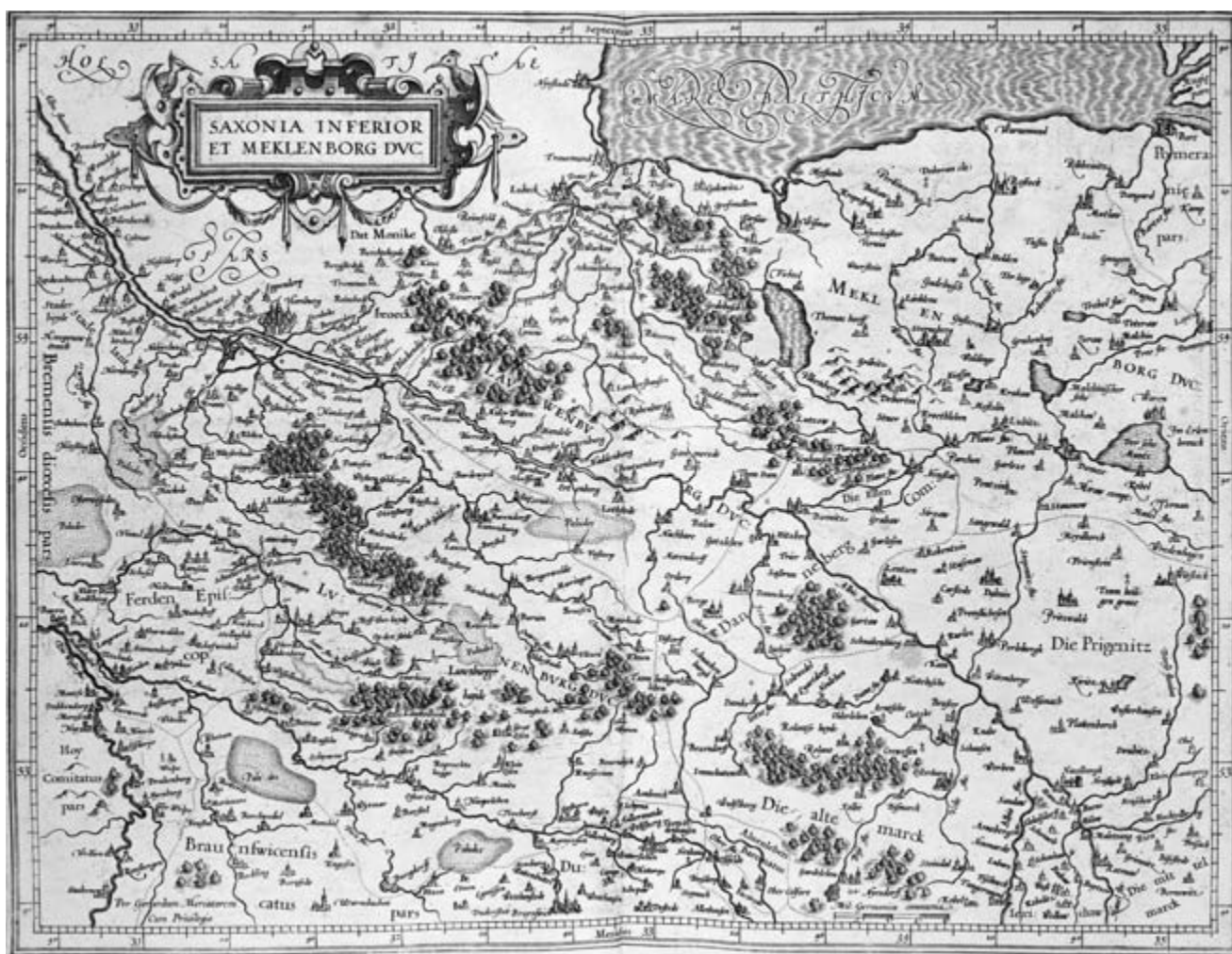


FIG. 42.30. MAP OF LOWER SAXONY IN GERARDUS MERCATOR'S *ATLAS*. Characteristic of the maps in Mercator's atlas is their uniformity and balance in terms of conventional signs, coordinates, and scale. The volume *Germaniae tabulae geographicae*, first published Duisburg, 1585, was the first set of maps covering the entire German area in that man-

ner. The example shows the area on both sides of the lower Elbe at a scale of ca. 1:750,000. Engraving.

Size of the original: 34 × 43.5 cm. From Gerardus Mercator, *Atlas sive Cosmographicae meditationes de fabrica mundi et fabricati figura* (Duisburg, 1595). By permission of Houghton Library, Harvard University (*42-1986 F).

He died young (1568), shortly after beginning his academic studies in Heidelberg.³⁶⁶ Rumoldus Mercator was trained as a publisher and bookseller in Cologne, Antwerp, and London.³⁶⁷ It was Rumoldus who took over the Mercator firm after Arnoldus's sudden death in 1587. The first publication with his name was the archetypal world map of 1587, drawn in two hemispheres in an equatorial stereographic projection. There followed in 1590 a twelve-sheet wall map of the German lands based on the regional maps published in 1585 and further manuscript material for the depiction of the north and east.³⁶⁸ In the spring of 1595, the first cumulative edition of all Mercator maps in folio format that were ready appeared under the title *Atlas*.³⁶⁹ Gerardus Mercator had died on 2 December 1594, a few months earlier.

366. Rüdiger Thiele, "Breves in sphaeram meditauiculae: Die Vorlesungsausarbeitung des Bartholomäus Mercator im Spiegel der zeitgenössischen kosmographischen Literatur," in *Gerhard Mercator und die geistigen Strömungen des 16. und 17. Jahrhunderts*, ed. Hans Heinrich Blotevogel and R. H. Vermij (Bochum: Brockmeyer, 1995), 147–74.

367. For a new summary, see Meurer, *Germania-Karten*, 413–16.

368. Meurer, *Germania-Karten*, 416–19 and 422–33.

369. The complete title reads, *Atlas sive Cosmographicae meditationes de fabrica mundi et fabricati figura*. The term "atlas" was used by Mercator for the complete work, especially for the preceding introduction; for a modern German translation of this text, see Gerardus Mercator, *Atlas; oder, Kosmographische Gedanken über die Erschaffung der Welt und ihre kartographische Gestalt*, ed. Wilhelm Krücken (Duisburg: Mercator, 1994). The title "atlas" for a collection of maps came into use only when supplements and editions without these cosmographical introductions appeared in Amsterdam from 1630 onward.

The great project in Duisburg was never completed; further installments with regional maps of Spain and the New World were announced but never published. Being the scientist of the house of Mercator was too much for the bookseller Rumoldus Mercator. Moreover, there seems to have been a disagreement between Rumoldus and Arnoldus's three sons,³⁷⁰ Johannes Mercator, a skilled surveyor and engraver who died (or left Duisburg) shortly after 1595; Gerardus Mercator Jr., who became a merchant; and Michael Mercator, who tried to set up his own publishing firm, was active as a freelance surveyor until about 1605, and later became a wine dealer.

The only new publication of the house of Mercator after 1595 was a separate map bearing the imprint of only Rumoldus Mercator and showing the sites of a regional campaign in Westphalia in 1599.³⁷¹ A variant of this edition has a piece of paper pasted onto the original Latin, with a new title in Dutch and a second imprint of the Amsterdam bookseller and publisher Cornelis Claesz. Significantly, the plate was engraved not in Duisburg, but in Amsterdam, by Baptista van Doetecum.

In 1602, the "Mercator heirs" (apparently Gerardus Jr. and Michael) published a final Duisburg issue of the *Atlas*; it was unchanged from the 1595 edition. Viewed realistically, they had neither the skill nor the possibility to preserve their grandfather's business in Duisburg. In the spring of 1604, they sold all Mercator copperplates to Cornelis Claesz.³⁷² He continued Mercator's heritage in cooperation with Jodocus Hondius the Elder in the rising mapmaking center of Amsterdam.

CHRISTIAAN SGROOTEN

Christiaan Sgrooten (also s'Grooten, Sgroeth, or Schrot) was a native of Sonsbeck on the lower Rhine and lived in Kalkar in the Duchy of Kleve from 1548 until his death.³⁷³ Details of his education and early activity are scarce. The decorative design of his maps suggests that he was a pupil of the school of painting that was flourishing in Kalkar around this time. There is some evidence of his interest in cartography around 1540.³⁷⁴ He was trained—possibly with Mercator in Duisburg—in surveying and map drawing, probably in the first half of the 1550s. His first work was a now-lost map of the duchy of Kleve and the surrounding countries on the lower Rhine, published in 1558 in Antwerp by Bernard van den Putte.³⁷⁵

In December 1557, Sgrooten was appointed geographer to King Philip II of Spain. This was a well-remunerated post until 1578, after the national bankruptcy of Spain. Documents with specific details of Sgrooten's duties are lost. In the first decade of his work, his main project was probably the new mapping of Philip's possessions in the Netherlands and the neighboring areas in France and northern Germany.

The results of Sgrooten's surveying are visible for the first time in a wall map of Germania by him that was first published about 1566 in Antwerp by Hieronymus Cock (fig. 42.31).³⁷⁶ The map was drawn at a scale of about 1:1,300,000 in a conical projection with newly calculated coordinates of varying accuracy. It was based on many printed models that appeared before about 1560. Sgrooten's wall map is an essential source for the tradition of two important regional maps, the original editions of which are lost today: the 1526 map of Poland by Bernard Wapowski and the 1552 map of Denmark by Marcus Jordanus.³⁷⁷ Also, the image of northern Germany, Brandenburg, and parts of Saxony follow unpublished surveys by Sgrooten and other unknown authors. In all, this wall map is a glorification of the Holy Roman Empire. The decoration of the title cartouche includes the motto: "There is no authority but by act of God." This quotation from Saint Paul (Romans 13:1) must be interpreted as reflecting the partisanship of Sgrooten with regard to his patron. Philip II, who did not inherit the German crown, considered himself the sole and true keeper of the old imperial idea under his strongly Catholic leadership.

There are three maps of biblical subjects in Sgrooten's work. He edited the material collected by Peter Laicksteen in 1570, which he published in the form of a map of the Holy Land (1570), and drew a two-fold plan showing ancient and modern Jerusalem (1572). In 1572, a wall map of the Mediterranean area also appeared, conceived

370. For a new summary of the activities of Gerardus Mercator's grandsons, see Meurer, *Germania-Karten*, 361–62.

371. Peter H. Meurer, "De kaart van Wesfalen van Mercators erven uit 1599," *Caert-Thresoor* 6 (1987): 11–14.

372. It had previously been assumed that Jodocus Hondius had acquired the copperplates at auctions in Leiden, where Mercator's estate was sold in summer 1604. The role of Cornelis Claesz. in this transition becomes clear in contemporary catalogs of the Frankfurt and Leipzig book fairs. For more detailed documentation, see Meurer, *Germania-Karten*, 375–77, and Peter H. Meurer, "De verkoop van de koperplaten van Mercator naar Amsterdam in 1604," *Caert-Thresoor* 17 (1998): 61–66.

373. See Karrow, *Mapmakers of the Sixteenth Century*, 480–94, and Peter H. Meurer, *Die Manuskriptatlanten Christian Sgrootens* (Alphen an den Rijn: Canaletto, forthcoming).

374. The Stadtbibliothek Trier has some books that were in Sgrooten's possession. One of them, an edition of the ancient writers Pomponius Mela and Caius Julius Solinus, published in Basel in 1576, includes a manuscript depiction of a globe that can be dated around 1540; see Peter H. Meurer, "Ein frühes Landkarten-Autograph Christian Sgrothens in der Trierer Stadtbibliothek?" *Kurtrierisches Jahrbuch* 33 (1993): 123–34.

375. Sgrooten's survey of Geldern is known only from a second version, published in 1568 by Hieronymus Cock (engraving, six sheets, 81 × 76.5 cm). No copy of the original edition has been traced. A copy of a 1601 reissue is in the BNF.

376. See Meurer, *Germania-Karten*, 344–48.

377. Fragments of Wapowski's map of Poland survive; see figure 61.6. A 1585 map of Denmark by Marcus Jordanus is illustrated as figure 60.9.

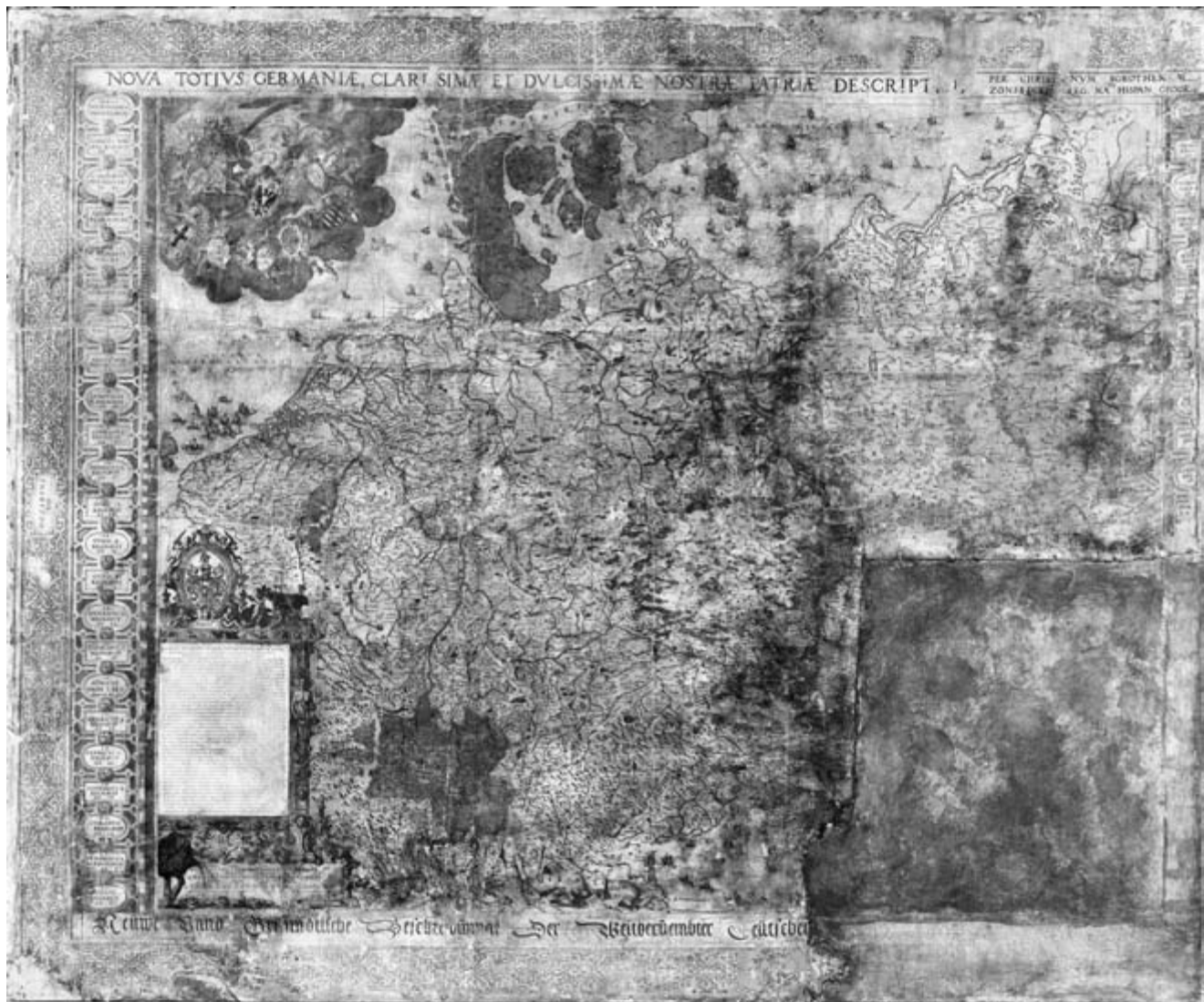


FIG. 42.31. CHRISTIAAN SGROOTEN'S WALL MAP OF THE HOLY ROMAN EMPIRE. The patriotic map, titled *Nova totius Germaniæ, clarissimæ et dulcissimæ nostræ patriæ descriptio*, is focused more on the “German Fatherland,” than on the Holy Roman Empire. The lists of emperors on both sides are printed from separate plates. The illustration

shows the sole surviving, heavily damaged copy of the first edition (Antwerp, ca. 1566). For the northern part, Sgrooten used the results of his own extensive surveys. Engraving in nine map sheets and border (fourteen sections).

Size of the mounted version: ca. 132.5 × 160 cm. Photograph courtesy of the Universitätsbibliothek, Innsbruck.

to show the locations mentioned in the Old and New Testaments. After 1572, Sgrooten radically reduced his publishing activities. He contributed some maps to the Antwerp atlases by Ortelius and De Jode, and Mercator acknowledged Sgrooten in his atlas for putting much material (especially on France and northern Germany) at his disposal.

The pinnacle of Sgrooten's work was a project first mentioned in an order of 1568 as a “description of miscellaneous countries and towns.” The so-called Brussels Atlas, which Sgrooten handed over to the Spanish authorities in Brussels around 1575, was an incomplete se-

ries of thirty-seven manuscript maps covering the Holy Roman Empire at scales of between 1:80,000 and 1:800,000.³⁷⁸ Nearly half of the collection shows the Spanish possessions in the Netherlands at scales of between 1:80,000 and 1:240,000. Designed as aids for military

378. Brussels, Royal Library of Belgium (MS. 21596). There are two earlier facsimile editions of maps from the Brussels atlas: Hans Mortensen and Arend W. Lang, eds., *Die Karten deutscher Länder im Brüsseler Atlas des Christian s'Grooten (1573)*, 2 vols. (Göttingen: Vandenhoeck & Ruprecht, 1959), and Christiaan Sgrooten, *Christiaan Sgrooten's kaarten van de Nederlanden*, intro. S. J. Fockema Andreae and Bert van 't Hoff (Leiden: Brill, 1961).

planning, the maps are very detailed; numerous small localities appear for the first time, based on printed models and Sgrooten's own surveys. The miniatures representing settlements were individually and realistically drawn.

Because of the war in the Netherlands and on the lower Rhine, many details of Sgrooten's life and work during the following fifteen years are unclear. In 1592, he finished a second version of the Brussels Atlas, titled "Orbis terrestris tam geographica quam chorographica descriptio." This so-called Madrid Atlas includes thirty-eight manuscript maps: three world maps, two maps of the Near East, and thirty-three maps of central Europe (plate 47).³⁷⁹ They were again based on a multitude of sources. A detailed comparison with the topography in the Brussels Atlas shows that Sgrooten had revisited and resurveyed many areas since 1575. A noteworthy feature of the maps in the Madrid Atlas is their highly decorative design, with magnificent coloring. Sgrooten's atlases were never published and remained unknown for centuries.

FRANS HOGENBERG AND THE COLOGNE SCHOOL

Frans Hogenberg was born around 1538 in Mechelen and trained by his father, the Munich-born engraver Nikolaus Hogenberg.³⁸⁰ A follower of Calvinism, Frans left his Flemish homeland for the Rhineland. He was in Wesel in 1562, and by about 1565 he had settled in Cologne.³⁸¹ His brother Remigius Hogenberg worked as an engraver in Emmerich on the lower Rhine (ca. 1566–70) and afterward in London.³⁸² Frans Hogenberg built up a flourishing engraver's workshop and publishing house in Cologne; however, he retained close connections with Flanders.³⁸³ The business was continued after his death by his second wife until her son, Abraham Hogenberg, took over the management around 1610. Johann, Frans's son from his first marriage, was paid off by his stepmother in 1591 and established his own business as an engraver.³⁸⁴ His most interesting works are nine historical maps and plans illustrating the *Epideigma*, a history of Cologne by Stephan Broelmann (discussed later).

The Cologne house of Hogenberg specialized in cartography and topography, in which it played a dominant role beyond the regional market. Apart from single-sheet maps and maps for book illustration, the production included some large and long-term projects such as the "Geschichtsblätter," a series of about 470 illustrations of contemporary history (up to 1634) (fig. 42.32);³⁸⁵ the *Itinerarium orbis christiani* (1579), a road atlas in octavo format with 84 maps;³⁸⁶ and an undated, untitled atlas (ca. 1588) of the Low Countries, with 20 maps in folio format.

Hogenberg's best-known and most extensive publication was the *Civitates orbis terrarum* (six volumes, 1572–1617), the first printed town atlas in the history of cartography, which was conceived in parallel with the



FIG. 42.32. DEPICTION OF THE CAPTURE OF GELDERN (1587) FROM HOGENBERG'S "GESCHICHTSBLÄTTER." Comparison with figure 42.33 shows the different styles of Hogenberg's two main works. The topographical details are taken from the same sources, but this version from the "Geschichtsblätter" is more pictorial. The orthographic map is replaced by a panoramic view. Engraving. Size of the original: 20 × 28 cm. Photograph courtesy of the Bayerische Staatsbibliothek, Munich (4 Mapp. 54-214).

Antwerp world atlas *Theatrum orbis terrarum* by Ortelius.³⁸⁷ In all, the *Civitates* included 543 plans and views based on printed and manuscript models of different origins (fig. 42.33). The editor and the author of the texts was the Cologne humanist and theologian Georg Braun.

379. The Madrid Atlas is edited in Meurer, *Manuskriptatlanten Christian Sgrootens*.

380. For older summaries on the Hogenberg family, see Meurer, *Fontes cartographici Orteliani*, 169–70, and Frans Hogenberg and Abraham Hogenberg, *Geschichtsblätter*, ed. Fritz Hellwig (Nördlingen: Alfons Uhl, 1983).

381. Much new biographical information is provided by Walter Stempel in "Franz Hogenberg (1538–1590) und die Stadt Wesel," in *Karten und Gärten am Niederrhein: Beiträge zur klevischen Landesgeschichte*, ed. Jutta Prieur (Wesel: Stadtarchiv Wesel, 1995), 37–50.

382. Arthur Mayger Hind, *Engraving in England in the Sixteenth & Seventeenth Centuries: A Descriptive Catalogue with Introductions*, 3 vols. (Cambridge: Cambridge University Press, 1952–64), 1:64–78. However, it appears doubtful that Frans Hogenberg stayed in England.

383. From about 1567, Frans Hogenberg engraved maps for Ortelius's *Theatrum orbis terrarum*.

384. Johann Jakob Merlo, *Kölnische Künstler in alter und neuer Zeit*, ed. Eduard Firmenich-Richartz (Düsseldorf: Schwann, 1895), 377–81.

385. The modern edition is Hogenberg and Hogenberg, *Geschichtsblätter*. For an annotated selection, see Karel Kinds, *Kroniek van de opstand in de Lage Landen, 1555–1609: Actuele oorlogsverslaggeving uit de zestiende eeuw met 228 gravures van Frans Hogenberg*, 2 vols. ([Wennum Wiesel]: Uitgeverij ALNU, 1999).

386. Meurer, *Atlantes Colonienses*, 116–41.

387. See Georg Braun and Frans Hogenberg, *Civitates orbis terrarum, 1572–1618*, 3 vols., intro. R. A. Skelton (Cleveland: World Publishing, 1965).



FIG. 42.33. MAP OF GELDERN FROM HOGENBERG'S *CIVITATES ORBIS TERRARUM*, 1581. Many maps and views in Hogenberg's book of towns were copied from printed models; others were based on unpublished primary sources. This engraving of the fortress of Geldern (in the Lower Rhineland) from volume 3 (Cologne, 1581) used a manuscript map of a survey by Jacob van Deventer, a cartographer in the service of King Philip II, in the 1560s. The printed version adopts the high-level topographical accuracy of the model in all regards.

Size of the original: 17 × 26.5 cm. Photograph courtesy of the Beinecke Rare Book and Manuscript Library, Yale University, New Haven (1975, fol. 41).

Among the works printed by Abraham Hogenberg are a four-sheet map of the environs of Cologne (ca. 1615) and the *Prodromus geographicus* (1620), an atlas of the Archbishopric of Cologne (including Westphalia) with seven maps by the mathematician and physician Johannes Michael Gigas.³⁸⁸ In the early 1640s, Hogenberg negotiated with the Amsterdam house of Blaeu for the sale of the copperplates of the *Civitates*.³⁸⁹ However, the negotiations failed, and a few years later the plates were sold to Blaeu's competitor Johannes Janssonius.

What has been called the Cologne school of cartography developed around the Hogenberg workshop.³⁹⁰ It was mainly composed of artists and scholars (both Catholics and Protestants) who had fled the religious and political disturbances in the Low Countries. The Delft-born priest Christiaan van Adrichem was the author of the *Theatrum Terrae Sanctae* (Cologne, 1590), a historical lexicon of places in the Holy Land. The book was illustrated with a plan of Jerusalem, an overview map of Palestine, and ten detailed maps of the settlement areas of the tribes of Israel; they form the first atlas devoted to the Holy Land.³⁹¹ Michael von Eitzing (Michael Eytzinger), an Austrian-born jurist in rather unlucky Habsburg service in the Netherlands, lived in Cologne after 1581.³⁹² His many historical writings include the periodically published *Relationes* (1583), the precursors of modern journals. Among his cartographic works is the famous *Leo*

Belgicus (1587), an allegorical map of the Low Countries in the form of a lion.³⁹³

The temporary decline of the Hogenberg printing house after 1590 made room for some minor map publishers such as Johann Bussemacher and Peter Overadt.³⁹⁴ A central figure in this later milieu was the geographer and engraver Matthias Quad, who was trained in the Netherlands and lived in Cologne from 1587 to 1604.³⁹⁵ In addition to producing a series of single sheets, he started the edition of a series of smaller pocket atlases and illustrated itineraries. Mainly conceived as aids for travelers, they also represented inexpensive substitutes for the relatively costly folio atlases by De Jode, Mercator, and Ortelius, which served almost exclusively as the models for these Cologne prints. An atlas project by Bussemacher and Quad began in 1592 with *Europae . . . descriptio*; a later edition published as *Geographisch Handtbuch* (1600) was the first atlas originally written in the German language.³⁹⁶ The text of the *Geographische und historische Beschreibung der uberauß grosser Landschafft America* (Cologne, 1598) is a German translation of the *Historia natural y moral de las Indias* (Seville, 1590) by José de Acosta.³⁹⁷ This book was illustrated with twenty maps based on the *Descriptionis Ptolemaicae augmentum*, an atlas of the Americas (Louvain, 1597) by Cornelis van Wytfliet. After long sojourns in Italy and Bel-

388. Hans Kleinn, "Johannes Gigas (Riese), der erste westfälische Kartograph und sein Kartenwerk," *Westfälische Forschungen* 31 (1981): 132–47, and *In memoriam Johannes Riese, Doktor der Medizin und Mathematik, Kartograph und Astronom, 1582–1637*, with contributions by Reinhard Oldemeier et al. (Lügde, 1992).

389. This new detail appears from the catalogs of the Leipzig and Frankfurt book fairs.

390. For a full study, see Meurer, *Atlantes Colonienses*.

391. Laor, *Cartobibliography*, 1–2 (nos. 7–18) and 137 (no. 934); Meurer, *Atlantes Colonienses*, 54–65; and Nebenzahl, *Maps of the Holy Land*, 90–91 and 94–97.

392. Meurer, *Atlantes Colonienses*, 105–15.

393. H. A. M. van der Heijden, *Leo Belgicus: An Illustrated and Annotated Carto-Bibliography* (Alphen aan den Rijn: Canaletto, 1990).

394. Bernadette Schöller, *Kölner Druckgraphik der Gegenreformation: Ein Beitrag zur Geschichte religiöser Bildpropaganda zur Zeit der Glaubenskämpfe mit einem Katalog der Einblattdrucke des Verlages Johann Bussemacher* (Cologne: Kölnisches Stadtmuseum, 1992), and Peter H. Meurer, "The Cologne Map Publisher Peter Overadt (fl. 1590–1652)," *Imago Mundi* 53 (2001): 28–45.

395. Meurer, *Atlantes Colonienses*, 197–235. From about 1600, Quad had difficulties with the Cologne authorities because of his Reformed beliefs. Therefore, he also published under the pseudonym Cyprian Eichovius with publishers in Frankfurt am Main and in the nearby Oberursel.

396. Matthias Quad, *Geographisch Handtbuch, Cologne 1600*, facsimile, intro. Wilhelm Bonacker (Amsterdam: Theatrum Orbis Terrarum, 1969).

397. Meurer, *Atlantes Colonienses*, 47–53. The maps are reprinted in José de Acosta, *Das Gold des Kondors: Berichte aus der Neuen Welt, 1590*, ed. Rudolf Kroboth and Peter H. Meurer (Stuttgart: Erdmann, 1991).

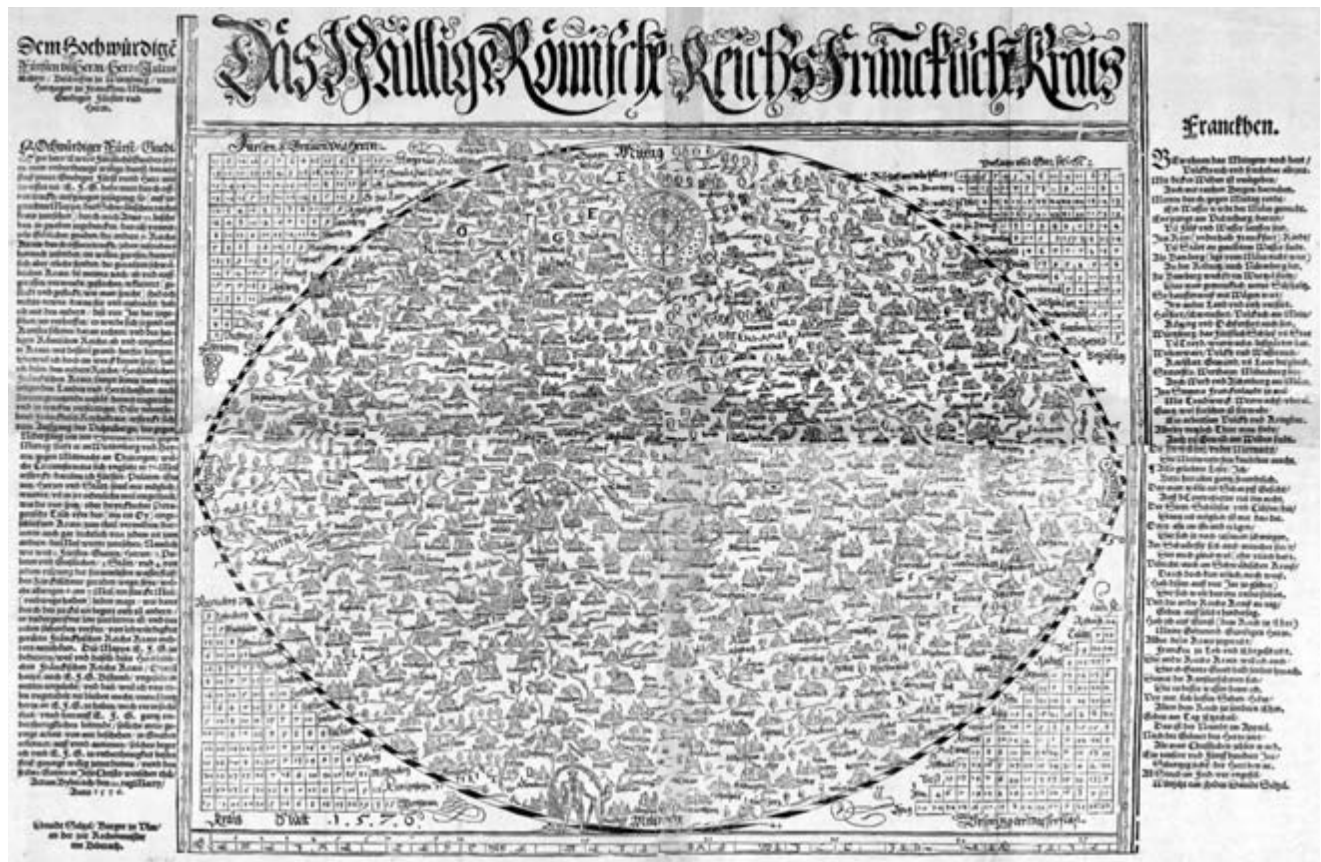


FIG. 42.34. DAVID SELTZLIN'S MAP OF FRANCONIA, 1576. This is the second and last sheet from Seltzlin's unfinished map series showing all districts of the German empire. With respect to other contemporary cartographic efforts, the style and the topographical quality are rather old-fashioned.

Interesting details are the distance triangles in the four corners. Woodcut (side text in letterpress) on four sheets. Size of the original: 38.5 × 51.1 cm. Photograph courtesy of the Öffentliche Bibliothek der Universität, Basel (Kartensammlung AA 51).

gium, the Burgundian-born polymath Jean Matal (Johannes Metellus) settled in Cologne in 1563.³⁹⁸ His atlas in quarto format was published from 1594 in installments on separate countries and continents.³⁹⁹ The complete edition of 1602, *Speculum orbis terrae*, with 261 maps, is among the largest one-volume atlases.

GERMAN CARTOGRAPHY IN LATE HUMANISM: AN OVERVIEW

From about 1570, public and scientific life in many of the German lands sank into lethargy, mainly as a consequence of the continuing clash between Protestantism and the Counter-Reformation. This great fragmentation and the relatively minor importance of German mapmaking in that period—together with a lack of modern research—make it difficult to structure the history of German cartography in late humanism. I present here an outline, with emphasis on some highlights, ending around 1650 after the disaster of the Thirty Years War (1618–48). Only around 1670 would the roots of a new tradition in German cartography become visible.

SOME GENERAL MAPS OF THE EMPIRE

There were some attempts to map the entire Holy Roman Empire. David Seltzlin, a teacher of mathematics from Ulm, planned to produce woodcut maps of all twelve imperial districts, but his project never got beyond the maps of the Swabian district (1572) and the Franconian district (1576) (fig. 42.34).⁴⁰⁰ However, the project's failure for financial and professional reasons was not a great loss. The accuracy of the maps and their craftsmanship were average at best, and their graphic design was an example

398. A recent excellent biography is Peter Arnold Heuser, *Jean Matal: Humanistischer Jurist und europäischer Friedensdenker (um 1517–1597)* (Cologne: Böhlau, 2003).

399. Meurer, *Atlantes Colonienses*, 162–96. The post-1597 installments were edited by Matthias Quad. Among them is the first specialized atlas of Asia: Jean Matal, *Asia tabulis aeneis secundum rationes geographicas delineata* (Oberursel, 1600). See Susan Gole, "An Early Atlas of Asia," *Map Collector* 45 (1988): 20–26.

400. Meurer, *Fontes cartographici Orteliani*, 235–36, and Meurer, *Germania-Karten*, 274–75. A new study on the metrical accuracy is provided by Kurt Brunner, "Zwei Regionalkarten Süddeutschlands von David Seltzlin," in *Karten hüten*, 33–47.

of an unsuccessful combination of orthogonal and pictorial representations.⁴⁰¹

An interesting wall map that followed the previously mentioned wall maps of the empire by Sgrooten and Mercator was a three-sheet map titled *Gloriae Germanicae typus* designed by Matthias Quad and first published in 1600 by Peter Overadt in Cologne (fig. 42.35).⁴⁰² The rich decorative borders were a clear illustration of the hierarchical structure of the Holy Roman Empire and the way it saw itself in 1600. The iconography included a series of portraits of the mythical Germanic forefathers and of the emperors from Charlemagne to Rudolf II, the portraits and the coats of arms of the seven electors (the “pillars of the Empire”), and the so-called quaternions of the imperial estates (the “foundations of the Empire”). The provocative anti-Habsburg detail was covered with text extolling the advantages of a political system headed by a ruler whose dignity was theoretically nonhereditary.

Remarkable examples of anti-Habsburg cartographic propaganda appeared on the occasion of the temporary military success of the Protestant party from 1630 onward, initiated by Swedish troops under King Gustavus II Adolphus (r. 1611–32). A reissue of the 1590 Mercator wall map that was published in 1632 by Henricus Hondius in Amsterdam appeared with a dedication to Gustavus Adolphus as the “defender of belief and protector of oppressed liberty in Germany.”⁴⁰³ In 1633, the Protestant Strasbourg engraver Isaac Brun published one of the few maps of the Holy Roman Empire produced in the German area after 1600 (fig. 42.36).⁴⁰⁴ Among its marginal town views are those of the Protestant imperial cities of Frankfurt, Nuremberg, Strasbourg, and Ulm, while the imperial residences of Prague and Vienna were disregarded. The series of capitals of the electorates includes Heidelberg instead of Munich, significantly neglecting the transmission of the formerly Protestant Palatine electorship to Bavaria in 1623 by Emperor Ferdinand II.

In a way, the decline of German mapmaking is visible in the road map of the Holy Roman Empire published in 1641 by the cartographers Johann Georg Jung and Georg Conrad Jung from Rothenburg ob der Tauber (fig. 42.37).⁴⁰⁵ This map was a fairly innovative cartographic transformation of contemporary itineraries, but its craftsmanship was rather poor and there were difficulties in its publication. The Jungs tried an early form of cartographic direct marketing: they offered to print special editions for individual clients. One such edition is known with a dedication to the senate of Nuremberg.

THE IMPERIAL COURT AT PRAGUE: A MISSED CHANCE FOR CARTOGRAPHY

Among the very few centers of research in the German lands around 1600 was the imperial court of Emperor Rudolf II (r. 1576–1612), which resided mostly in Prague.

Rudolf fits the classical image of a Renaissance period ruler similar to Maximilian I, the patron of early humanists. Rudolf’s generosity and personal interests attracted scholars and artists from many countries.⁴⁰⁶ In 1599, the great Danish astronomer Tycho Brahe became the founder and first director of the observatory in Prague.⁴⁰⁷ After his death, Johannes Kepler became his successor as court astronomer (i.e., court astrologer).⁴⁰⁸ In Prague, Kepler elaborated his fundamental work *Astronomia nova seu physica coelestis* (Ulm, 1609), which contained the first formulation of his laws of planetary movements. The Antwerp-born landscape painter Jakob Hoefnagel, who contributed many views of towns in Bohemia, Hungary, Poland, and Austria to the *Civitates orbis terrarum* by Braun and Hogenberg in Cologne, worked at the imperial court.⁴⁰⁹ Among other artists, Erasmus Habermel, one of the most important makers of astronomical and surveying instruments of his time, was active here.⁴¹⁰ However, the political developments around the Counter-Reformation in Austria, which had started in the late sixteenth century, prevented mapmaking from flourishing. Its figurehead was the ultra-Catholic Emperor Matthias (r. 1612–19), the brother and later the successor of Rudolf II. The emperor became depressed over this “brotherly feud in the house of Habsburg,” and life at the court was characterized by a gloomy lethargy.

401. However, the two prints of the maps of Seltzlin are remarkable in one regard: they contain in the corners the first known printed “distance triangles,” tables in the form of a triangle that can be read easily to obtain distances between places. For a more detailed study of early German distance triangles, see Peter H. Meurer, “Zur Frühgeschichte der Entfernungsdreiecke,” *Cartographica Helvetica* 24 (2001): 9–19.

402. Meurer, *Germania-Karten*, 396–99.

403. Meurer, *Germania-Karten*, 425–29, quotation on 425.

404. Meurer, *Germania-Karten*, 473–74.

405. Meurer, *Germania-Karten*, 484–86.

406. For an overview, see the catalog of an exhibition by the Kulturstiftung Ruhr in the Villa Hügel in Essen: *Prag um 1600: Kunst und Kultur am Hofe Kaiser Rudolfs II.*, 2 vols., exhibition catalog (Freren: Luca, 1988).

407. See J. L. E. Dreyer, *Tycho Brahe: A Picture of Scientific Life and Work in the Sixteenth Century* (Edinburgh: Adam and Charles Black, 1890; reprinted New York: Dover, 1963), and, more recently, J. R. Christianson, *On Tycho’s Island: Tycho Brahe and His Assistants, 1570–1601* (Cambridge: Cambridge University Press, 2000).

408. The annotated edition of the collected works is Johannes Kepler, *Gesammelte Werke* (Munich: C. H. Beck, 1937–). A standard work is Max Caspar, *Johannes Kepler*, 4th ed. (Stuttgart: Verlag für Geschichte der Naturwissenschaften und der Technik, 1995); for the English edition, see *Kepler*, trans. and ed. C. Doris Hellman (London: Abelard-Schuman, 1959). See also Rhonda Martens, *Kepler’s Philosophy and the New Astronomy* (Princeton: Princeton University Press, 2000), and James R. Voelkel, *Johannes Kepler and the New Astronomy* (New York: Oxford University Press, 1999).

409. There is no basic study on his topographical work so far.

410. Wolfgang Eckhardt, “Erasmus und Josua Habermel—Kunstgeschichtliche Anmerkungen zu den Werken der beiden Instrumentenmacher,” *Jahrbuch der Hamburger Kunstsammlungen* 22 (1977): 13–74.

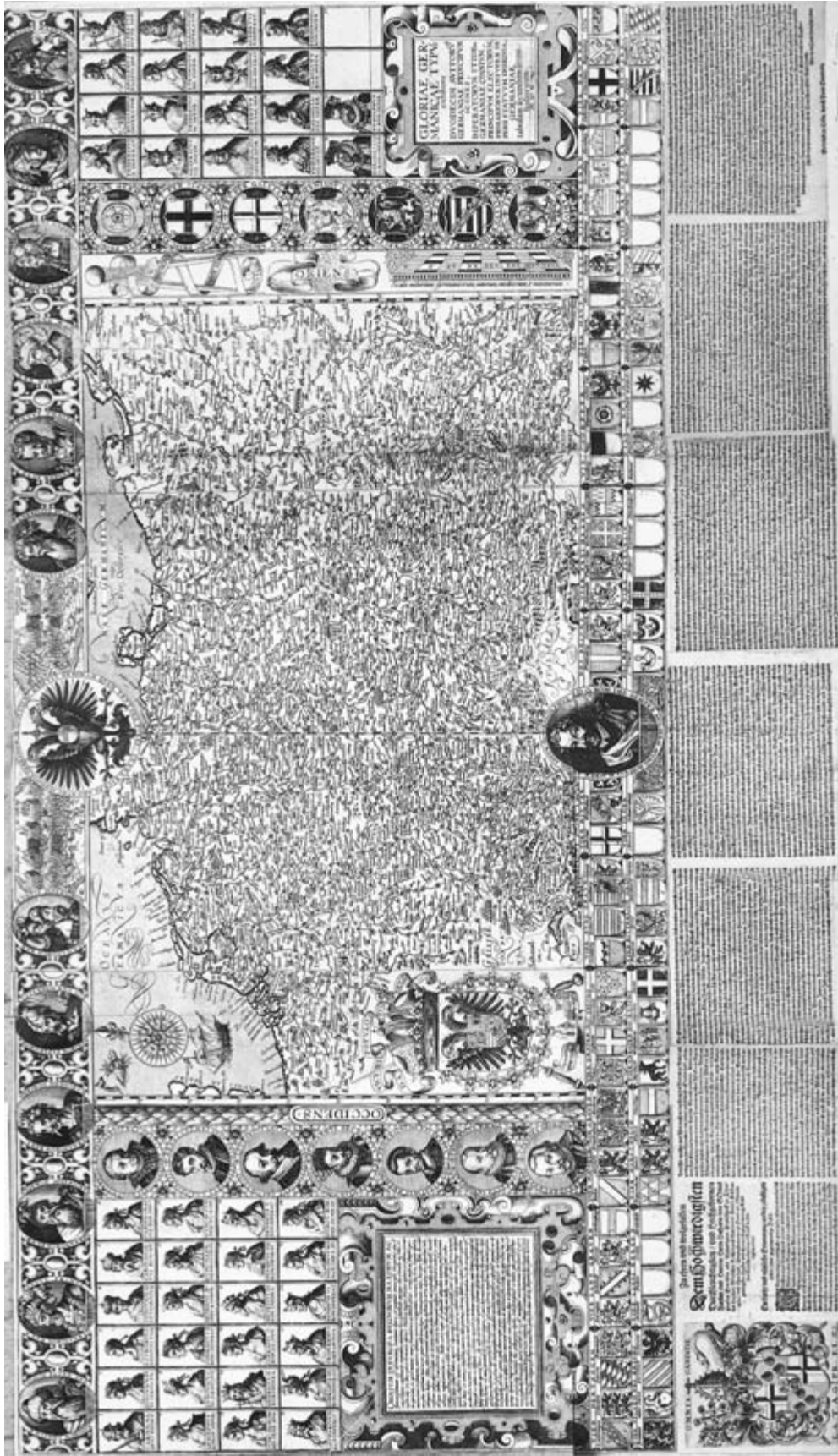


FIG. 42.35. MATTHIAS QUAD'S MAP OF THE HOLY ROMAN EMPIRE, 1600. The purpose of this highly decorative map, *Gloriae Germanicae typus*, was to propagate the glory and optimal (nonhereditary) structure of the empire. Along the upper border and on both sides are the portraits of sovereigns, from the mythical Germanic forefather Tuiscon through Caesar and Charlemagne to Rudolf II. On the side borders of the

map are the portraits and coats of arms of the seven electors, at the bottom the coats of arms of the imperial estates. Engraving on three sheets, text below in letterpress. Size of the original: 64 × 112 cm. Photograph courtesy of the Bildarchiv, Österreichische Nationalbibliothek, Vienna (NB 204.626).

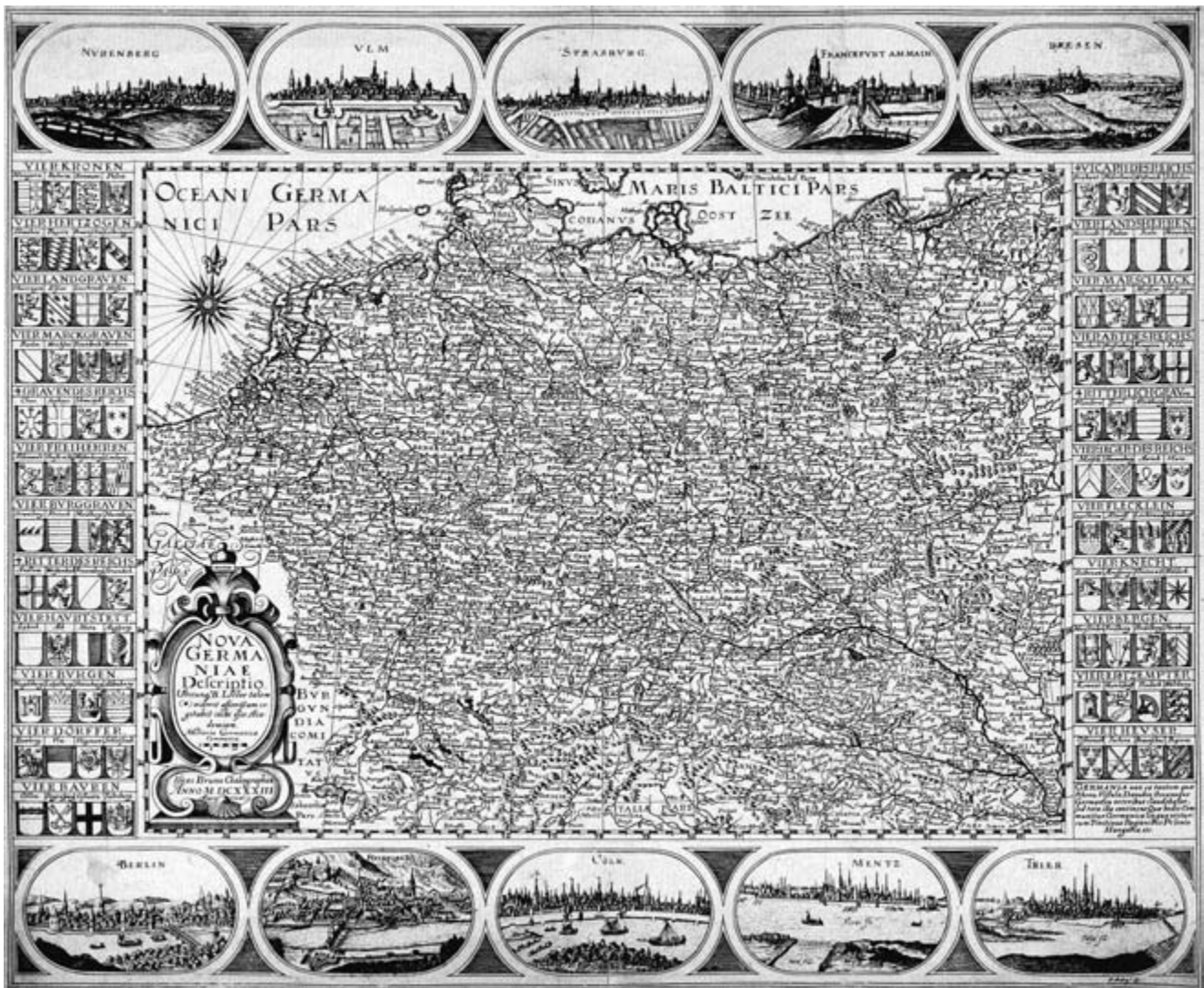


FIG. 42.36. ISAAC BRUN'S MAP OF THE HOLY ROMAN EMPIRE, 1633. This map type, with marginal town views, was created in Amsterdam shortly after 1600. This engraving, by the Strasbourg artist Isaac Brun, is the sole specimen pro-

duced in the German area. Interesting is the selection of towns, with a preference for the capitals of Protestant states. Size of the original: 46 × 55.5 cm. Photograph courtesy of the Staats- und Stadtbibliothek, Augsburg (Karte 6,1).

The flourishing of Prague as a center of the sciences and arts in late humanism ended with the death of Rudolf II. In all, this Prague milieu was relatively unimportant for the history of cartography. This is obvious for four reasons. First, the only cartographer directly associated with the court of Rudolf II was the imperial secretary Warmund Ygl. However, the surveys for his map of Tyrol (Prague, 1604/05) were made in 1595, when Ygl still lived in Tyrol.⁴¹¹ Second, a long-overdue new map of the Habsburg crown land of Bohemia by Paulus Aretinus, a cleric and follower of Matthias, was published only in 1619.⁴¹² Third, also under Rudolf II and Matthias, no attempt was made to initiate or support the production of a map of the entire Holy Roman Empire.⁴¹³ And finally, there were no concrete advances in celestial cartography,

as might have been expected from the activities of Brahe and Kepler.

A late product of Johannes Kepler's work in Prague, the *Tabulae Rudolphiinae* (Ulm, 1627), was published long af-

411. Meurer, *Fontes cartographici Orteliani*, 269–70; for a facsimile, see Warmund Ygl, *Neue Karte der sehr ausgedehnten Grafschaft Tirol und ihrer Nachbargebiete*, with commentary by Hans Kinzl, *Die Karte von Tirol des Warmund Ygl 1604/05* (Innsbruck: Österreichischer Alpenverein, 1962).

412. Kuchař, *Early Maps*, 19–22.

413. In 1583, the Augsburg instrumentmaker Christoph Schissler received an imperial privilege for an *instrumentum geometricum*. He proposed to use this invention to make a survey of the empire. However, this idea was not taken up by the imperial authorities. See Meurer, *Germania-Karten*, 276.



FIG. 42.37. ROAD MAP OF THE GERMAN LANDS BY JOHANN GEORG JUNG AND GEORG CONRAD JUNG, 1641. The rich entries of roads make this map, *Totivs Germaniæ novvm itinerarivs* by the Rothenburg cartographers Jung, a good medium for planning travel. However, the rather

poor artistic quality underlines the decline of German map-making during the Thirty Years War. Engraving. Size of the original: 43.5 × 57.5 cm. Photograph courtesy of the Germanisches Nationalmuseum, Nuremberg (LA 17).

ter he had left. This catalog, with newly calculated positions for over 1440 fixed stars, was an important basis for navigation and mathematical cartography in the following years. The world map by a friend of Kepler, Nuremberg merchant and amateur astronomer Philip Eckbrecht, is especially notable, for it was compiled from coordinates of major European observatories that had been calculated.⁴¹⁴

GERMAN RULERS AND REGIONAL CARTOGRAPHY

There were only singular and isolated regional survey projects by official order from about 1560 onward, and this continued unchanged until 1650. Only a few German princes had their countries mapped. Among the resulting maps are those of the surveys of the Principality of Lüneburg (from 1593) by the physician Johannes Mellinger, of the duchy of Pomerania (1618) by Eilhard Lubin, and of

the duchy of Mecklenburg (1622) by Johannes Lauremberg, a professor of mathematics and poetry.⁴¹⁵ In the Habsburg territories, the making of printed maps was for the most part initiated not by the imperial authorities, but by the regional estates. This trend began with the map of

414. Shirley, *Mapping of the World*, 358–59 (no. 335); on Eckbrecht, see Pilz, *Astronomie in Nürnberg*, 268–69. Although dated 1630, the map was published no earlier than 1658. There is no detailed analysis of this interesting map.

415. Jäger, “Johannes Mellinger,” and Alfred Haas, *Die große Lubinsche Karte von Pommern aus dem Jahre 1618*, ed. Eckhard Jäger and Roderich Schmidt (Lüneburg: Nordostdeutsches Kulturwerk, 1980). A detailed study of Lauremberg’s map is needed; on the author, see J. Classen, *Ueber das Leben und die Schriften des Dichters Johann Lauremberg* (Lübeck: Borchers, 1841). Lauremberg is also known for his maps of ancient Greece. The final, posthumous edition was Lauremberg’s rare atlas *Graecia antiqua* (Amsterdam: Joannem Janssonium, 1660); for a facsimile, see Johannes Lauremberg, *A Description of Ancient Greece*, intro. C. Broekema (Amsterdam: Hakkert, 1969).

Silesia by the teacher Martin Helwig, first published in 1561.⁴¹⁶ Later examples are the maps of Alsace (1576) by the architect Daniel Specklin,⁴¹⁷ of Tyrol (1604 and 1611) by the officials Warmund Ygl and Matthias Burgklehner,⁴¹⁸ of Carinthia (1612) by the engineer Israel Holzwurm, and of Upper Austria (1628) by his brother Abraham Holzwurm.⁴¹⁹

Difficult to explain is an evidently greater interest in the utility of maps in semidemocratic state structures. There were detailed measurements of the territories of some imperial cities, such as Aachen,⁴²⁰ Cologne,⁴²¹ Dortmund,⁴²² Frankfurt am Main,⁴²³ and Nuremberg.⁴²⁴ Also, many cantons of the Swiss Confederation were surveyed. There are large-scale maps of Bern,⁴²⁵ Fribourg,⁴²⁶ Grisons,⁴²⁷ Luzern,⁴²⁸ and Zurich.⁴²⁹ They culminated in the basic general map of Switzerland by the Zurich painter and cartographer Hans Conrad Gyger, first published in 1635.⁴³⁰

Other regional maps were—according to present-day knowledge—made on the initiative of their authors alone. Among many examples are maps of the Bodensee area and of the Black Forest (ca. 1578) by the teacher Johann Georg Tibianus,⁴³¹ of the Archbishopric of Cologne (1583) by the exiled Dutch surveyor Cornelis Adgerus,⁴³² of East Friesland (1595) by the mathematician Ubbo Emmius,⁴³³ of Thuringia (ca. 1605) by the Protestant priest Adolarius Erichius,⁴³⁴ and of Moravia (1627) by the pedagogue Johann Amos Comenius.⁴³⁵ Overall, a numeric decline of re-

416. Karrow, *Mapmakers of the Sixteenth Century*, 288–92; for a new edition, see Kurt Brunner and Heinz Musall, eds., *Martin Helwigs Karte von Schlesien aus dem Jahre 1561* (Karlsruhe: Fachhochschule, 1996).

417. Meurer, *Fontes cartographici Orteliani*, 243–44; the standard work on Specklin is Albert Fischer, *Daniel Specklin aus Straßburg (1536–1589): Festungsbaumeister, Ingenieur und Kartograph* (Sigmaringen: Thorbecke, 1996).

418. Lukas Rangger, “Matthias Burgklehner: Beiträge zur Biographie und Untersuchung zu seinen historischen und kartographischen Arbeiten,” *Forschungen und Mitteilungen zur Geschichte Tirols und Vorarlbergs* 3 (1906): 185–221. On the Warmund Ygl map, see note 411.

419. For a summary, see Peter H. Meurer, “Die wieder aufgefundene Originalausgabe der Kärnten-Karte von Israel Holzwurm (Strassburg 1612),” *Cartographica Helvetica* 34 (2006): 27–34.

420. On a manuscript map (Stadtmuseum, Aachen) by the Dutch-born painter Cornelis Jansz. Fries, see Heinrich Savelsberg, “Die älteste Landkarte des Aachener Reiches von 1569,” *Zeitschrift des Aachener Geschichtsvereins* 23 (1901): 290–305.

421. Special literature on this four-sheet engraving by Abraham Hogenberg (from about 1615) is needed.

422. On several maps by the merchant and amateur historian Detmar Mülher, see Wilhelm Fox, “Ein Humanist als Dortmunder Geschichtsschreiber und Kartograph—Detmar Mülher (1567–1633),” *Beiträge zur Geschichte Dortmunds und der Grafschaft Mark* 52 (1955): 109–275.

423. A highly decorative map of the surroundings of Frankfurt (combined with a town plan) as surveyed in 1582 by the painter Elias Hoffmann was printed in 1598; see Meurer, *Fontes cartographici Orteliani*, 168–69.

424. A highlight of large-scale regional mapping is the manuscript atlas of the Nuremberg area, with twenty-eight maps, made by the

Nuremberg merchant and patrician Paul Pfinzing in 1594 (Staatsarchiv, Nuremberg). A facsimile edition is Paul Pfinzing, *Der Pfinzing-Atlas von 1594*, ed. Staatsarchiv Nürnberg and Altnürnberger Landschaft (Nuremberg, 1994); for a detailed study, see Peter Fleischmann, *Der Pfinzing-Atlas von 1594: Eine Ausstellung des Staatsarchivs Nürnberg anlässlich des 400 jährigen Jubiläums der Entstehung*, exhibition catalog (Munich: Generaldirektion der Staatlichen Archive Bayerns, 1994).

425. The basic map, *Inclitae Bernatvm urbis*, by the physician Thomas Schoepf, was published in 1578 at Strasbourg; for a facsimile, see Georges Grosjean, ed., *Karte des Bernischen Staatsgebietes von 1577/78* (Dietikon-Zurich: Bibliophile Drucke von J. Stocker, 1970). A revised version by the artist and surveyor Joseph Plepp was published in 1638; on the author, see Johanna Strübin Rindisbacher, “Vermessungspläne von Joseph Plepp (1595–1642), dem bernischen Werkmeister, Maler und Kartenverfasser,” *Cartographica Helvetica* 12 (1995): 3–12.

426. On this manuscript map, see Jean Dubas and Hans-Uli Feldmann, “Die erste Karte des Kantons Freiburg von Wilhelm Techtelmann, 1578,” *Cartographica Helvetica* 10 (1994): 33–40.

427. The first issue of the map *Alpinae seu Foederatae Rhaetiae*, by the historian Fortunat Sprecher von Bernegg, appeared in 1618 at Leiden; for a facsimile, see Georges Grosjean, *Die Rätia-Karte von Fortunat Sprecher von Bernegg und Philipp Klüwer aus dem Jahre 1618* (Dietikon-Zurich: 1976). A bibliography of the early editions is provided by Franchino Giudicetti in “Eine bisher unbekannte Ausgabe der Rhaetia-Karte von Fortunat Sprecher v. Bernegg und Philipp Klüwer,” *Cartographica Helvetica* 5 (1992): 17–20.

428. On the various manuscript versions of a survey executed from 1597 onward by the town secretary Renward Cysat and the painter Hans Heinrich Wägmann, see Thomas Klöti, “Die älteste Karte des Kantons Luzern von Hans Heinrich Wägmann und Renward Cysat, 1597–1613, die Originalzeichnung und die Nachbildungen,” *Cartographica Helvetica* 2 (1990): 20–26.

429. A basic work was the map by Zurich artist and poet Jos Murer, first published in 1566; see Meurer, *Fontes cartographici Orteliani*, 205–6, and Arthur Dürst, “Das älteste bekannte Exemplar der Holzschnittkarte des Zürcher Gebiets 1566 von Jos Murer und deren spätere Auflagen,” *Mensuration, photogrammétrie, génie rural: Revue/ Vermessung, Photogrammetrie, Kulturtechnik: Fachblatt* 73 (1975): 8–12. For a reprint from the original woodblocks, see Jos Murer, *Karte des Kantons Zürich* (Zurich: Matthieu, 1966). Murer also published a large bird’s-eye view of the town of Zurich in 1576; see Arthur Dürst, “Die Planvedute der Stadt Zürich von Jos Murer, 1576,” *Cartographica Helvetica* 15 (1997): 23–37.

430. A reprint of the *Helvetiæ, Rhaetiæ & Valesiæ . . . tabula nova & exacta* was published in 1979 (Zofingen: Ringier) and in 1982 (Bern: Schweizerisches Gutenbergmuseum). We have no study of Gyger and his maps (among which are basic manuscript maps of the Canton of Zurich, 1620–67); the dates are summarized in “Gyger, Hans Conrad,” in *Lexikon*, 1:284–85.

431. Ruthardt Oehme, *Joannes Georgius Tibianus: Ein Beitrag zur Kartographie und Landesbeschreibung Südwestdeutschlands im 16. Jahrhundert* (Remagen: Bundesanstalt für Landeskunde, 1956).

432. Peter H. Meurer, “Die Kurköln-Karte des Cornelius Adgerus (1583),” *Rheinische Vierteljahrsblätter* 48 (1984): 123–37.

433. The research is summarized in Heinrich Schumacher, “Ubbo Emmius: Trigonometrie, Topograph und Kartograph—Unter besonderer Berücksichtigung neuer Forschungsergebnisse,” *Jahrbuch der Gesellschaft für bildende Kunst und vaterländische Altertümer zu Emden* 73–74 (1993–94): 115–49.

434. The new standard work on Erichius is Gunter Görner, *Alte Thüringer Landkarten 1550–1750 und das Wirken des Kartographen Adolar Erich* (Bad Langensalza: Rockstuhl, 2001).

435. Kuchař, *Early Maps*, 37–43, and Walter Sperling, *Comenius’ Karte von Mähren 1627* (Karlsruhe: Fachhochschule, 1994).

gional mapping in the German lands is obvious from about 1620, again as a result of the Thirty Years War.

However, there was a general interest in maps by German authorities. Outstanding map collections were already at the courts of Dresden,⁴³⁶ Munich,⁴³⁷ and Wolfenbüttel⁴³⁸ in the third quarter of the sixteenth century. Singular sources also point to maps in the possession of minor rulers and local administrations.⁴³⁹ Of course, maps and atlases were part of many municipal and monastic libraries. This is a wide field for future research.

WORKS IN HISTORICAL CARTOGRAPHY

Not least, the works by the Mercators show that the classical-humanist traits remained strong at the end of the sixteenth century. At that time, historical cartography, the science of mapping cultural and physical phenomena of the past, developed.⁴⁴⁰ The intellectual roots of this new discipline must be attributed to the reception of Ptolemy's *Geography*; all modern editors were aware that the twenty-seven *tabulae antiquae* gave an outdated depiction of the world. The early modern maps of the Holy Land, showing topography, place-names, and other features as described in the Holy Scriptures and classical writings, were another precursor. Finally, works such as the 1523 Aventinus map of Bavaria, which has some entries of archeological sites, should also be included.

The beginning of historical cartography in the German lands was marked by a map of Switzerland in Roman times (*Helvetia Iulii Caesaris*) in Johannes Stumpf's *Gemeiner loblicher Eydenossenschaft . . . beschreibung* (Zurich, 1548). The Vienna humanist Wolfgang Lazius drew two maps of ancient Greece and the Peloponnesus for his *Commentariorum rerum Graecorum libri duo* (Vienna, 1558). Humanist and Lutheran priest Caspar Henneberger illustrated his *Kurtze und warhafftige Beschreibung des Landes Preussen* (Königsberg, 1584) with a map of ancient Prussia.⁴⁴¹ The historical atlas *Parergon* by Abraham Ortelius, the father of systematic work in historical cartography, included from 1590 the *Germaniae veteris typus*, a highly influential general map of the German area according to classical authors.⁴⁴² Marcus Welser, a humanist from Augsburg, authored the *Rerum Augustanorum vindelicorum* (Frankfurt am Main, 1595), a chronicle of his home region that included a map (*Vindeliciae veteris descriptio*) of the area between the Danube and the Adriatic Sea in the Roman period.⁴⁴³ Austrian philologist and jurist Georgius Acacius Enenckel illustrated his edition of the *Thukydidēs* (Tübingen, 1596) with a map of Ancient Greece that he had made himself.⁴⁴⁴ A joint project of Ortelius and Welser was the publication of the Peutingering map (Antwerp, 1598); this edition can be regarded as the earliest specimen of what today would be called a facsimile edition.⁴⁴⁵ The *Epitagma sive specimen historiae . . . amplae Civitatis Ubio-*

rum . . . (Cologne, 1608), a history of the Rhineland in Roman times by Cologne humanist and jurist Stephan Broelmann, includes historical maps of Europe and Germany as well as four representations in which Broelmann attempted to reconstruct the appearance of Cologne in Roman times.⁴⁴⁶ A series of five maps on German history was included in the *Commentariorum rerum germanicarum libri tres* (Amsterdam, 1616), a historical geography by Petrus Bertius, who was working as a historian at Leiden University.⁴⁴⁷ It was followed by a set of ten very innovative maps in the *Germania antiqua* (Leiden, 1616) by Philipp Clüver from Danzig, who lived as a private scholar in Leiden (fig. 42.38).⁴⁴⁸

436. The rich map holdings in the *Kunstammer* of the Saxon electors are described in Hantzsch, *Landkartenbestände*. An inventory from 1595 lists fifty-seven framed and displayed wall maps; see Walther Haupt, "Landkartenbestände in Dresden bis zum Dreißigjährigen Krieg," *Sächsische Heimatblätter* 34 (1988): 94–96. Only minor parts of this collection can be traced today in the Sächsische Landesbibliothek, Dresden.

437. The first inventory of the Munich court library of 1577 lists forty wall maps. See Otto Hartig, *Die Gründung der Münchener Hofbibliothek durch Albrecht V. und Johann Jakob Fugger* (Munich: Königlich-Bayerische Akademie der Wissenschaften, 1917), 353–56. This magnificent collection is completely lost today.

438. There is not yet an edition of the maps in the Herzog August Bibliothek at Wolfenbüttel. For a preliminary survey, see the exhibition catalog by Arend W. Lang et al., *Das Kartenbild der Renaissance* (Wolfenbüttel: Herzog August Bibliothek, 1977).

439. For an exemplary study on maps in the possession of Hessian princes, see Fritz Wolff, "Karten und Atlanten in fürstlichen Bibliotheken des 16. und 17. Jahrhunderts: Beispiele aus Hessen," in *Karten hüten*, 221–31.

440. For an introduction to the subject, see Peter H. Meurer, "Ortelius as the Father of Historical Cartography," in *Abraham Ortelius and the First Atlas: Essays Commemorating the Quadricentennial of His Death, 1598–1998*, ed. M. P. R. van den Broecke, Peter van der Krogt, and Peter H. Meurer ('t Goy-Houten: HES, 1998), 133–59.

441. Jäger, *Prussia-Karten*, 293, and Hans Crome, "Kaspar Hennebergers Karte des alten Preußens, die älteste frühgeschichtliche Karte Ostpreußens," *Alt-Preußen* 5 (1940): 10–15 and 27–32.

442. Meurer, "Ortelius," 148–52.

443. Meurer, *Fontes cartographici Orteliani*, 266–67; for a more exhaustive study of Welser, see Paul Joachimsen, *Marx Welser als bayerischer Geschichtsschreiber* (Munich: Kutzner, 1905).

444. Meurer, *Fontes cartographici Orteliani*, 141, and Ruthardt Oehme, "Georg Acacius Enenckel, Baron von Hoheneck, und seine Karte des alten Griechenlandes von 1596," *Zeitschrift für Württembergische Landesgeschichte* 44 (1985): 165–79.

445. Meurer, "Ortelius," 157–58. Conrad Celtis found a medieval copy of the Roman road map in a library in southwest Germany (possibly at Speyer). He bequeathed this manuscript to Peutingering, who gave it his name (the Peutingering map or Tabula Peutingeriana).

446. Meurer, *Atlantes Colonienses*, 90–95, and Bernadette Schöller, "Arbeitsteilung in der Druckgraphik um 1600: Die 'Epitagma' des Stephan Broelmann," *Zeitschrift für Kunstgeschichte* 54 (1991): 406–11.

447. Leonardus Johannes Marinus Bosch, *Petrus Bertius, 1565–1629* (Meppel: Krips Repro, 1979).

448. A summary is given by Stephen A. Bromberg in "Philipp Clüver and the 'Incomparable' Italia Antiqua," *Map Collector* 11 (1980): 20–25.

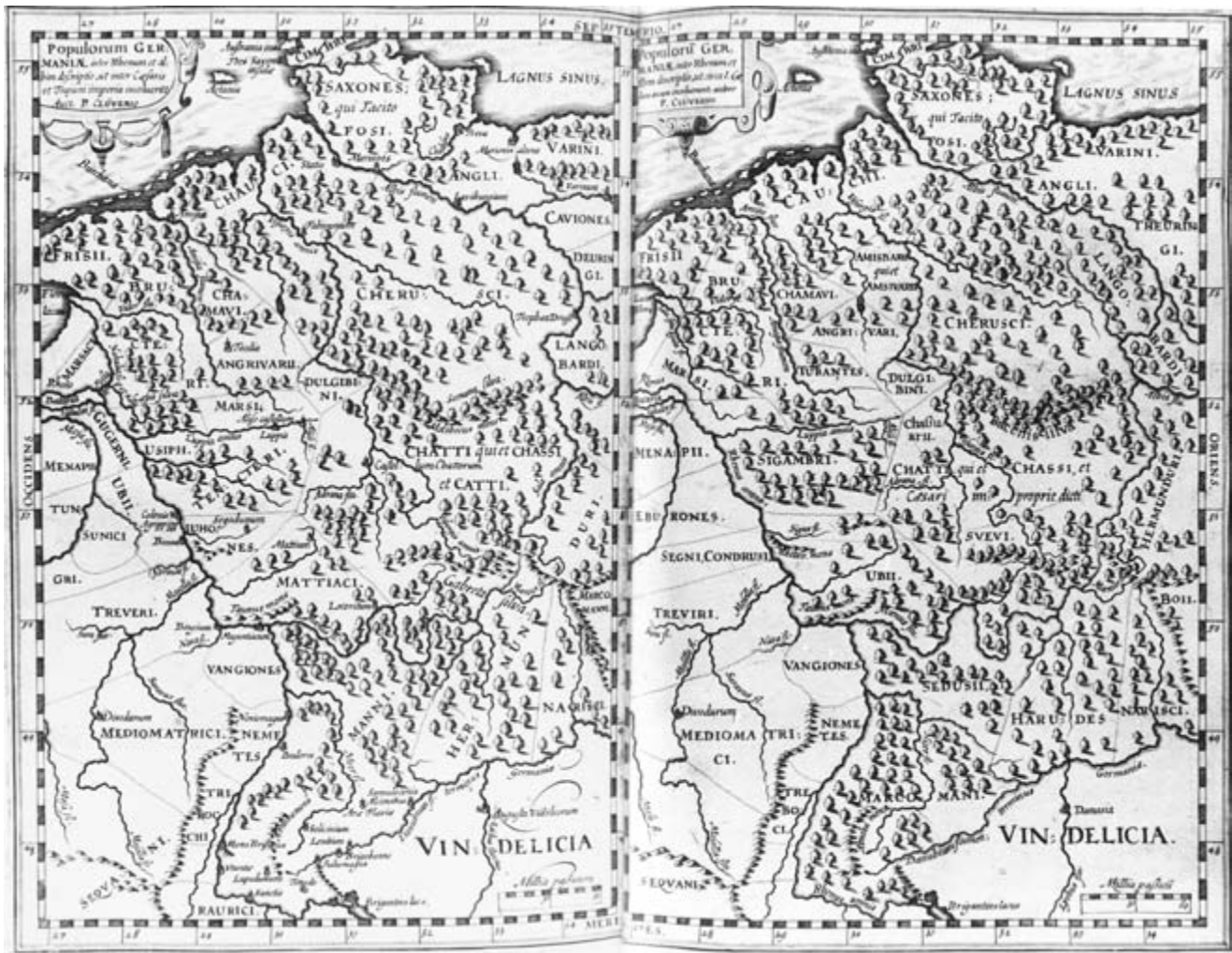


FIG. 42.38. EXAMPLE OF A HISTORICAL MAP. A two-page map from Philipp Clüver's *Germaniae antiquae libri tres* (Leiden: Elzevirius, 1616). Taking the topographical image from a contemporary map, Clüver reconstructed the geogra-

phy of Germania at the time of Caesar (ca. 50 B.C., left) and of Trajan (ca. A.D. 100, right). Engraving. Size of the original: 25 × 34 cm. Photograph courtesy of the Herzog August Bibliothek, Wolfenbüttel (190 Hist. 2°).

MAP PRINTING AND MAP PUBLISHING

Dominant and specialized map publishing houses especially developed in the sphere of the Flemish school, in Antwerp, Amsterdam, Cologne, and—as a singular feature—in Duisburg with the Mercator press. In the rest of the Holy Roman Empire, many publishing houses and workshops were engaged in cartography, but maps were only a small part of their production, and their activity was often shown by the publication of only a single map. This changed toward the end of the seventeenth century, when some innovative entrepreneurs entered the field of cartography, especially in Nuremberg and Augsburg.

Aside from direct marketing, the book fairs of Frankfurt am Main and Leipzig were the focus of the map trade in central Europe. Established booksellers settled mainly in university towns and commercial centers. Traveling

dealers visited the weekly markets and also events such as imperial diets and peace conferences.

An important innovation in German map publishing in the middle of the sixteenth century was the increasing use of copper engraving as the preferred method of reproduction. Continuities and clear lines of development can hardly be identified here, for the change occurred very slowly. Woodcutting was still being used in the German area as late as the seventeenth century. The earliest examples for its replacement by copper engraving or etching in the German area, with the exception of Flanders, can be found in Austria, for instance, in the map by Wolfgang Lazius of 1545 or the works of Augustin Hirschvogel. In Austria, copper engraving continued to be the generally used method of reproduction; further examples are the atlas of Austria by Lazius (1561) and the map of Moravia by Fabricius (1568). However, it is there that we



FIG. 42.39. VIEW OF TRIER FROM MATTHÄUS MERIAN'S TOWN BOOK, 1646. The illustrations in the multi-volume editions of Merian are based on numerous sources. The present example shows the bird's-eye view of Trier in the *Topographia archiepiscopatum Moguntinensis, Trevirensis et Coloniensis*, ed. Martin Zeiller (Frankfurt, 1646). It is an ar-

tistically reworked, but topographically unchanged, adaptation of Münster's depiction one century earlier (see fig. 42.21). Engraving.

Size of the original: 21 × 34 cm. By permission of Houghton Library, Harvard University (Ger. 8138.6.6F, near page 32).

also find examples for a pronounced discontinuity represented by the maps of Tyrol by Ygl (1605) and Burgklehner (1611), both published as woodcuts.

During the early phase of copper engraving, Nuremberg was able to continue its tradition as a center for mapmaking. A few smaller graphic publishers established themselves who, in addition to occasionally producing engravings of a variety of subjects, emphasized cartographic and topographic works. These are early examples of cartographic reporting with the goal of showing a large audience the contemporary theaters of war, especially the conflicts between the occidental powers and the Ottoman empire. Probably the most important of these small publishers in Nuremberg was Matthias Zündt.⁴⁴⁹ He was a goldsmith by trade and probably learned engraving as part of an apprenticeship in metal engraving. Zündt's works, mostly based on original drawings or his own compilations from printed models, still seem original. Notable are maps of the contemporary theaters of war in the Low Countries, Hungary, and the Mediterranean. With about twenty-five maps and topographic prints, the

engraver Balthasar Jenichen was the most prolific among the group of Nuremberg mapmakers;⁴⁵⁰ however, his works were almost exclusively reproductions of existing prints, especially of Italian origin.

Despite such native endeavors, with the advent of copper engraving the influence of the Flemish school in the entire German area continued to grow stronger. Immigrants from the Low Countries played a role in map publishing not only in the circles around Mercator and Hogenberg in the lower Rhine region, but also in other places in the German area. In 1590, Theodor de Bry settled in Frankfurt am Main. Together with his son Johann Theodor, he published single maps in addition to two multivolume series with illustrated reports on contemporary voyages of discovery.⁴⁵¹ Levinus Hulsius worked in

449. Karrow, *Mapmakers of the Sixteenth Century*, 617–21.

450. Peter H. Meurer, "Karten und Topographica des Nürnberger Kupferstechers Balthasar Jenichen," *Speculum Orbis* 4 (1988–93): 35–62.

451. John G. Garratt, "The Maps in De Bry," *Map Collector* 9 (1979): 3–11.

Nuremberg and Frankfurt am Main,⁴⁵² Dominicus Custos in Augsburg, and the Sadeler family in Munich, Augsburg, and Austria. The family of Jakob van der Heyden, who from about 1620 ran an important German map publishing house in Strasbourg, was also native to the Low Countries.⁴⁵³ The original editions of numerous German regional maps of the period appeared directly in the Netherlands.

A pupil of Jacob van der Heyden and a son-in-law of Johann Theodor de Bry was the Basel-born engraver Matthäus Merian the Elder.⁴⁵⁴ Owner of the De Bry workshop since 1625, he built up in Frankfurt the most productive German publishing house for graphics of the seventeenth century. Richly illustrated multivolume works became a Merian specialty. With respect to cartography and topography, the two most important productions were the *Theatrum Europaeum* (twenty-one volumes, 1633–1738), a compendium on contemporary history with numerous maps, plans, views, and portraits mostly based on primary sources,⁴⁵⁵ and the so-called *Topographia Germaniae* (sixteen volumes, 1641–54), a description of the Holy Roman Empire with about 1500 illustrations (fig. 42.39).⁴⁵⁶ Numerous writers, engravers, and other contributors worked for Matthäus Merian and his sons, Matthäus the Younger, Caspar, and Joachim. In all, the firm flourished until 1734.

A significant milestone at the end of this period was also a Merian production. In 1650, the so-called *Amore pacis* (“For love of peace”) map appeared, showing battles and garrisons of the Swedish troops and their allies in the German lands from 1632 to 1648.⁴⁵⁷ The map was engraved by Merian by order of the Swedish court and edited by Cornelius von den Bosch and Carl Heinrich von der Osten, two German officers in Swedish service.

CONCLUSIONS

The history of cartography in the German lands for the years 1450–1650 mirrors the political fragmentation in the state structure. The territorial patchwork quilt of the Holy Roman Empire resulted in a profusion of local—and in some cases very independent—centers of map-making. The lack of a central authority was one of the main reasons an officially initiated and sponsored cartographic survey of the entire area of the German Empire was never carried out in the period; all general maps of

Germania were products of the private initiatives of their authors. As a modern result of this political fragmentation and the differing centers and scenes, each of the many German lands and territories has its own cartographic history. In most cases, this is still to be written.

Parallel phenomena were some archetypal world maps by independent scholars such as Waldseemüller and Vopel. But neither the emperor nor the German regional sovereigns were engaged in the voyages of discovery and the colonization of the world in the sixteenth century. German mapmakers were not involved in maritime cartography, not even in the areas of the North and Baltic Seas.

The strong position of territorial rulers is reflected in the large number of regional maps. Their quality and functions differ enormously. The ideas of the Reformation stimulated German cartography, gave many cartographers protection and a new perspective, and contributed to the scholarly status of the subject.

At the end of the sixteenth century, the flourishing of the Amsterdam cartographic milieu would not have been possible without the separation of the northern Low Countries from Habsburg rule. In the remaining parts of the Empire, innovative forces in cartography became scarce. A growing lethargy culminated in nearly total decline during the Thirty Years War.

452. Adolf Asher, *Bibliographical Essay on the Collection of Voyages and Travels, Edited and Published by Levinus Hulsius and His Successors at Nuremberg and Franckfort from anno 1598 to 1660* (Berlin: Asher, 1839; reprinted Amsterdam: Meridian, 1962), and Josef Benzinger, “Levinus Hulsius: Schriftsteller und Verleger,” *Mitteilungen aus der Stadtbibliothek Nürnberg* 7, no. 2 (1958): 3–7.

453. I am preparing a study on the maps by Jakob van der Heyden, who has issued about fifty maps and other prints on related subjects.

454. The standard work is Lucas Heinrich Wüthrich, *Das druckgraphische Werk von Matthaeus Merian d. Ae.*, 4 vols. (Basel: Bärenreiter, 1966–72; Hamburg: Hoffmann und Campe, 1993–96).

455. Wüthrich, *Matthaeus Merian*, 3:113–272.

456. Wüthrich, *Matthaeus Merian*, vol. 4. There is a facsimile edition of Merian’s *Topographia Germaniae*, 16 vols. (Kassel: Bärenreiter, 1960–67). Merian had planned to extend the project toward a “*Topographiae Europae*.” There appeared the *Topographia Galliae* (13 vols., 1655–61), the *Topographia urbis Romae* (1 vol., 1681), and a first volume of a *Topographia Italiae* (1688). After that, the project stagnated.

457. Meurer, *Germania-Karten*, 479–82, and Harald Köhlin, “A Map of Germany Made after the Swedish Campaign of 1630–48,” *Imago Mundi* 8 (1951): 50–51.