

# 60 • Scandinavian Renaissance Cartography

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## THE SETTING

When the first cartographic representation of the Scandinavian world was undertaken by its scholars, the constituent countries of Denmark, Finland, Iceland, Norway, and Sweden were united under a common monarchy in the Kalmar Union (1389–1523).<sup>1</sup> Within the frame of the Union, the Danish realm, focused on Copenhagen, stretched from Schleswig-Holstein in the south to Arctic Norway in the north. To the west, it included Iceland, the Faeroe Islands, and the Greenland settlements; to the east, it embraced the provinces of Skåne, Halland, Blekinge, and Bohuslän (in southern Sweden), together with the Baltic island of Gotland. Territorially, Denmark was the most extensive kingdom in Europe. The Swedish realm, focused on Stockholm, had the province of Finland as its eastern wing. After the unwieldy Union broke up through internal dissension in 1523, Gustavus I (Vasa; r. 1523–60) established a powerful dynasty in Sweden and Christian III (r. 1534–59) settled upon the throne in Denmark.

The political boundaries of the two kingdoms were least satisfactorily defined in the north and the east (fig. 60.1). In the north, Denmark challenged Muscovy in Arctic Norway, while Sweden pushed northward into Lapland from the landward side. To the east, Sweden took the initiative in defining its boundaries with Muscovy, with the formal frontier being agreed upon by the Peace of Teusina (1595). The regions associated with these boundary determinations were depicted cartographically in several freehand sketches from the period (fig. 60.2).<sup>2</sup> In the expansive age that followed, Sweden extended its trans-Baltic territories by the Peace of Stolbovo (1617) to include Ingria (Ingermanland), Estonia, and Livland (Livonia), a region of Latvia. To the south, it acquired a number of German provinces under the Peace of Westphalia (1648). Westward, a succession of campaigns against Denmark led to Swedish control of the northern provinces of Jämtland and Härjedalen as well as the island of Gotland and, subsequently, of the provinces of Skåne, Halland, Blekinge, and Bohuslän by the Peace of Roskilde (1658).

This is the geopolitical background to the earliest maps

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A special thanks to Ulla Ehrensvärd for her invaluable comments on a previous draft of this chapter.

1. Interest in the history of cartography among Scandinavian scholars received a boost from several quarters in the last two decades of the nineteenth century. First, the search for maps and charts was stimulated by exploration in high latitudes, above all by A. E. Nordenskiöld. Following his epic journey through the Northeast Passage in 1878–79, Nordenskiöld developed an intense interest in early cartography, especially that of northern Europe. He assembled a large personal collection that is in the possession of the Helsingin Yliopiston Kirjasto (University of Helsinki Library). See *The A. E. Nordenskiöld Collection in the Helsinki University Library: Annotated Catalogue of Maps Made up to 1800*, 5 vols., comp. Ann-Mari Mickwitz, Leena Miekkaavaara, and Tuula Rantanen, with indexes, vols. 5.1 and 5.2, by Cecilia af Forselles-Riska (Helsinki: Helsinki University Library, 1979–95); 1:ix–xxviii deals with the origins of the collection. See also George Kish, *North-East Passage: Adolf Erik Nordenskiöld, His Life and Times* (Amsterdam: Nico Israel, 1973). Nordenskiöld's desire to make early maps available to a wider public resulted in two volumes of reproductions unique for their time—*Periplus: An Essay on the Early History of Charts and Sailing-Directions*, trans. Francis Arthur Bather (Stockholm: P. A. Norstedt, 1897), and *Facsimile-Atlas to the Early History of Cartography*, trans. Johan Adolf Ekelöf and Clements R. Markham (Stockholm: P. A. Norstedt, 1889). A second stimulus to cartographic interest was the discovery of a number of key maps from the early sixteenth century, that of the Swede Olaus Magnus in particular. Simultaneously, the geographical societies of Scandinavia came into being—Denmark (1876), Sweden (1877), Finland (1888), and Norway (1889)—each having members with an interest in early cartography. Strangely enough, northern Europe's most remarkable store of cartographic material, the product of the precocious Swedish *Lantmäterikontoret* (Land Survey Office), was neglected even after the publication of Sven [Erik] Lönborg, *Sveriges karta, tiden till omkring 1850* (Uppsala: I distribution hos Almqvist och Wiksells boktryckeri, 1903). Lönborg also touched upon the riches of the Rikssarkivet (Military Archives). The book, being in Swedish, had little impact outside the country. Important maps are also reproduced in Axel Anthon Bjørnbo and Carl S. Petersen, *Anecdota cartographica septentrionalia* (Copenhagen, 1908). See also William B. Ginsberg and Inger G. Ginsberg, *Scandia: Important Early Maps of the Northern Regions & Maps and Charts of Norway* (New York: American-Scandinavian Foundation, 2002); William B. Ginsburg, *Printed Maps of Scandinavia and the Arctic, 1482–1601* (New York: Septentrionalium Press, 2006); and Ulla Ehrensvärd, *The History of the Nordic Map: From Myths to Reality*, trans. Roy Hodson (Helsinki: John Nurminen Foundation, 2006).

2. Lönborg, *Sveriges karta*, 8–9, refers to freehand sketches of the Russian-Swedish border and of the territory between the Gulf of Bothnia and Varanger Fjord associated with the Danish-Swedish boundary meeting of 1601 in Stockholm's Rikssarkivet. Freehand drawings of parts of the Russian border by Jaakko Teitti (Jacob Teit) in Helsinki's Kansallisarkisto, dated 1555, are discussed and reproduced by Kyösti

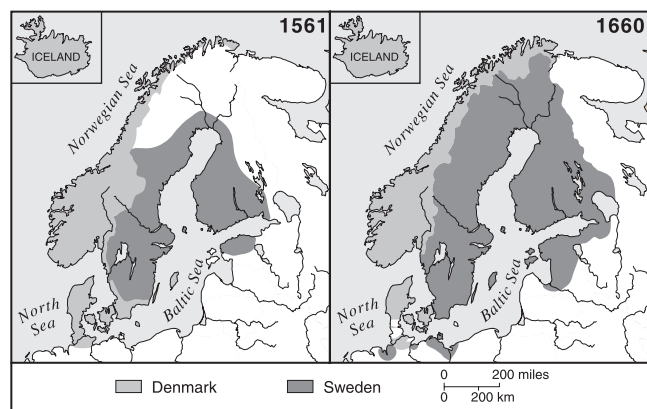


FIG. 60.1. REFERENCE MAP OF SCANDINAVIA. The boundaries of the kingdoms of Denmark and Sweden gradually acquired a measure of permanence between the mid-sixteenth and mid-seventeenth centuries (above). Denmark's sphere of influence in the Baltic contracted as Sweden became a dominant European power. To the east, Sweden established its frontier with Muscovy by treaties in 1595 and 1617. To the west, it established its authority in the provinces of Jämtland and Härjedalen. To the south, it acquired the provinces of Skåne, Halland, Blekinge, and Bohuslän from Denmark (1658). There was little settlement in the northern halves of Norway, Sweden, and Finland except along the coasts. Frontiers were only confirmed on the ground in the eighteenth century. The map on the right shows places mentioned in this chapter.

Left based on H. W:son [Hans Wilhelmsson] Ahlman, ed., *Norden i text och kartor* (Stockholm: Generalstabens Litografiska Anstalt, 1976), 14.



of the Nordic area by Scandinavians.<sup>3</sup> Although mariners, principally Dutch and British, compiled their charts and merchants measured the distances along trade routes, it was mainly the scholarly and itinerant ecclesiasts of the day who gave cartographic form to the accumulating body of geographical information about the north.<sup>4</sup> As the Ptolemaic maps were bounded on the north by the sixty-third parallel, the area that lay beyond was described at best as *tenebrosum* (dark); at worst, as *ignotum* (unknown). From the first tentative efforts of Claudius Clavus, it took rather more than a century for a map to depict features that bore some resemblance to those derived from modern coordinates. The art of mapmaking became allied with the science of surveying during the same period. Simultaneously, it acquired a military significance and became a tool of Renaissance monarchy and (in Sweden, at any rate) an arm of the exchequer.

### PIONEERING IN NORDIC CARTOGRAPHY

The first map of hyperborean Europe by a Scandinavian is attributed to Claudius Clavus (Swart; Svartbo), sometimes called Nicolaus Niger, a native of Sallinge on the Danish island of Fyn and subsequently associated with the Cistercian monastery of Sorø in Sjælland (Zealand). Claudius Clavus was in Rome in 1423–24, where he moved in pa-

pal circles and is assumed to have become familiar with cartographic materials pertaining to northern Europe.<sup>5</sup>

Julku, *Suomen itärajan synty* (Rovaniemi: Pohjois-Suomen Historiallinen Yhdistys, 1987), 248–97. A sketch of the Kymi River in Finland is included in Harri Rosberg et al., *Vanhojen karttojen Suomi: Historiallisen kartografian vertaileva tarkastelu* (Jyväskylä: Gummerus, 1984), 14–15.

3. Unless the significantly older T-shaped map of the world in Lund cathedral, dated about 1150, is to be considered part of the cartographic corpus of Scandinavia (reproduced in Axel Anthon Bjørnbo, “Adam af Bremens Nordensopfattelse,” *Aarbøger for Nordisk Oldkyndighed og Historie*, 2nd ser., 24 [1909]: 120–244, esp. 189 [fig. 2]).

4. See Louis Rey, ed., *Unveiling the Arctic* (Fairbanks: University of Alaska Press for the Arctic Institute of North America, 1984), esp. Ulla Ehrensvärd, “Cartographical Representation of the Scandinavian Arctic Regions,” 552–61. See also Leo Bagrow, “Norden i den äldsta kartografien,” *Svensk geografisk årsbok* 27 (1951): 119–33; and Heinrich Winter, “The Changing Face of Scandinavia and the Baltic in Cartography up to 1532,” *Imago Mundi* 12 (1955): 45–54.

5. First dealt with by Gustav Storm, “Den danske Geograf Claudius Clavus eller Nicolaus Niger,” *Ymer* 9 (1889): 129–46 and 11 (1891): 13–38. The early detective work that went into tracing the movements of Clavus, the sources of his work, and the consequences of it are the subject of an impressive monograph, Axel Anthon Bjørnbo and Carl S. Petersen, *Der Däne Claudius Claussøn Swart (Claudius Clavus): Der ältteste Kartograph des Nordens, der erste Ptolemäus-Epigon der Renaissance* (Innsbruck: Wagner, 1909). See also Ehrensvärd, *Nordic Map*, 36–45.

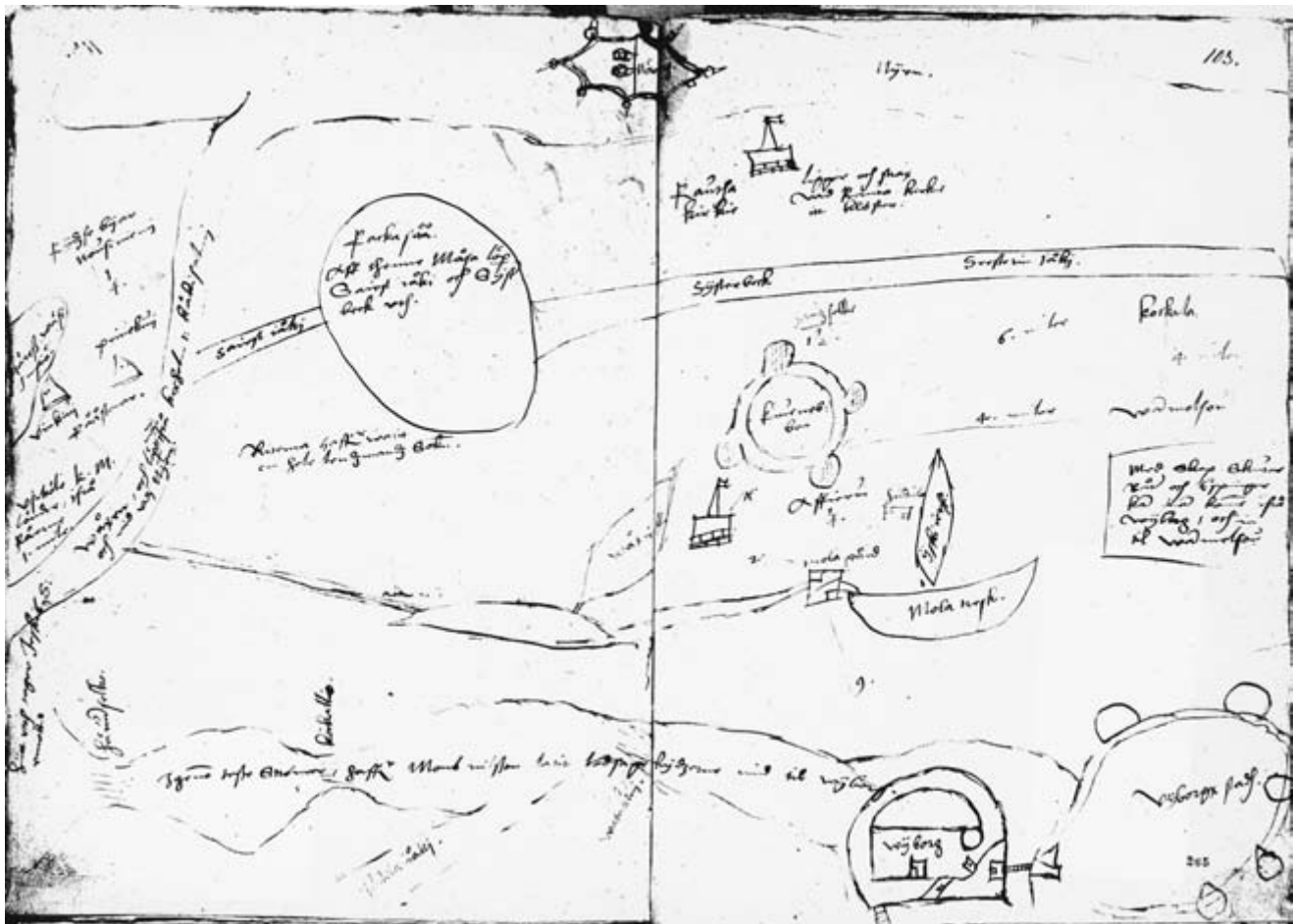


FIG. 60.2. JAAKKO TEITTI, A FREEHAND SKETCH OF THE KARELIAN ISTHMUS IN EASTERN FINLAND, CA. 1555. The fortress of Viipuri appears in the bottom right corner. The principle task of Teitti, a member of an old Finnish family from Perniö in southwest Finland, was to lead a royal

commission enquiring into properties (*frälse*) exempt from land dues to the crown (1555–56).

Size of the original: 30 × 42 cm. Photograph courtesy of the Kansalliskartasto (National Archives of Finland), Helsinki (VA 215k, p. 265).

It is possible that he was invited by the Danish king Eric of Pomerania (Eric VII) to prepare a map of the Scandinavian world, which was then united by the Kalmar Union.

During the 1830s a manuscript of Ptolemy's *Geography* came to light in the city library of Nancy, France. It was dated 1427 and included a map of the northern regions that bore the name of Claudius Clavus (fig. 60.3).<sup>6</sup> No maps from Clavus's hand exist, but this oldest extant version associated with Clavus was the first of the "modern" maps (*tabulae modernae*) added to the standard Ptolemaic maps in the *Geography*.<sup>7</sup> Clavus's map of the north must have been compiled from sailing charts and route books (which no longer exist), the oral information of mariners who had sailed to Iceland and the Greenland settlements, and the knowledgeable Hanseatic traders whom Claudius Clavus must have encountered.<sup>8</sup>

The map gives the Scandinavian peninsula a pronounced east-west orientation, likewise Jutland and the

Danish islands, and it is not until the 1532 map by Jacob Ziegler that the peninsula takes on a more north-south orientation. The semicircular coastline of the southeast Baltic

6. First described in Jean Blau, "Supplément du mémoire sur deux monuments géographiques conservés à la Bibliothèque Publique de Nancy," *Mémoires de la Société Royale des Sciences, Lettres et Arts de Nancy*, 1835, 67–105.

7. The standard Ptolemaic maps came from two Greek recensions of the *Geography*: one with twenty-seven Ptolemaic maps (called the A recension) and one with sixty-four Ptolemaic maps (the B recension); both recensions were used in various Latin translations (on the reception of Ptolemy's *Geography*, see chapter 9 in this volume). Although this map of the north appears in the 1427 manuscript, new maps of other regions were not added to Ptolemy manuscripts until the 1460s.

8. Niels Erik Nørlund, *Danmarks Kortlægning* (Copenhagen: Ejnar Munksgaard, 1943), 15, and Haraldur Sigurðsson, "Some Landmarks in Icelandic Cartography Down to the End of the Sixteenth Century," in *Unveiling the Arctic*, ed. Louis Rey (Fairbanks: University of Alaska Press for the Arctic Institute of North America, 1984), 389–401, esp. 392–93.

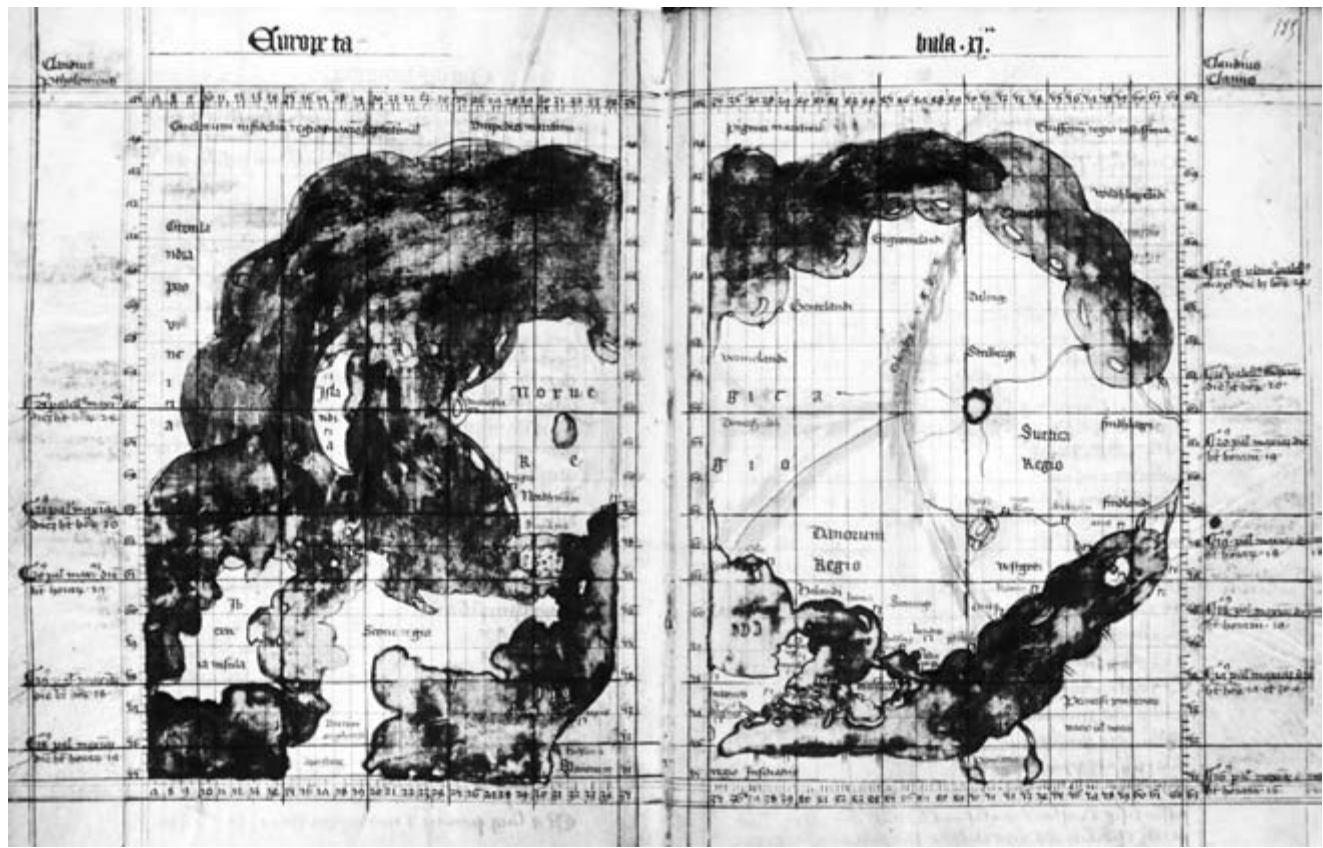


FIG. 60.3. CLAUDIUS CLAVUS, MANUSCRIPT MAP OF THE NORTH IN PTOLEMY'S *GEOGRAPHY*, NANCY MANUSCRIPT, 1427. On this oldest extant version of Clavus's map, the Scandinavian peninsula is divided into three realms: Noruegica, Suetica, and Danozum. There are about fifty place-names, nearly half in Denmark. There are two latitude scales on the map with a 4° difference. On the left side of

each folio the latitude values are based on Ptolemy (55°–75°N); those on the right are based on corrections by Claudius Clavus (51°–71°N).

Size of the original: 14.8 × 21.5 cm. Photograph courtesy of the Bibliothèque Municipale de Nancy (MS. 441 [354], fols. 184v–185r).

Sea is well represented, but the twin gulfs of Bothnia and Finland are not depicted. The fifth of the map lying north of the Arctic Circle lacks territorial identity. For the first time, Greenland appears on a map. It extends in a sweeping arc across the top of the map, flanking the Scandinavian peninsula to the north and west. "The diocese of ice," as it was called, was ecclesiastically significant because the settlement of Gardar (Igaliko) was the most remote outpost of Catholic Europe.<sup>9</sup> Iceland appears west of the Scandinavian peninsula, midway between it and Greenland.<sup>10</sup>

In later manuscripts of the *Geography* the map of the north appears in two different versions. One version depicts Greenland as a peninsula directly west of Scandinavia and connected to it with a speculative land bridge across Mare Congelatum, similar to the version in the Nancy manuscript. Iceland is located between Greenland and Scandinavia (fig. 60.4). A second version shows Greenland directly north of Scandinavia. Iceland is moved farther west and farther north (fig. 60.5).<sup>11</sup> Early examples

of both versions are found in Nicolaus Germanus's manuscripts of the *Geography*,<sup>12</sup> and both versions were trans-

9. Louis Rey, "The Evangelization of the Arctic in the Middle Ages: Gardar, the 'Diocese of Ice,'" in *Unveiling the Arctic*, ed. Louis Rey (Fairbanks: University of Alaska Press for the Arctic Institute of North America, 1984), 324–33.

10. Haraldur Sigurðsson, "Landmarks in Icelandic Cartography," 392–94.

11. The two maps of the north are discussed by Bjørnbo and Petersen, *Der Däne Claudius Clausson Swart*, esp. 19–43, and they also include reconstructions of the two versions of the map and an analysis of the texts that accompany them; Nørlund, *Danmarks Kortlægning*, 12–16; and Haraldur Sigurðsson, *Kortasaga Íslands: Frá öndverðu til loka 16. aldar* (Reykjavík: Bókauktgáfa Menningarsjóðs og Þjóðvinafélagsins, 1971), 69–76.

12. Interestingly, when Nicolas Germanus first included a map of the north in his manuscripts of the *Geography*, it was of the version with Greenland west of Scandinavia (these are sometimes referred to as manuscripts in Nicolas Germanus's second edition). But later, he switched to the second version of the map as illustrated in fig. 60.5 (sometimes called his third edition), and it was this second version that became the

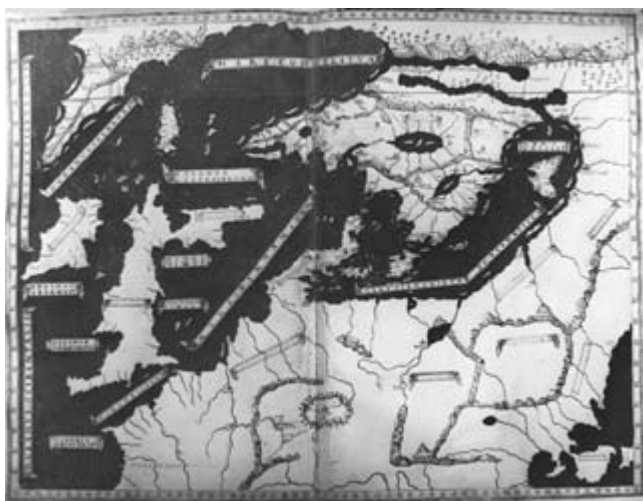


FIG. 60.4. MAP OF THE NORTH FROM PTOLEMY'S *GEOGRAPHY*, CA. 1490. This manuscript map of the north is in an edition of the *Geography* edited by Henricus Martellus Germanus. Greenland is a peninsula attached to the mainland across the *Mare Congelatum*. Although Ptolemy indicated that Scandinavia was an island and some versions depict it as such, it is clearly shown on this map as a peninsula.

Size of the original: 57.5 × 83.5 cm. Biblioteca Nazionale Centrale, Florence (MS. Magl. Cl. XIII, 16 cc. 104v–105r [la tavola moderna del nord Europa]). By concession of the Ministero per i Beni e le Attività Culturali della Repubblica Italiana.

mitted to later printed editions of the *Geography* and other printed maps based on Ptolemy.<sup>13</sup>

It was over a century before another pioneer essayed a map of the north. The Bavarian-born Jacob Ziegler, described by Nørlund as a wandering scholar, attended German universities before moving to Rome (1521–25).<sup>14</sup> There he met Archbishop Johannes Magnus (brother of Olaus), the Swede Peder Månsson, and the Norwegian bishops Erik Walkendorf and Olav Engelbriktsson, all of whom were well informed on the topography of Scandinavia. From them he acquired personal information “of Norway . . . Götaland Svealand and Finland . . . the northern half of widespread Lapland, the Greenland peninsula and Thule.”<sup>15</sup> From more than four hundred recorded determinations of position, the distances incorporated in sailing directions, and the lengths of the longest and shortest days in particular places, Ziegler was able to construct his own manuscript outline of the north. The map of “Schondia” (1530) was later published in his *Quae intus continentur*, printed in Strasbourg in 1532 and reprinted in 1536 (*Terrae Sanctae*).<sup>16</sup> The woodcut included a framework of latitude and longitude, but no scale (fig. 60.6). The outline of Denmark was poor by comparison with the presentation of Claudius Clavus. The link between Norway and Greenland was retained but there was no suggestion that it was an ice bridge. The map was no-



FIG. 60.5. MAP OF THE NORTH FROM PTOLEMY'S *GEOGRAPHY*, CA. 1481. For reasons not completely understood, some editors of the *Geography* followed a different model of the north in their *tabulae modernae*. This version placed Greenland directly north of Scandinavia and placed Iceland farther north and west. An early editor to use this model was Nicolaus Germanus, who also prepared at least four manuscripts following the other version for his map of the north. He prepared this ornate version, which was commissioned and dedicated to Duke Borso d'Este.

Size of the original: 42 × 57 cm. Biblioteca Medicea Laurenziana, Florence (Plut. 30.4, cc. 84v–85r). By concession of the Ministero per i Beni e le Attività Culturali.

table in that it incorporated the largest number of place-names yet to appear on any map of the north.

Ziegler was invited to Uppsala, but never considered going there. Had Johannes Magnus known that the information on Sweden he handed over to Ziegler was of interest to his brother Olaus, it is unlikely that he would have been so willing to have done so. In any event, the

basis for the first printed editions of Ptolemy that contained a map of the north (Ulm 1482 and 1486). See Józef Babicz, “Nordeuropa in den Atlanten des Ptolemaeus,” in *Das Danewerk in der Kartographiegeschichte Nordeuropas*, ed. Dagmar Unverhau and Kurt Schietzel (Neumünster: K. Wachholtz, 1993), 107–28.

13. For example, Martin Waldseemüller is generally regarded as having been critical for the transmission of the second version of the map of the north through his world map (1507).

14. Nørlund, *Danmarks Kortlægning*, 18; “Ziegler, Jacob,” in *Biographiskt lexicon öfver namnkunnige svenske män*, 23 vols. (Uppsala, 1835–52; Örebro, 1855–56), 23:92–100; and Karl Schottenloher, “Jakob Ziegler aus Landau an der Isar,” *Reformationsgeschichtliche Studien und Texte*, vols. 8–10 (1910).

15. Nørlund, *Danmarks Kortlægning*, 15.

16. For more on Ziegler's cartographic endeavors and for a detailed account of the various versions of his map of Scandinavia, see Robert W. Karrow, *Mapmakers of the Sixteenth Century and Their Maps: Bibliographies of the Cartographers of Abraham Ortelius, 1570* (Chicago: Published for the Newberry Library by Speculum Orbis Press, 1993), 603–11.

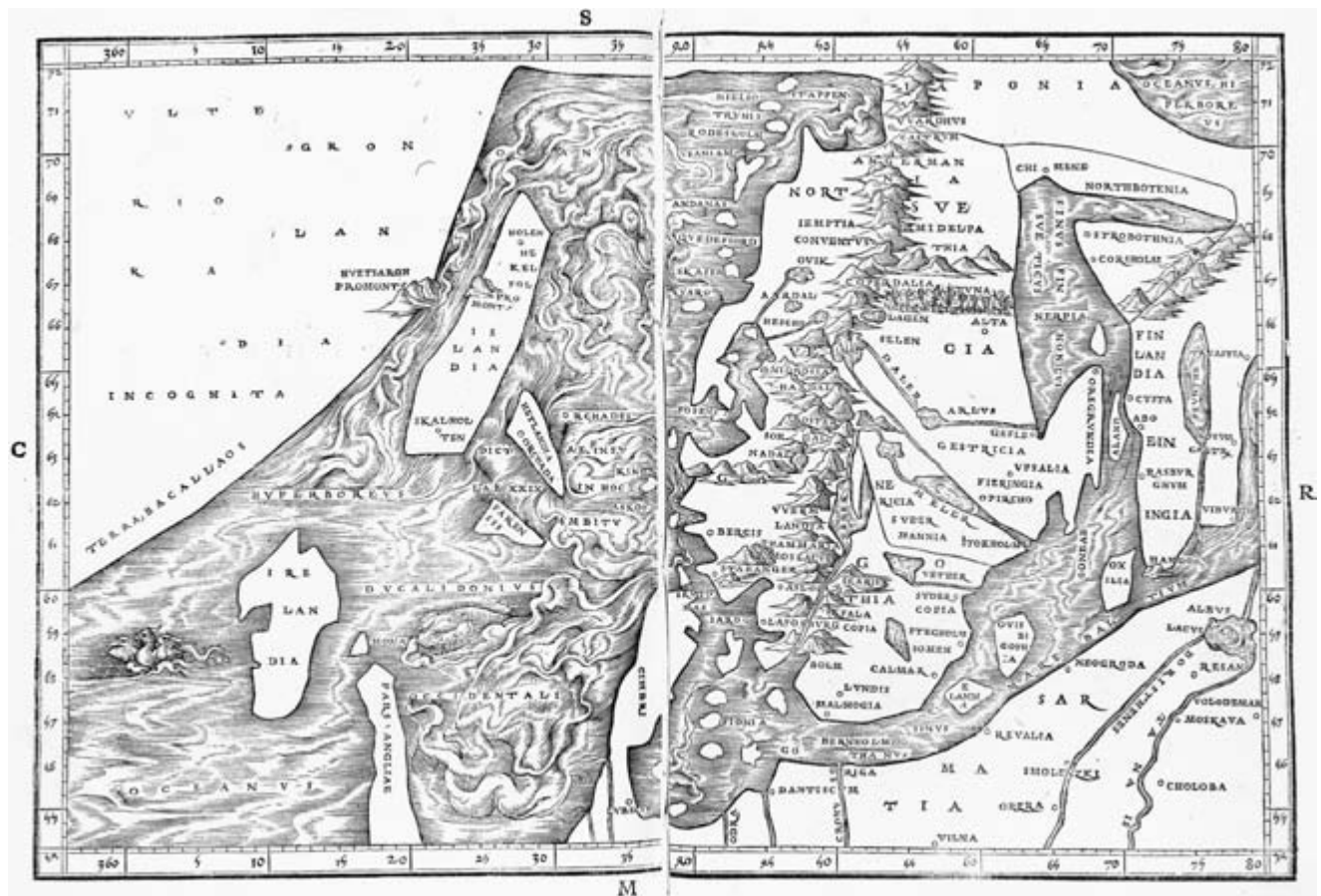


FIG. 60.6. JACOB ZIEGLER, MAP OF THE NORTH, PRINTED IN 1532. Ziegler is the first to give the correct north-south orientation to the Scandinavian peninsula and to introduce the mountainous divide between Norway and Sweden; but the land link to Greenland is retained and the author is still groping after the outline of the Baltic Sea.

Size of the original: 23.2 × 34.5 cm. From Jacob Ziegler, *Quae intvs continentvr. Syria, ad Ptolomaici operis rationem . . .* (Strasbourg: Petrum Opilionem, 1532), map no. 8. Photograph courtesy of the John Carter Brown Library at Brown University, Providence.

map of Olaus Magnus, to which we now turn, was to be far more influential.

### A GOTHIC VISION OF THE NORTH

Olaus Magnus spent most of his later years away from his home country.<sup>17</sup> Although he was appointed to the archbishopric of Uppsala in 1544 after his brother's death, he never occupied the see (after 1527 Sweden had broken its contact with the Catholic church and the pope). Olaus Magnus, a native of the Swedish city of Linköping, traveled in Sweden/Norway in 1518–19. His destinations included Trondheim, where he stayed with Archbishop Walkendorf and other prelates who were knowledgeable about Norwegian geography and who later provided Ziegler with information. He left Sweden in 1524 on manifold ambassadorial missions that carried him from Poland to the Netherlands and from Lübeck to Rome.

Olaus Magnus is celebrated for his *Carta marina* and the *Historia de gentibus septentrionalibus*. The *Carta ma-*

*rina* was published in Venice in 1539.<sup>18</sup> The idea for the map came to him no earlier than 1527. It was the product

17. For a full review of his life and work, see Karl Jakob Mauritz Ahlenius, *Olaus Magnus och hans framställning af Nordens geografi: Studier i geografis historia* (Uppsala: Almqvist och Wiksells Boktryckeri-Aktiebolag, 1895), and Hjalmar Grape, *Olaus Magnus: Forskare, moralist, konstnär* (Stockholm: Proprius Förlag, 1970). See also "Bidrag till Olai Magni historia," *Historiska Handlingar* 12, no. 2 (1893): 1. "Literära fragmenter," ed. H. Hjærne; 2. "Handlingar angående Olai Magni egendomsförvärf och kvarlätenskap" (The literary fragments contain Olaus Magnus's autobiographical notes); Herman Richter, *Geografis historia i Sverige intill år 1800* (Uppsala: Almqvist och Wiksells Boktryckeri, 1959), 46–50; Karrow, *Mapmakers of the Sixteenth Century*, 362–66; and Olaus Magnus, *Description of the Northern Peoples, Rome 1555*, 3 vols., ed. Peter Godfrey Foote, trans. Peter Fisher and Humphrey Higgins, with annotation derived from the commentary by John Granlund (London: Hakluyt Society, 1996–98), 1:xiii–lxxxix.

18. Ulla Ehrensward, "Zum zeitgeschichtlichen Hintergrund der *Carta marina*: Ein Beitrag zum Werk der Brüder Johannes und Olaus Magnus," and Elfriede Regina Knauer, "Die *Carta marina* des Olaus

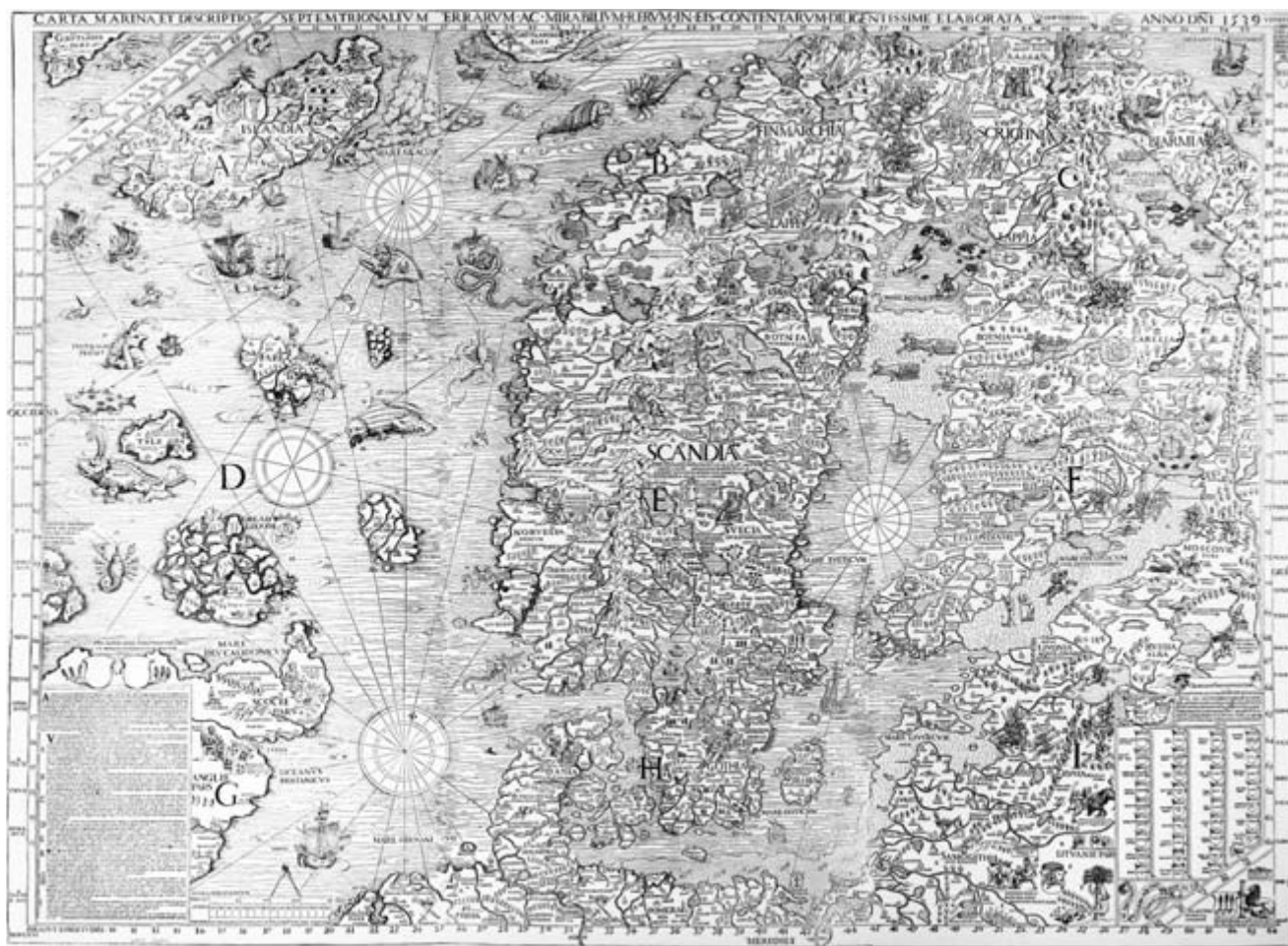


FIG. 60.7. OLAUS MAGNUS, *CARTA MARINA*, VENICE, 1539. Woodcut. The *Carta marina* was the first map to give a correct picture of the Danish islands and the proper border with Germany. It was the main model for the wall maps of the

of eleven and a half years of work in Poland, along with his other duties. Olaus Magnus was in Venice in 1538/39, where there was an active school of cartographers and cosmographers. The woodcut map, printed on nine sheets (fig. 60.7), owes much to his patron and host in Venice Hieronimo Quirini, to whom it was dedicated. It is set in a frame with a quadrilateral grid, and its compass roses identify thirty-two directions with radiating loxodromes.<sup>19</sup> The Canary Islands (*Insulae fortunatae*) are taken as the zero meridian. Both the astronomical pole (*Polus arcticus*) and the magnetic pole (*Insula magnetum*) are marked. The maximum length of the day is recorded in the margin. The scale is in Gothic (Swedish), German, and Italian miles (with two Swedish miles equaling fifteen German miles and sixty Italian miles). For the first time on a map by a Scandinavian there are armorial shields, in this case thirty-four. Most major settlements are shown, and the variety of symbols employed establishes a new precedent among the Scandinavian mapmakers. There are symbols for towns, castles, woodlands, and mines (which are

Nordic countries in the Terza Loggia of the Vatican and in the Palazzo Vecchio in Florence.

Size of the original: 125 × 170 cm. Photograph courtesy of the Uppsala University Library.

distinguished according to whether they produce gold, silver, copper, or iron). Letters are inscribed on the map that link map features and drawings to descriptions in an accompanying key located directly on the original map. Olaus also expanded the key and published it as a com-

Magnus: Zur Geschichte und Einordnung als Kunstwerk," both in *Das Danewerk in der Kartographiegeschichte Nordeuropas*, ed. Dagmar Unverhau and Kurt Schietzel (Neumünster: K. Wachholtz, 1993), 11–20 and 21–48; Herman Richter, *Olaus Magnus Carta marina 1539* (Lund, 1967); Edward Lynam, *The Carta Marina of Olaus Magnus, Venice 1539 and Rome 1572* (Jenkintown, Pa.: Tall Tree Library, 1949); and Carol Louise Urness, "Olaus Magnus: His Map and His Book," *Mercator's World* 6, no. 1 (2001): 26–33. The *Carta marina* was reprinted in its original size by Generalstabens litografiska anstalt (Stockholm, 1970), together with the *Opera brevis*, which is the key to the lettering, and also reprinted by Offsetcenter (Uppsala, 1986) and in 1990–91 for the Uppsala Universitetsbibliotek.

19. All the technical details pertaining to the map are covered by Ahlenius, *Olaus Magnus*, 59–107, and corrected by Richter, *Carta marina*, 85–96. See also Karrow, *Mapmakers of the Sixteenth Century*, 362–66.

panion booklet, the most famous version of which was the *Opera brevis*, published in Italian in 1539, followed a few months later by a version in German, *Ain kurze Avslegung vnd Verklärung der neuuen Mappen von den alten Goet-tenreich vnd andern Nordlenden . . .* (1539).

The *Carta marina*, whose sources were mainly collected in Poland, is a distinct improvement on Ziegler's "Schon-dia." Parallels in nomenclature suggest that Ziegler's map was employed. The longitudinal extent of the Scandinavian peninsula is exaggerated, as is its breadth in comparison with the eastern half of the Baltic Sea. The *Carta marina* is the first map to identify more precisely the Danish Islands and the gulfs of Bothnia and Finland and to show the open sea to the north of the Scandinavian peninsula. However, the White Sea is still represented as a lake—*Lacvs albis*.

The map is pictorial and crowded with informative detail—ecclesiastical, commercial, and military as well as purely geographical (fig. 60.8). An unusual feature is the symbolic outline of winter ice in the Baltic Sea. It provides the setting for a military encounter at the head of the Gulf of Finland between the Swedes/Finns and Ivan III's Muscovites in 1495 and for sleighs drawn by reindeer across the narrows of the Gulf of Bothnia. The wastes of the outer ocean are filled with an immense variety of sea monsters. The maelstrom off the coast of northern Norway, already depicted by Ziegler, has its appointed place. Flaming mountains dominate western Iceland.<sup>20</sup>

A complementary text, *Historia de gentibus septentrionalibus*, published in Rome in 1555, contains a small modified version of the map.<sup>21</sup> As with the *Carta marina*, the *Historia* offers a splendid mixture of fact and fancy—a veritable hyperborean apotheosis. The large number of vignettes are in the same style as those that decorate the original map. They are the work of Olaus Magnus himself: he was no mean artist. Indeed, the Swedish historian Hjalmar Grape juxtaposes some of his woodcuts with those of Hans Holbein, whose style possibly influenced Olaus Magnus.<sup>22</sup> The illustrations belong to the bold, vigorous, and occasionally naive artistry of the north. The pictorial content seems to have been designed to show the Catholic world of the south what had been lost through the Reformation in the north. At the same time, Olaus Magnus remained a Nordic patriot who was anxious to replace the concept of a barbaric north with a more civilized image. He titled the map "Carta Gothica"<sup>23</sup> and wrote on a number of occasions of the *Carta marina* as his "Gothic" map, as if seeking to give the adjective a less pejorative meaning.

The *Historia* had a wider influence than the map because of the disappearance of the *Carta marina* in the early 1570s.<sup>24</sup> A small woodcut of it was published in the Basel edition of the *Historia* (1567), and a copperplate engraving half the size of the original *Carta marina* was produced by the map and print publisher Antonio Lafreri in Rome in 1572. Either directly or indirectly, a number

of maps are indebted to the *Carta marina*. Thus the map of the Nordic lands in Sebastian Münster's *Cosmographia* (Basel, 1544) recalls Münster's links with Olaus and Johannes Magnus as well as with Ziegler and the Swedish court. The *Cosmographia* has a dedicatory epistle to Gustavus I.<sup>25</sup> The *Carta marina*'s influence is also evident in Abraham Ortelius's map of the north (in his *Theatrum orbis terrarum*, Antwerp, 1570) as well as in Gerardus Mercator's 1541 globe.<sup>26</sup>

### "AN EMBRYONIC SCHOOL OF CARTOGRAPHY"

Despite the dedicatory epistle to Gustavus I in Münster's *Cosmographia*, it was with Copenhagen rather than Stockholm that cartographic links were struck. They gave

20. Elfriede Regina Knauer, *Die Carta marina des Olaus Magnus von 1539: Ein kartographisches Meisterwerk und seine Wirkung* (Göttingen: Grata-Verlag, 1981), 28, describes the Hekla mountain chain of Iceland as having sugarhats (*Zuckerhüte*) of permanent snow (*nix perpetua* on the *Carta marina*) and flaming bases due to volcanic activity; Olaus Magnus represented the Hekla chain as three flaming mountains occupying the western half of the island on his map (although only the westernmost mountain is labeled Monshekla). See also Sumarliði Ísleifsson, "Carta Marina, Olaus Magnus and Iceland," *IMCoS Journal* 83 (2000): 21–26.

21. See Olaus Magnus, *Description*, for the English translation. For the Swedish translation, see Olaus Magnus, *Historia om de nordiska folken*, 5 vols. (Uppsala: Almqvist och Wiksells Boktryckeri, 1909–51), esp. vol. 5, which is John Granlund's *Kommentar*. A somewhat shortened German translation was made by Johann Baptist Fickler, trans., *Olai Magni Historien der mittnächtigen Länder* (Basel, 1567). It was embellished with the woodcuts that extended the figurative content of those on the *Carta marina*. A small sketch of the *Carta marina*, attributed to Fickler himself, is included in the volume. An earlier English translation bears the title *A Compendious History of the Goths, Svvedes, & Vandals, and Other Northern Nations* (London, 1658). The literature employed in the work of Olaus Magnus is explored in Hjalmar Grape, *Det litterära antik- och medeltidsarvet i Olaus Magnus patriotism* (Stockholm: Svenska Kyrkans Diakonistyrelses Bokförlag, 1949). Much that is relevant to the setting and map is found in Hans Hildebrand, "Minne af Olaus Magni," *Svenska Akademiens Handlingar* 12 (1897): 93–280.

22. Grape, *Olaus Magnus: Forskare, moralist, konstnär*, 216–19, deals with the woodcuts. See also Ragnhild Boström, "Kan man lita på Olaus Magnus?" *Folkets Historia* 16, no. 2 (1988): 24–34.

23. Peter H. Meurer, "Eine Rechnung für eine Kartenlieferung das Hauses Fugger an Alonzo de Santa Cruz von 1546," *Cartographica Helvetica* 16 (1997): 31–38, esp. 32–33.

24. Oskar Brenner, "Die ächte Karte des Olaus Magnus vom Jahre 1539 nach dem Exemplar der Münchener Staatsbibliothek," *Forhandlingar i Videnskabs-selskabet i Christiania*, 1886, no. 15; reprinted in *Acta cartographica* 16 (1973): 47–68, tells of the discovery of the copy of the *Carta marina* in Munich in 1886. A second copy turned up in Switzerland in 1962 and was purchased by Uppsala Universitetsbibliotek.

25. Efraim Lundmark, "Sebastian Münsters Kosmografi och Norden: Obeaktade brev från Münster till Georg Norman och Christen Morsing," *Lychmos* (1939): 72–101. Gustavus I is also associated with the first map printed in Sweden—a woodcut in his Bible of 1541.

26. Ahlenius, *Olaus Magnus*, 427–33.





FIG. 60.8. FINLAND FROM THE CARTA MARINA. In this portion of Olaus Magnus's pictorial map of the Scandinavian world, Finland is given a clear peninsular shape for the first time. The commercial pursuits are reflected in the depictions of

tar barrels, dried fish, and boat building. The White Sea portage is indicated. There are Orthodox missionaries in Lapland. Size of this detail: ca. 93.7 × 67.7 cm. Photograph courtesy of the Uppsala University Library.

the Danish capital a pivotal status in Nordic mapmaking. Ehrensvärd has written of “an embryonic school of cartography” emerging in Copenhagen in the sixteenth century.<sup>27</sup> Degn employs the phrase *Königlichen Schule* (royal school)<sup>28</sup> and, if there was nothing that conformed to a formal school, there was certainly a group of cartographic practitioners who had a close association with the court.

Central to it was Marcus Jordanus, who came to the capital from his home area in Holstein in 1550 and worked under the patronage of Christian III. His map of Denmark, published by Hans Vingaard in Copenhagen in 1552 and regarded as the first to be printed in the country, is now lost, but it rapidly established itself as the standard statement on Denmark.<sup>29</sup> In 1585, the influential nobleman Heinrich von Rantzau asked Jordanus to make a map of Denmark to be printed in Georg Braun’s and Frans Hogenberg’s *Civitates orbis terrarum* (fig. 60.9). Jordanus also published a woodcut of the province of Holstein (Hamburg, 1559) set in a circular frame and ringed with a calendar.

Much better known than Marcus Jordanus was Tycho Brahe, who conducted his astronomical pursuits from Uraniborg (Uranienborg) Castle on the small island of Hven (Ven, when it became Swedish) in the Øresund (Danish Sound) for a generation before the political situation made it advisable for him to leave the autocracy of Denmark for the liberty of Prague. Brahe, who was the first scientific surveyor in Scandinavia, elevated the technical level of geodetic activity, not least by establishing his own workshops for the production of instruments.<sup>30</sup> His specific cartographic contribution was a pioneering triangulation of the island of Hven, which resulted in his map of the island, printed in 1592 and published in his *Epistolarum astronomicarum libri* (1596). The map was subsequently published alongside detailed descriptions of Brahe’s instruments and astronomical investigations in his *Astronomiae instauratae mechanica* (Wandsbek, 1598).<sup>31</sup> This map ultimately formed the basis for the well-known representation of the island found in Joan Blaeu’s *Atlas maior* (1662). In 1585 the Royal Librarian was sent to Hven with all of the maps available in Copenhagen castle in order that Brahe might prepare a map of the realm. The plans for it never materialized.<sup>32</sup> Nevertheless, in anticipation, Brahe undertook a series of measurements and set about fixing the locations of a number of topographical features. It was typical of his independent attitude that, although the official Danish unit of measurement (*alen*—the *ale*) was established in 1521 (and introduced to Norway in 1541), he continued to use his own measurement of distance—the Tychonic foot (259 mm).<sup>33</sup>

Brahe had around him a group of colleagues that included the Danes Elias Olsen Morsing,<sup>34</sup> Christian Severin (called Longomontan, also known as Christen Sørensen Longomontanus), and Peder Jacobsen Flemløse<sup>35</sup> and the Dutchman Willem Jansz. Blaeu.<sup>36</sup> The historian Anders

Sørensen Vedel was also of their company.<sup>37</sup> In 1589, Morsing made a field survey of Skåne, fixing the position of settlements in anticipation of his own projected map of Denmark.<sup>38</sup> About the same time, Flemløse was determin-

27. Ehrensvärd, “Cartographical Representation,” 554.

28. Christian Degn’s introduction to Caspar Danckwerth, *Die Landkarten von Johannes Mejer, Husum, aus der neuen Landesbeschreibung der zwei Herzogtümer Schleswig und Holstein*, ed. K. Domeier and M. Haack, intro. Christian Degn (Hamburg-Bergedorf: Otto Heinevetter, 1963).

29. Abraham Ortelius printed the map’s title in his *Catalogus auctorum*. Nørlund, *Danmarks Kortlægning*, 24–25; Johanne Skovgaard, “Georg Braun og Henrik Rantzau,” in *Festskrift til Jobs. C. H. R. Steenstrup paa halvfjerdsaaers-dagen fra en kreds av gamle elever* (Copenhagen: Erslev, 1915), 189–211; and Karrow, *Mapmakers of the Sixteenth Century*, 324–26.

30. He also constructed his own large celestial globe; see Ib Rønne Kejlbo, *Rare Globes: A Cultural-Historical Exposition of Selected Terrestrial and Celestial Globes Made before 1850—Especially Connected with Denmark* (Copenhagen: Munksgaard/Rosinante, 1995), 26–47, and idem, “Tycho Brahe und seine Globen,” *Der Globusfreund* 18–20 (1969–71): 57–66.

31. The manuscript maps of Hven and the Norwegian province of Nordfjord and the coastline of Stavangerfjord are in the Österreichische Nationalbibliothek, Vienna (Cod. Vindob. 10.688). The Brahe manuscripts, which are a unique collection of materials pertaining to the astronomical and geodetic techniques of the time, are published in Tycho Brahe, *Tychonis Brahe Dani Opera omnia*, 15 vols. ed. J. L. E. Dreyer (Copenhagen: Libraria Gyldendaliana, 1913–29). Directly relevant is Hans Raeder, Elis Strömngren, and Bengt Strömngren, eds. and trans., *Tycho Brahe’s Description of His Instruments and Scientific Work as Given in Astronomiae instauratae mechanica (Wandesburgi 1598)* (Copenhagen: I Kommission hos Ejnar Munksgaard, 1946). See also J. L. E. Dreyer, *Tycho Brahe: A Picture of a Scientific Life and Work in the Sixteenth Century* (Edinburgh: Adam and Charles Black, 1890); Victor E. Thoren, *The Lord of Uraniborg: A Biography of Tycho Brahe*, with contributions by J. R. Christianson (Cambridge: Cambridge University Press, 1990); Alex Wittendorff, *Tyge Brahe* (Copenhagen: G. E. C. Gad, 1994); Michael Jones, “Tycho Brahe og kartografien på slutten av 1500-tallet,” *Nordenskiöld-samfundets Tidsskrift* 62 (2003): 51–78; and J. R. Christianson, *On Tycho’s Island: Tycho Brahe and His Assistants, 1570–1601* (Cambridge: Cambridge University Press, 2000).

32. Nørlund, *Danmarks Kortlægning*, 31.

33. Niels Erik Nørlund, *De gamle danske Længdeenheder* (Copenhagen: I Kommission hos Ejnar Munksgaard, 1944), 32–51. The length of the *ale* varied with time and place.

34. F. R. Friis, *Elias Olsen Morsing og hans Observationer* (Copenhagen, 1889). The data associated with Morsing’s itinerary are reproduced in full in Herman Richter, “Cartographia scanensis: De äldsta kända förarbetena till en kartläggning av de skånska provinserna, 1589,” *Svensk geografisk årsbok* [6] (1930): 7–51.

35. F. R. Friis, *Peder Jakobsen Flemløse: Tyge Brahes første Medhjælper, og hans Observationer i Norge* (Copenhagen: G. E. C. Gads Universitetsboghandel, 1904).

36. Herman Richter, “Willem Jansz. Blaeu—En Tycho Brahes lärjunge: Ett blad ur kartografiens historia omkring år 1600,” *Svensk geografisk årsbok* [1] (1925): 49–66, and idem, “Willem Jansz. Blaeu with Tycho Brahe on Hven, and His Map of the Island: Some New Facts,” *Imago Mundi* 3 (1939): 53–60, esp. 56.

37. C. F. Wegener, *Om Anders Sörensen Vedel: Kongelig historio-graph i Frederik II’s og Christian IV’s dage* (Copenhagen: Trykt hos Bianco Luno, 1846).

38. Richter, *Geografiens historia i Sverige*, 54.



FIG. 60.9. MARCUS JORDANUS, MAP OF DENMARK, 1585. Jordanus's map was adopted by Dutch atlas makers as the model for their representation of Denmark. It displays a curiously uneven distribution of place-names, with a relative lack of place-names on the principal island of Sjælland (Zealand). All inscriptions are in Latin. There is a dedication

ing the latitude of Bergen, Trondheim, Hamar, and Akershus. In fact, together with his colleagues, Brahe determined some 325 statements of latitude and longitude.

At this time libraries were beginning to collect both maps and texts pertaining to cartography. Brahe's assistants doubtless benefited from his personal collection. It certainly contained Abraham Ortelius's *Theatrum orbis terrarum* (1570). It might well have included the oldest book on field measurement—Jakob Köbel's *Geometrei, vonn künstlichem Messen vnnd Absehen allerhand Höhe . . .* (Frankfurt, 1536), which was in the library of the contemporary Swedish nobleman Hogenskild Bielke. The Copenhagen printer Lorentz Benedicht had published a Danish version in about 1578 of Valentin

to Heinrich von Rantzau, his patron.

Size of the original: 38.6 × 46 cm. From Georg Braun and Frans Hogenberg, *Civitates orbis terrarum*, 6 pts. in 3 vols. (Cologne: G. von Kempen, 1581–1618), pt. 4 (1617), pl. 25. Photograph courtesy of the Lessing J. Rosenwald Collection, Library of Congress, Washington, D.C.

Boltz's *Illuminierbuch* (Basel, 1549), which introduced to Scandinavians the use of color on maps.<sup>39</sup>

Mapmaking in Copenhagen retained its impetus into the seventeenth century, but leadership in the art was soon to pass to Sweden. Johannes Lauremberg, who had left Rostock to become professor of mathematics at Sorø Academy in Sjælland, was asked by Christian IV to produce a map of the kingdom.<sup>40</sup> The work was started in Sjælland, but because of its tardy progress the project was

39. Ulla Ehrensward, "Färg på gamla kartor," *Biblis* (1982): 9–56.

40. H. A. Hens, "Lauremberg, Hans Willumsen," *Dansk biografisk leksikon*, 3d ed., 16 vols. (Copenhagen: Gyldendal, 1979–84), 8: 620–21.

handed over to Johannes Mejer in 1647. His *Kort over det danske Rige* appeared mid-century.<sup>41</sup>

The principal contributions of Mejer occurred in the years after 1650. Nevertheless, for some years before he took over the Lauremberg project he had been planning a major atlas of the Nordic countries, for which he had assembled his own collection of maps. A part of the collection, covering Greenland, Iceland, Spitsbergen, and the north Atlantic islands, was intended as a source of hydrographic description for the northern waters.<sup>42</sup> The demands on Mejer for military reconnaissance mapping during the mid-century Dano-Swedish wars must in part account for the failure of the atlas to materialize.

### CARTOGRAPHY AND TERRITORIAL CLAIMS

Following the break-up of the Kalmar Union, mapmaking became of increasing concern to Sweden and Denmark for the substantiation of territorial claims. Some of the resulting maps looked to the land; some to the sea. Seaward, Christian IV of Denmark commissioned expeditions to Greenland (1605–7) that produced several maps and charts. It is possible that the expeditions, motivated by whaling and the competition with Dutch and English whalers, resulted partly from the putative land bridge between Greenland and northern Europe that was often depicted in sixteenth-century maps. Insofar as Christian IV regarded himself as the master of the north Atlantic area, it was necessary for its territorial features to be confirmed.<sup>43</sup>

The expeditions yielded an important cartographic harvest. It included maritime charts by James Hall, the English captain in charge;<sup>44</sup> an anonymous hand-drawn chart called “The Stockholm chart” on a Mercator projection and identifying latitude and longitude, which set the pattern for the shape of Greenland on many subsequent maps;<sup>45</sup> a map (1605) by Hans Poulsen Resen, which was richly annotated;<sup>46</sup> and a Greenland chart (1606) with indications of latitude prepared by the Icelandic Guðbrandur Thorláksson (Þorláksson) possibly for Resen.<sup>47</sup> In addition, a Dutch navigator engaged by Christian IV, Joris Carolus, produced a map of Greenland, Iceland, and northeastern North America (1626).<sup>48</sup> Collectively, the product of Christian IV’s enterprise amounted to a remarkable body of new information.

Iceland, itself an integral part of the Danish realm renowned for its physical geography, had already made its cartographic debut thanks to Guðbrandur Thorláksson, bishop of Hólar. Guðbrandur Thorláksson was a mathematician, and by locating Hólar at 65°44’N, he was the first to determine the position of any site in Iceland by scientific methods.<sup>49</sup> His original map of Iceland is not extant, but it appeared in *Additamentum IV* of Ortelius’s *Theatrum orbis terrarum* (1590) without reference to

him. The richly decorated map (engraved by Ortelius in 1585), with its scale in Icelandic miles, had some 250 place-names and included a number of pictorial features (fig. 60.10). The map probably passed to Ortelius by way of the Danish historian Anders Sørensen Vedel or the influential Danish purveyor of cartographic information Heinrich von Rantzau. The map contains a dedication by Vedel to King Frederick II of Denmark, which has led some to speculate whether Vedel was the author of the map rather than Guðbrandur Thorláksson.<sup>50</sup>

Landward, attention was concentrated on the northern part of the Scandinavian peninsula, where Denmark,

41. Johannes Mejer, *Johannes Mejers kort over det Danske rige*, 3 vols., ed. Niels Erik Nørlund (Copenhagen: Ejnar Munksgaard, 1942), 1:9–24. As a young man Mejer worked in Holstein and produced maps of Rungholt (1636), Eiderstedt (1636), and Frisia (1640). Rungholt was the first signed map by Mejer; see Ruth Helkier Jensen and Kr. Marius Jensen, *Topografisk atlas Danmark: 82 kortudsniit med beskrivelse* (Copenhagen: Det Kongelige Danske Geografiske Selskab: i kommission hos C.A. Reitzel, 1976), 84–85.

42. The collection is identified by Lönborg, *Sveriges karta*, 54–58, as being in Copenhagen, Kongelige Bibliotek (Gl. Kongl. S [fol.] 710, 711, 712).

43. Ib Rønne Kejlbo, “Map Material from King Christian the Fourth’s Expeditions to Greenland,” *Wolfenbütteler Forschungen* (1980): 193–212, in which an analysis of the items is given. Compare also C. C. A. Gosch, *Danish Arctic Expeditions, 1605 to 1620*, 2 vols. (London: Printed for the Hakluyt Society, 1897), and Axel Anthon Bjørnbo, *Cartographia groenlandica*, Meddelelser om Grønland, vol. 48 (Copenhagen: I Kommission hos C. A. Reitzel, 1912). See also Peter C. Hogg, “The Prototype of the Stefánsson and Resen Charts,” *Historisk Tidsskrift* (Oslo) 68 (1989): 3–27, and Kirsten A. Seaver, “Renewing the Quest for Vinland: The Stefánsson, Resen, and Thorláksson Maps,” *Mercator’s World* 5, no. 5 (2000): 42–49.

44. Hall’s original report to the King of Denmark, BL, Royal MS. 17A, contains four maps; Gosch, *Danish Arctic Expeditions*, vol. 1.

45. Stockholm, Kungliga Biblioteket, Sveriges Nationalbibliotek, K.29 (manuscript map). Knud Johannes Vogelius Steenstrup, *Om Østerbygden*, Meddelelser om Grønland, vol. 9 (Copenhagen: I Kommission hos C. A. Reitzel, 1889), 1–51, contains a reconstruction of the map on p. 10.

46. Hans Poulsen Resen, “Map of Greenland,” Copenhagen, Kongelige Bibliotek, 4100-0-1605/1.

47. Copenhagen, Kongelige Bibliotek, G. K. S. 4°, 2876. Also of interest on these last two maps is Hogg, “Stefánsson and Resen Charts,” and Seaver, “Stefánsson, Resen, and Thorláksson Maps.”

48. The 1626 map was the basis for the maps Carolus produced in his *Het nieuw vermeerde Licht des zeevarts* (1634). All of the maps discussed in this paragraph are described in Kejlbo, “Map Material.”

49. Halldór Hermannsson, *Two Cartographers: Guðbrandur Thorláksson and Þórður Thorláksson* (Ithaca: Cornell University Press, 1926). Previously, Iceland had been copied from Olaus Magnus. The history of mapping in Iceland is fully dealt with in the two books by Haraldur Sigurðsson: *Kortasaga Íslands*, and *Kortasaga Íslands frá lokum 16. aldar til 1848* (Reykjavík: Bókaútgáfa Menningarsjóðs og Þjóðvinafélagsins, 1978).

50. For more information on this debate over authorship, see Wegener, *Vedel*, 235, and Oswald Dreyer-Eimbcke, “Island, Grönland und das nördliche Eismeer im Bild der Kartographie seit dem 10. Jahrhundert,” *Mitteilungen der Geographischen Gesellschaft in Hamburg* 77 (1987): 82–87.



FIG. 60.10. ABRAHAM ORTELIUS'S MAP OF ICELAND BASED ON A MAP BY GUÐBRANDUR THORLÁKSSON. In 1585 Ortelius engraved a map of Iceland based on a map prepared by Guðbrandur Thorláksson, bishop of Hólar. The map introduced many place-names hitherto unrecorded carto-

graphically.

Size of the original: 43.5 × 54 cm. From Abraham Ortelius, *Theatrum orbis terrarum* (Antwerp, 1592), pl. 98. Photograph courtesy of the Geography and Map Division, Library of Congress, Washington, D.C. (G 1006.T5 1592 Vault).

Sweden, and Muscovy all had claims.<sup>51</sup> Before these countries produced their own maps, territorial claims were based on maps made by others. Not least used were the maps of Sebastian Münster. To assert his rights, Christian IV made a personal gesture by voyaging to the boundaries of Muscovy on the Kola peninsula. Subsequently, he employed the Dutch merchant Simon van Salingen (who had earlier traveled in Lapland with a Danish nobleman) to prepare a map of Scandinavia. Van Salingen's map added to the documentary evidence employed for claims by firmly inscribing over Kola, "Lappia pars Norvegiae." It served to spur the Swedish crown to competitive cartographic endeavor.<sup>52</sup>

Although the taxation of the Lapps had already been agreed upon between Sweden and Muscovy at the time of the Treaty of Teusina in 1595, continuous Danish and Muscovite rivalry encouraged the Swedish crown to send scientific expeditions to Norrland (northern Sweden) in

1600 and 1601–2. At the time, most of present-day northern Sweden and northern Finland awaited colonization, and there was no formal boundary with Norway, which was part of the Danish realm. In the first expedition, Johannes Bureus, a member of a gifted family of natural scientists, participated and kept notes of the methods he used when conducting his surveys.<sup>53</sup> His cousin Andreas Bureus, whom he taught, was given the task of preparing the first map of Lapland. It was a compilation from all available

51. *Sveriges traktater med främmande magter jemte andra dit hörande handlingar*, vol. 5, pt. 1 (1572–1632), ed. O. S. Rydberg and Carl Jakob Herman Hallendorff (Stockholm: P. A. Norstedt och Söner, 1903).

52. E. G. Palmén, "Simon van Salinghens karta öfver Norden, 1601," *Fennia* 31, no. 6 (1912), and Kustavi Grotenfelt, "Kaksi Pohjois-Suomen ja Kuolanniemen karttaa, 1500-luvun lopulta," *Fennia* 5, no. 9 (1892).

53. See Andreas Bureus (Anders Bure), *Orbis arctoi nova et accurata delineatio*, 2 vols., ed. Herman Richter (Lund: C. W. K. Gleerup, 1936), 1:IX.

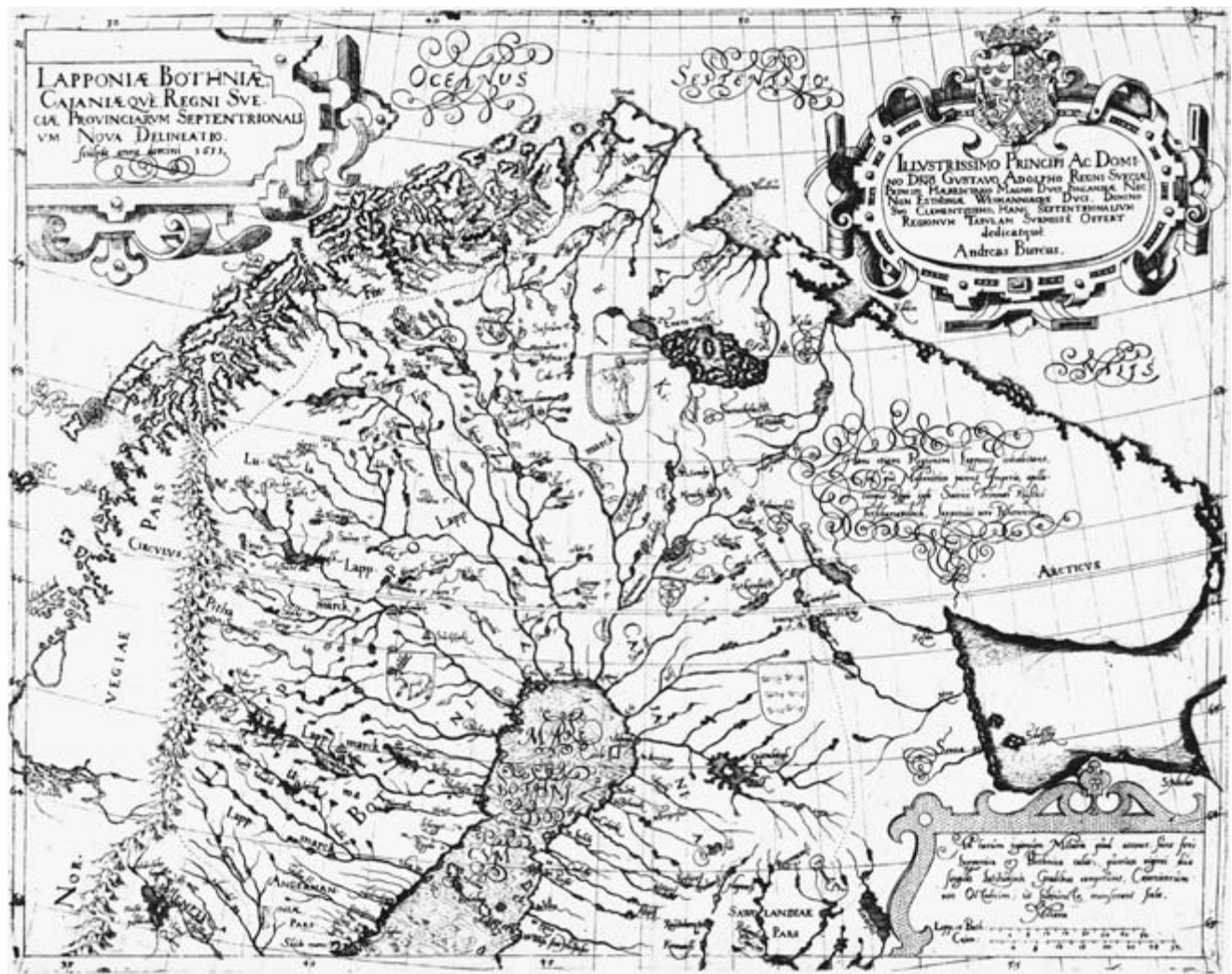


FIG. 60.11. ANDREAS BUREUS, *LAPPONIA*, 1611. *Lapponia* focuses on the Swedish territories of the high north. It was compiled largely from field surveys. The map was of geopolitical consequence, as illustrated by the dashed line that defines the boundary, as proposed by Bureus, between

Norway and Sweden.

Size of the original: 24.6 × 31 cm. Photograph courtesy of the Kungliga Biblioteket, Sveriges Nationalbibliotek, Stockholm (KoB 1 na).

sources, together with extensive field observations. *Lapponia, Bothnia, Cajaniaeque regni Sveciae provincialium septentrionalium nova delineatio* was engraved on copper in 1611, at a scale of 1:3,500,000, employing a conic projection and taking the Azores as zero meridian (fig. 60.11). It was dedicated to the crown prince of Sweden, Gustavus II Adolphus. The map covered Sweden north of 65° and extended eastward to the Kola peninsula. Although it exaggerated the size of Sweden, it was the best representation of the Scandinavian high north of its time.<sup>54</sup> *Lapponia*, as the map was popularly known, became an important addition to the diplomatic arsenal of the Swedish crown.

Andreas Bureus also produced a small map of Lake Mälaren in about 1613 at a scale of 1:1,300,000 (fig. 60.12) and dedicated it to the Dutchman Jacob van Dijck. Van Dijck was a company lawyer in diplomatic ser-

vice and later became an assistant ambassador to Sweden from the Netherlands and settled in 1621 in Sweden's newly founded city of Göteborg. The Latin dedication on the map alludes to Bureus's later 1626 map of Scandinavia (discussed below): "This little map I thee give instead of the whole world, and then I shall give thee the whole of Scandinavia on a copperplate."<sup>55</sup>



54. *Lapponia* is only known in two copies, one in Stockholm, Kungliga Biblioteket, Sveriges Nationalbibliotek, and one in Uppsala Universitetsbibliotek. To the same period belongs the first Swedish map of the world—*Orbis terrarum rudi pencilio* by Johannes Rudbeckius—made into a woodcut by J. L. Barchenius (1626) and printed in Västerås (1628). It is a curious document with south at the top.

55. Ulla Ehrensward, "Andreas Bureus' mälarkarta," in *Byggnads-vård och landskap*, Ymer 1975 (Stockholm: Generalstabens Litografiska Anstalts Förlag, 1976), 171–73.

MELER LACVS  
ADIACENTIVMQVE TERRARVM DELINEATIO.



LECTORI.

Cum nimis tediosum fuisset, candide lector, Castellis Parochijsq; singulis sua assculpere nomina, Castella Parochiasq; precipuum numeris signavi, eorumq; nominum indicem subieci: consulto reliqua prateriens, cum à locorum gnarib, ex situ intelligantur: Notat autem hoc signum  Castellum, illud verò  Parochiam.

1 Norebergh	10 Asker	19 Tumboo	28 Sundby	37 Arnö	46 Drotningholm
2 Lindesbergh	11 Segersjö	20 Vifvofund	29 Kiula	38 Skohöster	47 Bootekyrkie
3 Skinskattebergh	12 Vingåker	21 Munketorp	30 Dunker	39 Vafunda	48 Grodbinge
4 Fellensbroo	13 Malm	22 Strömsholm	31 Grypsholm	40 Hgtuna	49 Gärna
5 Swawelbruket	14 Bethna	23 Ryttern	32 Råfsnäs	41 Skånilla	50 Trofa
6 Glanshammar	15 Vifbyholm	24 Rumpfertuna	33 Tynneljö	42 Broo	51 Sorunda
7 Vinterösa	16 Iuletta	25 Salbergbet	34 Ekolfund	43 Sollentuna	52 Vestre & Östre Haninge
8 Edzbergh	17 Eskilstuna	26 Simtuna	35 Torstuna	44 Danery	53 Vaxholmen.
9 Kumbå	18 Öya	27 Konungäbra	36 Giresta	45 Spånga	

*Parvula pro toto datur hæc tibi chartula Mundo,  
Post dabitur sculpta Scandia tota, Vale.*

*Clarissimo consultissimoq; viro, Dno  
Iacobo à Dijk, Iuris utriusq;  
Doctori, amico & fautori  
colendo, dd:*

*Andreas Bureus.*

FIG. 60.12. ANDREAS BUREUS, LAKE MÄLAREN, CA. 1613. Copperplate engraving; this is the only known copy. The prime meridian is Corvo on the Azores, which is the same as Bureus's 1626 map of Scandinavia.

Size of the original: 26.3 × 21.1 cm. Photograph courtesy of the Kungliga Biblioteket, Sveriges Nationalbibliotek, Stockholm (KOB 9 bd).

### THE CONTRIBUTION OF THE FORTIFICATION ENGINEERS

Whereas small-scale maps of extensive territories supported land claims, large-scale plans of towns were inseparable from defense. They were essentially the work of military engineers or architects—indeed, their makers held a dozen or more specialist titles.<sup>56</sup> Both Denmark and Sweden sought them in the Netherlands and German states. The experiences of Gustavus II Adolphus in his Polish campaigns taught him that German military surveyors were indispensable. They are exemplified by Georg Ginther Kräill von Bemebergh, Georg von Schwengeln, and Heinrich Thome.

Kräill von Bemebergh was born in Ulm, studied in the Netherlands, entered the Danish military service, and subsequently accepted an invitation from Gustavus II Adolphus to move to Sweden. With justification, he coined for himself the nickname Philomathes (lover of learning). His *Tractatus geometricus et fortificationis* (Arnhem, 1618) was succeeded by a work in three parts. The first and second (*Mechanica* and *Architectura*) were unpublished manuscripts; part three contained a number of illustrations and it also went unpublished until impressions from the original copperplates were made in 1875 (fig. 60.13).<sup>57</sup> Perhaps one of his most unusual maps is of the conquest of Riga in 1621 (fig. 60.14). In Sweden Kräill von Bemebergh was directly concerned with city fortification as well as preparing one of the earliest maps of Södermanland (1625), scale 1:165,000. He and others prepared military maps around the Dvina (Daugava) estuary and in East Prussia and many sketch maps, without scales, were prepared for other areas, for example, Stettin (Szczecin, 1628; drawn by David Portius) and Werben (on the Elbe, ca. 1631; author unknown).

In 1624 a second surveyor entered Swedish service, the West Prussian Heinrich Thome. Thome was employed as an *ingenjör* (fortification officer), and was instrumental in drafting plans of towns and fortifications throughout the Swedish realm during the 1620s and 1630s. Georg von Schwengeln was a third surveyor employed by Sweden. This Livlander (or Lithuanian) was named *Geographicus* by King Gustavus II Adolphus in 1626. His first map for the Swedes shows the 1621 conquest of Riga. He also mapped fortifications in the Baltic provinces and drew what was probably the first map of the (now Estonian) island of Saaremaa (Ösel, Osilia) in 1644—when the island still belonged to Denmark.<sup>58</sup> The activities of the immigrant surveyors and the techniques that they introduced were factors behind the creation of a Swedish corps of surveyors in 1628.

Among the Swedes who emerged as leaders in the field was Olof Hansson Svart, later ennobled Örnehufvud.<sup>59</sup> He worked closely with Andreas Bureus, who was a prime mover in the establishment of the Swedish *Lantmäterikontoret* (Land Survey Office). Örnehufvud drew up plans

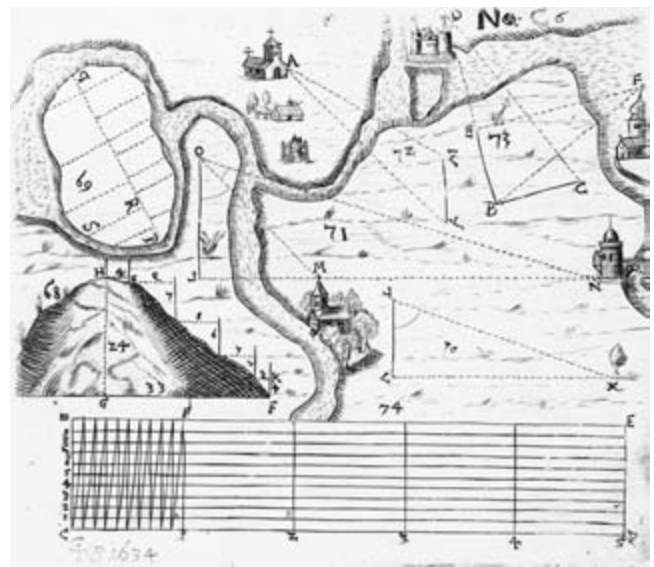


FIG. 60.13. SAMPLE MAP BY GEORG GINTHER KRÄILL VON BEMEBERGH. Kräill von Bemebergh's text includes a model map to show the way in which features of the landscape should be recorded by engineers in the field. Size of the original: 15 × 17 cm. From Georg Ginther Kräill von Bemebergh, *Mechanica der drite Theil* ([1636]; printed in 1875). Photograph courtesy of the Kungliga Biblioteket, Sveriges Nationalbibliotek, Stockholm (F1700-fol. 300).

56. Ulla Ehrensward, "Fortifikationsofficeren som kartograf," in *Fortifikationen: 350 år, 1635–1985*, ed. Bertil Runnberg and Sten Carlsson (Stockholm, 1986), 109–24, deals with the function of military officers as cartographers. Also directly relevant is Ludvig W. Munthe, *Kongl. fortifikationens historia*, vol. 1 (Stockholm: Kungl. Boktryckeriet, P. A. Norstedt och Söner, 1902). Its maps and diagrams are primarily of fortifications, although some take in the surrounding countryside.

57. For Kräill von Bemebergh, see Munthe, *Kongl. fortifikationens historia*, esp. 283 and 329–32; Marianne Råberg, *Visioner och verklighet*, 2 vols. (Stockholm: Kommittén för Stockholmsforskning Allmänna Förlaget i distribution, 1987), 1:197–201; Ludvig W. Munthe, "Crail," in *Svenskt Biografiskt Lexikon* (Stockholm: Albert Bonniers Förlag, 1918–), 9:64–68; and Olov Lönnqvist, *Sörmlands karta genom fem sekler* (Nyköping, 1973), 21–46 and 83–106.

58. Von Schwengeln's map of Riga is kept in the Armémuseum, Stockholm; the map of Saaremaa is lost; his plans of the city and castle Kuressaare (Arensburg) from 1641 are kept in the Krigsarkivet, Stockholm. See Harald Köhlin, "Georg von Schwengeln and His Work, 1620–1645," *Imago Mundi* 6 (1949): 67–72.

59. Ernst Ericsson, *Olof Hansson Örnehufvud och svenska fortifikationsväsendet till 300-årsminnet, 1635–1935* (Uppsala: Almqvist och Wiksells Boktryckeri, 1935). Svenske Plante Booken in Stockholm, Krigsarkivet, contains forty-six large-scale maps of fortified Swedish towns attributed to Örnehufvud. It also includes a map of the important mining town of Falun (1628), complete with details of the residential quarters. See also Ehrensward, "Fortifikationsofficeren som kartograf," 111–12. Dinse identified Örnehufvud with the name on maps printed by Janssonius, Blaeu, and others: "Olaus Iohannis Gothus, S. R. M. Sueciæ" (Paul Dinse, "Ein schwedischer Kartograph der Mark Brandenburg aus der Zeit des dreissigjährigen Krieges," *Zeitschrift der Gesellschaft für Erdkunde zu Berlin* 31 [1896]: 98–105). Wernstedt lists nine manuscript maps that Örnehufvud drew in Germany, which were models to the Dutch printers (F. Wernstedt, "Några obeaktade originalkartor av Olof Hansson Örnehufvud: Minnen från svensk kartografisk verksamhet på kontinenten under 30-åriga kriget," *Globen* 11 [1932]: 11–20).



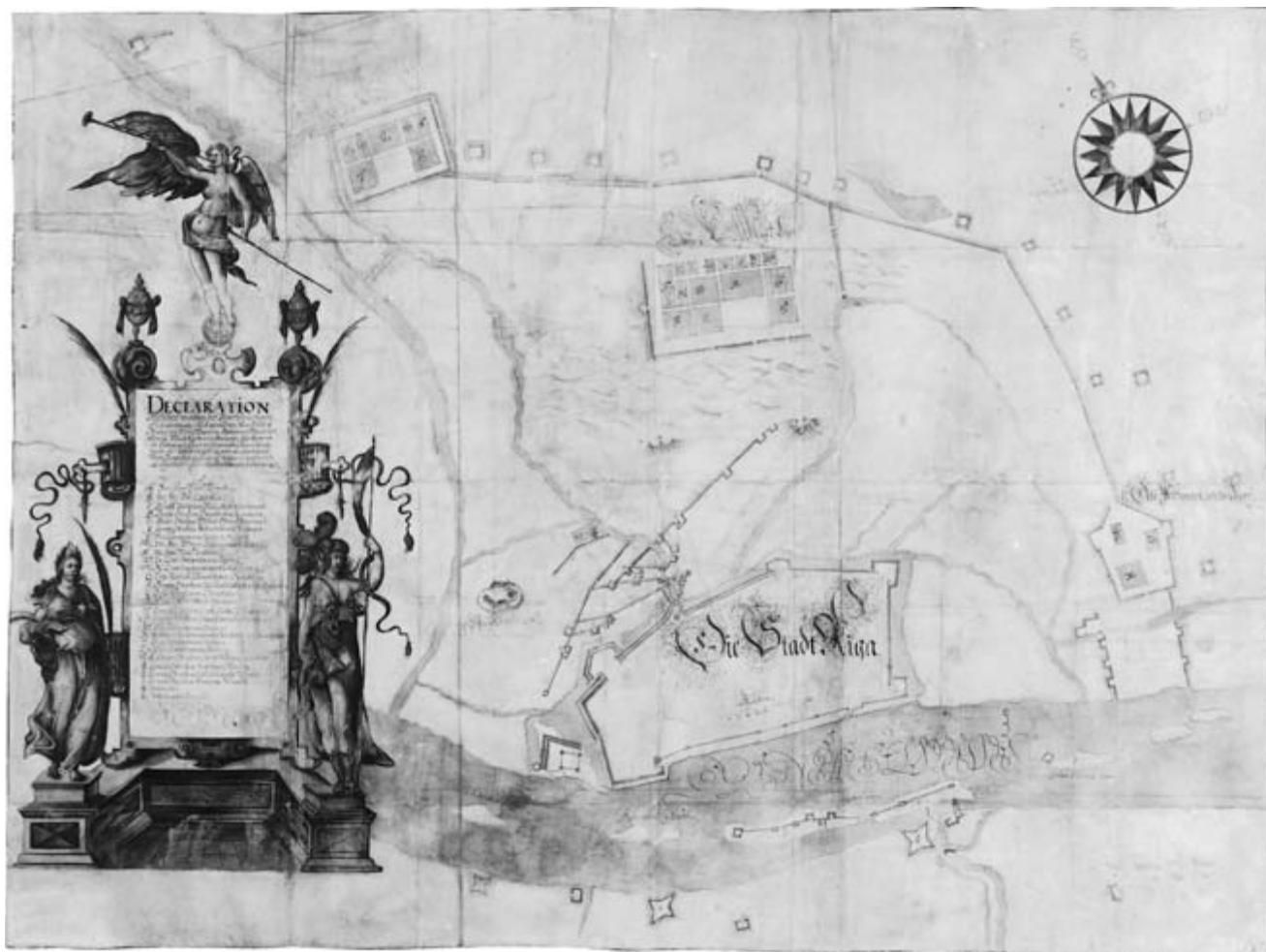


FIG. 60.14. GEORG GINTHER KRÄILL VON BEMEBERGH, MAP OF THE CONQUEST OF RIGA, 1621. Map on parchment. Size of the original: 64.6 × 85 cm. Photograph courtesy of the

Military Archives, Stockholm (Utländska stads- och fästningsplaner, Östersjöprovinserna, Riga, nr. 40).

for improvements to the fortified town and castle of Kalmar—a city that claims the oldest map of a fortified place in Sweden (by Dominicus Pahr, 1585).<sup>60</sup> When Bureus became the assessor at the War Office, Örnehufvud's responsibilities increased. He drafted a street plan of Stockholm and its suburbs within a frame of fortifications. Subsequently, he planned a number of fortifications across the Baltic—Elbing (Elbląg), Stettin, even Mainz. He also conducted extensive military geographical surveys in Brandenburg. Finally, he undertook a map of the province of Skåne in connection with the Swedo-Danish war of 1643–45.<sup>61</sup> This map was later corrected for the Danish crown and eventually found its way—through Johannes Janssonius's map of Skåne (1646)—into the Amsterdam publications of the day. It was the first map of its kind to give a general indication of the distribution of hills and woodlands, and it located large numbers of settlements.

Örnehufvud also produced an innovative map of “Bondestöten,” Stora Kopparberg's mine, at a scale of 1:5,000 (fig. 60.15).<sup>62</sup> The map consists of five sheets rep-

resenting five different levels of the mine, with cutouts where one could enter a lower level. The five sheets could, if desired, be spaced in a stack to make a five-layer model of the mine. It is possible that Örnehufvud got the idea from Italian architects who pierced holes on drawings to represent stairs, flues, and other features that connected floors. It became, however, a particularly Swedish way of mapping mines, as in Marcin German's engraved maps of the salt mines at Wieliczka, Poland.<sup>63</sup>

60. Martin Olsson, *Om Kalmars ålder* (Stockholm: Almqvist och Wiksell International, 1983), 16.

61. Herman Richter, “Den äldsta tryckta Skånekartan,” *Svensk geografisk årsbok* [3] (1927): 22–33, and idem, “Cartographia scanensis,” 19–41.

62. Ulla Ehrensverd, “Gruvor på kartor,” in *Vilja och kunnande: Teknikhistoriska uppsatser tillägnade Torsten Althin på hans åttioårsdag den 11 juli 1977 av vänner* ([Uppsala], 1977), 171–88, and idem, *Nordic Map*, 197–200.

63. F. Piestrak, “Marcina Germana plany kopalni wielickiej z r. 1638 i 1648,” *Czasopismo Techniczne* (1902): 1–31.

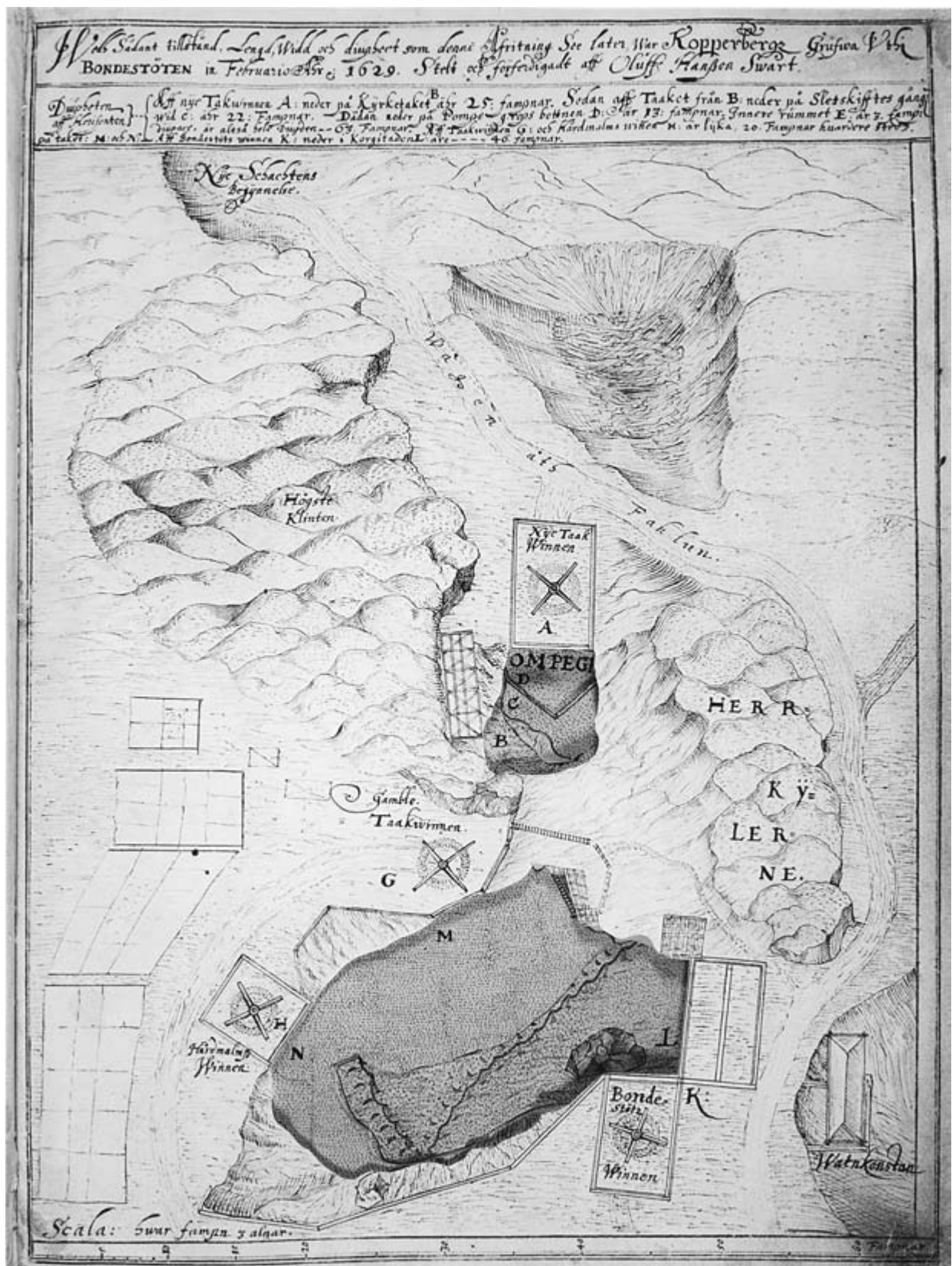


FIG. 60.15. OLOF HANSSON SVART (ÖRNEHUFVUD), MINERAL MAP, 1629. Map of Bondestöten, Kopperberg mine, Falun. One of the five sheets represents different levels

of mining operations. Size of the original: 33 × 24 cm. Photograph courtesy of the Bergslaget's Archive, Falun.

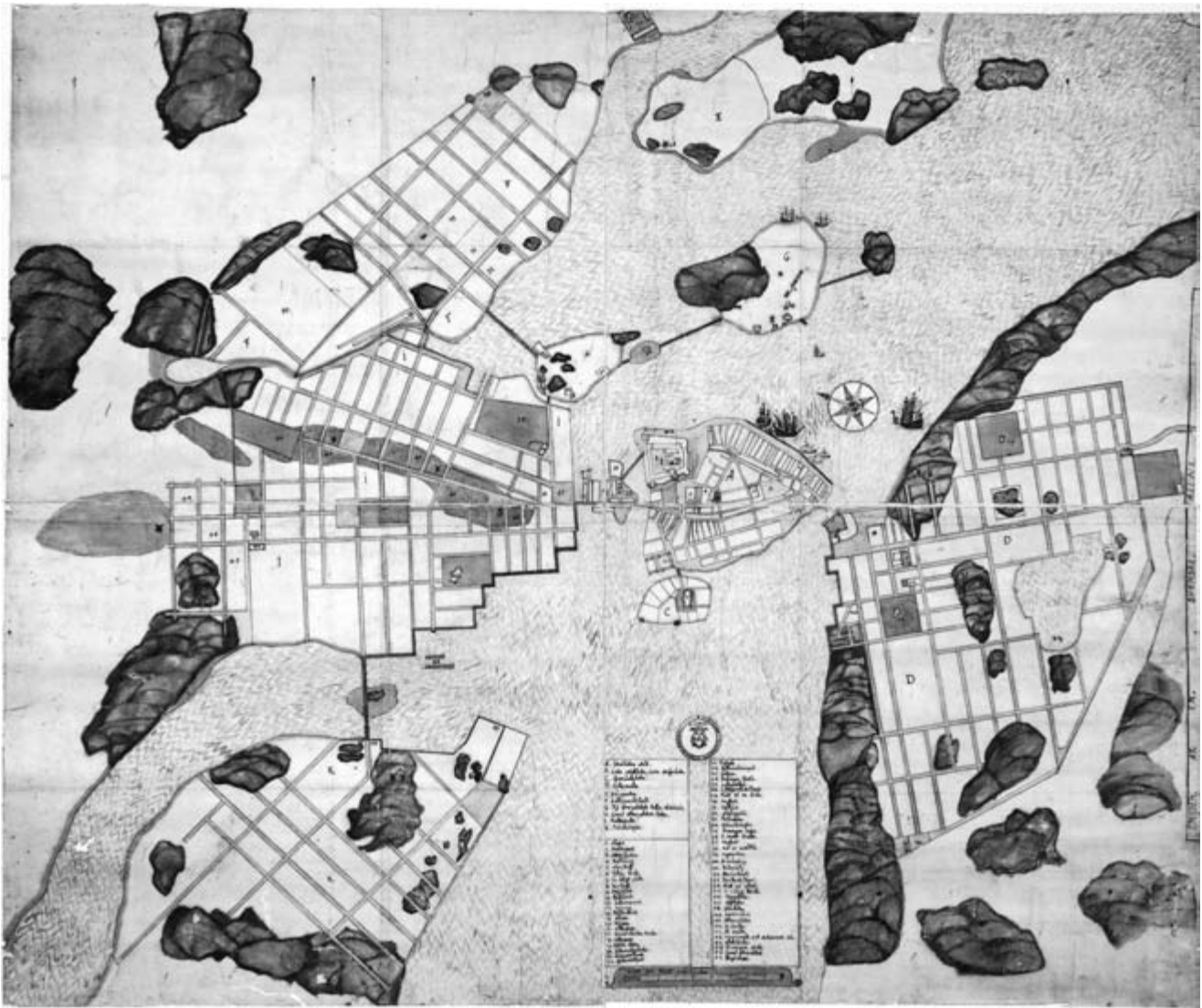


FIG. 60.16. THE “SPY MAP” (*SPIONKORT*) OF STOCKHOLM, 1640s. This map was produced by Danish agents during the mid-seventeenth-century wars between Sweden and Denmark. It is oriented to the east and employs a scale of 1:3,000 (scale given in Swedish *alms*). The map is colored:

brown for hilly outcrops and green for open spaces. All districts are identified in a key.

Size of original: 105.5 × 125.5 cm. Photograph courtesy of the Kongelige Bibliotek, Copenhagen (Map Section, KBK 1113, 151, 21-0-1640/1).

Before Örnehufvud was involved in Stockholm’s defenses, fortification engineers such as Thome were already producing plans of the city. A succession of maps suggests an increasing concern for the organization and management of the capital. The oldest map of Stockholm, dated 1625, is a manuscript, at a scale of 1:4,000, with the Swedish *aln* (0.594 m) as the unit of measurement. As with a number of related plans, it illustrates the street network—first and foremost on the island between the bridges but also in the outlying areas. The establishment of the little customs (*Lilla tullen*) in 1622 resulted in the inclusion of the toll gates, with the toll boundaries being identified as a staked fence. Incipient planning is evident in the geometric designs for the wider expansion of the

city. In the *Svensche Plante Booken* (no. 2), the superimposition of a number of octagonal lines suggests that ideas of radial planning, current elsewhere in Europe, were also to be introduced.<sup>64</sup> Despite the security with which these materials were held during the seventeenth-century wars between Denmark and Sweden, Danish agents managed to acquire knowledge of them. One result was the remarkable map of Stockholm produced in Denmark—the so-called “Spy Map” (*Spionkort*) from the 1640s (fig. 60.16).

64. The entire sequence of maps of Stockholm before 1650 is treated by Råberg, *Visioner*.

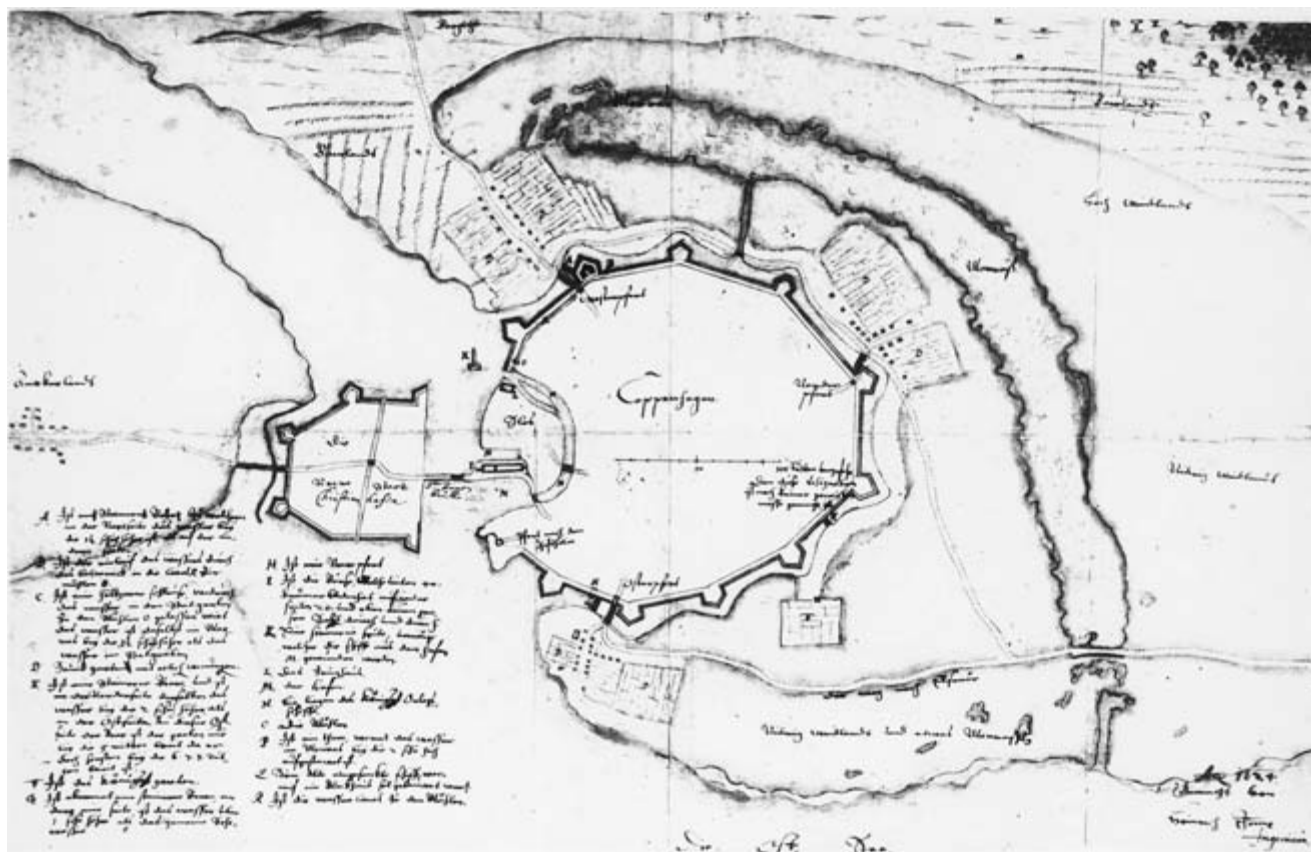


FIG. 60.17. HEINRICH THOME, MAP OF COPENHAGEN AND ITS ENVIRONS, 1624. Scale 1:5000.

Size of the original: 37 × 58 cm. Photograph courtesy of the Military Archives, Stockholm (Sveriges krig, nr. 1: 40).

The mapping of Copenhagen was pursued with similar zeal. It is reflected in the succession of topographical maps from the 1590s on.<sup>65</sup> The earliest maps had their accent on fortifications, with various parts of the developing urban area identified at a scale of 1:2000 to 1:5000. In some cases alphabetical letters with an associated key were used to single out particular features. Heinrich Thome's map, without a scale but colored and annotated in German, even included the detail of sunken ships in the fairway. Early plans for the extension of Copenhagen also projected the fashionable radial design (fig. 60.17), but they were never given effect. Half radial plans also appeared in Christian IV's projects for Kristianstad in Skåne and Glückstadt in Holstein. The first perspective of Copenhagen, based on the Italian model, was published in 1596.

Meanwhile, military mapping was initiated in Norway by the Danish engineer Isaac van Geelkercken.<sup>66</sup> He prepared a series of plans (scale 1:2000–1:7000) for the fortification of Christiania (Oslo) with the focus of attention on Akershus castle. He also used his own manuscript materials to prepare a map of Norway—*Daniae et Norvegiae Tabula*—the Danish part of which derived from Mejer.

## THE BIRTH OF THE SWEDISH LAND SURVEY

The Swedish *Lantmäterikontoret* was brought into being by Andreas Bureus. But for a full generation before he was called upon to create this unique and in some ways precocious institution, he had a heavy load of other cartographic duties thrust upon him. He was engaged in the diplomatic and practical task of boundary definition both before and after he published his *Lapponia*. He participated in the Swedish commission of 1603, which defined the Danish boundary and a decade later was involved again in refinements to the boundary. He was a member

65. Vilhelm Lorenzen, *Haandtegnede kort over København, 1600–1660* (Copenhagen: Henrik Koppels Forlag, 1930), lists twenty-two manuscript maps before 1650; idem, "Problemer i Københavns Historie, 1600–1660: Belyst ved samtidige kort," *Historiske Meddelelser om København*, 2d ser., 4 (1929–30): 145–240; and idem, *Drommen om den ideale By: Med en Bibliografi over Forfatterens litterære Arbejder, 1906–46* (Copenhagen: Rosenkilde og Bagger's Forlag, 1947).

66. Hans Jacob Barstad, *Norges Landforsvar, 1604–1643: Bidrag til Norges krigshistorie under Christian IV's regeringsperiode* (Oslo: A. W. Brøgers Bogtrykkeri, 1905), and Clare Sewell Widerberg, *Norges første militæringenjører Isaac van Geelkerck og hans virke, 1644–1656* (Oslo: A. W. Brøgers Bogtrykkeri, 1924). The Danish corps of engineers was founded in 1684.



FIG. 60.18. ANDREAS BUREUS, *ORBIS ARCTOI NOVA ET ACCURATA DELINEATIO*, 1626. This extensive map provided the most accurate depiction of the Scandinavian region of its day. Based both on existing maps of Scandinavia as well as on Bureus's own observations in the field, the map was dedicated to the Swedish King, Gustavus II Adolphus. A descrip-

tion of the North, written in Latin, surrounds the map on three of its four sides.

Size of the map (without text): 118 × 133 cm. Photograph courtesy of the Kungliga Biblioteket, Sveriges Nationalbibliotek, Stockholm.

of the boundary commission that marked the new frontier between Sweden and Russia following the peace of 1617. And during the time that he was occupied with these commitments and with other diplomatic missions and cartographic work, he had been entrusted by Carl IX with the task of constructing a *Tabula cosmographia regnorum septentrionalium*—in effect, a map of the expanded Swedish realm and its surrounding territories.

The map was commissioned in 1603 and was eventually engraved in 1626 under the title *Orbis arctoi nova et accurata delineatio* (fig. 60.18).<sup>67</sup> It was a geopolitical as

well as a cartographic statement, with cartouches dominated by the patrons Gustavus II Adolphus and his queen.

67. Bureus, *Orbis arctoi*. Volume 1 provides a transcription of the Latin text found on Bureus's 1626 map ("Orbis Arctoi Imprimisque Regni Sueciæ descriptio"). An English translation accompanies this transcription ("Description of the North and Especially of the Kingdom of Sweden") as well as a lengthy introduction by Herman Richter, in which he offers a contextual account of Bureus and his map ("Anders Bure and His *Orbis Arctoi Nova et Accurata Delineatio* from 1626"). See also Leif Åkesson, "Andreas Bureus—Father of Swedish Cartography," *IMCoS Journal* 75 (1998): 49–54.

After the maps of Claudius Clavus and Olaus Magnus, it represents the third notable stage in the mapping of northern Europe. The *Orbis arctoi*, a copperplate engraving on a conic projection, was published in six sheets in Stockholm. The engraver was Valentin S. Trauthman. The territory that it covered extended from the west coast of Norway to approximately the longitude of Moscow and poleward from latitude 52°N. The scale was roughly 1:1,000,000, and longitude was measured from Tenerife. The text was in Latin. Although there was probably recourse to the 1613 map of Adriaen Veen, which was also dedicated to Gustavus II Adolphus, it would seem that the principal sources were the personal knowledge of Andreas Bureus and his collaborators Johannes Bureus and Daniel Hjort. The configuration of northern Scandinavia owed much to *Lapponia*, whereas that of the territories framing the Scandinavian world derived from foreign sources. The principal error lay in the exaggeration of longitude. The bulge along the sixty-eighth parallel indicated how much new determinations of longitude were needed. The map was reprinted in Leiden in 1632.

Two years after its publication, on 4 April 1628, Andreas Bureus—general mathematicus, as he was officially styled—received an instruction from Gustavus II Adolphus. He was to prepare a synopsis of the situation of all the provinces and towns of Sweden, not only to protect the territory and realm from the enemy, but also for the improvement of their condition.<sup>68</sup> In Sweden, land had long been taxed according to its extent and use. The survey was calculated to improve the evidence for levying taxation at the same time as it fulfilled its stated purpose. The instruction effectively created the Swedish *Lantmäterikontoret*, the most important event in the history of Swedish cartography.<sup>69</sup> The first act of Andreas Bureus was to enlist six young men to whom he personally taught the necessary skills in geometry, mathematics, and geodesy, as well as the art of describing the features of the countryside. In due course, the six recruits were to become instructors in surveying. A formal examination was established in 1637. Each of the survey officers soon found himself responsible for mapping particular areas—Uppland, Västmanland, Östergötland, and Finland—and for dealing with specific *härader* (hundreds; divisions of a county) within them.<sup>70</sup>

The detail of recording that was required was already being enlarged by 1634–35, and the first correspondence about instruments was also circulating. Once the land was clear of snow and ice in spring, geometrical (*geometrisk*) surveying would begin on land and property belonging to all save the entailed estates. Record was required of: (1) arable land, according to whether it was clay, sand, peat, or heath; whether it was tilled or in fallow; and, if un-tilled, whether it was capable of tillage; (2) meadowland, according to whether it was firm land, peat land, or sedge

land, and the average hay crop; (3) woodland available for household use and whether it was suitable for reclamation; and (4) fisheries and the use to which streams were put. For the purposes of these maps, the area of arable land was to be estimated in *tunnland* (of fourteen thousand *kvadratalnar*).<sup>71</sup> Among the succession of instructions aimed at producing uniformity in representation was that of 19 May 1636 on the use of color. The color scheme was the first of its kind in the Nordic countries. Gray was to be used for arable land, green for meadow, yellow for moss land, black for fences, light blue for lakes, dark blue for rivers and streams, red for routeways, dark green for woods, and white for rock outcroppings. The compass must point to the top of the map, and a uniform size of paper for the finished map was urged. By the mid-1630s a number of completed atlases (*geometriska jordeböcker*) were being submitted for *härader* in the province of Uppland.<sup>72</sup> Scores of volumes were added to the stock by the middle of the century. By 1642, the map archive was acquiring such proportions that an inspector, Peder Menlös, was appointed to take charge of it. Nor did the call for further refinement of information cease. Soon different types of woodland were to be identified—conifer, hazel, beech, and oak; hop yards were also to be distinguished. The use of a uniform scale was encouraged.

Attention continued to be directed to the north, not least for political reasons. Responsibility for covering the vast territories of Norrland was vested in Olof Larsson Tresk, whose field surveys lasted from 1635 to 1643.<sup>73</sup> His first concern was with the provinces of Ångerman-

68. Viktor Ekstrand, ed., *Samlingar i landtmäteri*, 3 vols. (Stockholm: Isaac Marcus, 1901–5), esp. 1:1; Ekstrand provides the entire list of historic instructions. For the most explicit statement in English, see R. J. P. Kain and Elizabeth Baigent, *The Cadastral Map in the Service of the State: A History of Property Mapping* (Chicago: University of Chicago Press, 1992), 49–58. Also relevant is a discussion of the Swedish land survey in Leif Wastenson, ed., *National Atlas of Sweden*, 17 vols. (Stockholm: SNA Publishing, 1990–96), 1:126–45. The archive of the *geometriska jordeböcker* is housed in the Land Survey Office of Gävle, Sweden. For information on archives, other survey offices, and museums where old cadastral maps are housed, see Birgitta Roech Hansen, ed., *Nationalutgåva av de äldre geometriska kartorna* (Stockholm: Kungl. Vitterhets Historie och Antikvitets Akademien, 2005), texts in Swedish and English.

69. *Svenska lantmäteriet, 1628–1928*, 3 vols. (Stockholm: P. A. Norstedt och Söner, 1928). This work is a compilation of contributions from various authors. See also Elizabeth Baigent, “Swedish Cadastral Mapping 1628–1700: A Neglected Legacy,” *Geographical Journal* 156 (1990): 62–69.

70. The entire body of surveyors is recorded in Viktor Ekstrand, *Svenska landtmätare, 1628–1900* (Umeå and Uppsala, 1896–1903).

71. Lönborg, *Sveriges karta*, 22–23.

72. Lönborg, *Sveriges karta*, 24–25, details the progress made.

73. Olof Tresk, *Kartor över Kemi & Torne Lappmarker, 1642 och 1643*, with an introduction by Nils Ahnlund (Stockholm, 1928); and Ulla Ehrensward et al., *Kartor—Fem seklers svensk kartografi* (Stockholm: Armémuseum, 1991).

land, Medelpad, and Hälsingland, but the best known of his maps was that of the Torne Lappmark region (1642), with its clearly defined river systems and marginal notes; he also drew a similar map of Kemi Lappmark. His mapping of the Nasa mountain area on the Norwegian border (1639), spurred on by the discovery of silver, was important in that it established a precedent for demarcating a part of the Kjølén (Keel) mountain system as the boundary between Norway and Sweden. Tresk's broad surveys yielded small-scale maps different in character from the large-scale work of his colleagues.

By 1643, the geometrical mapping of the settled areas of Sweden-Finland was moving steadily forward and a special instruction spurred on the so-called "geographical" (*geographisk*) mapping—the topographical mapping of the entire countryside as distinct from the occupied, and cultivated (and thus taxable) terrain.<sup>74</sup> Special road maps were also prepared in conjunction with geographical mapping.<sup>75</sup> Many of the resulting maps included what was called a *Tabula geographica* (in this instance, a table of geographical data), for example, those of northeast Uppland province and Stora Kopparberg mining center.

The features to be recorded on the geographical maps were the subject of a separate series of instructions.<sup>76</sup> All forms of settlement were to be recorded and named—churches, estates, vicarages, farms, and cottages. Lakes, streams, islands, and peninsulas were to be precisely outlined. In the archipelagoes, harbors, sailing routes, shallows, and sandbanks were to be identified. Along rivers and streams, mills and other features were to be plotted, along with bridges. Special note was to be made of stone bridges, which crossed meadows and bog lands as causeways, as well as streams. Carr land, marshes, and hills were to be outlined as well as woodlands. The extent, name, and boundaries of common lands were also required. Major roads were to be identified in a dark color to distinguish them from local roads (which were to be indicated in red). The reasons for curves in the roads were to be explained as well as the differences between summer routes and winter routes. An original feature was the marking of monuments, tumuli, and rune stones.<sup>77</sup> The instruction concluded with a firm injunction that no other methods of representation were to be employed other than those stated. It was intended that the scale should be 1:50,000, but a number of scales (down to 1:360,000) were eventually used.

The new survey office took over the formal mapping of the older settlements and the preparation of plans for new towns. Before its establishment, Olaus Bureus, brother of Andreas and a medical doctor by training, was already drawing up plans for new settlements in Norrland and Finland. In 1620–21 he traveled around the Gulf of Bothnia, providing cartographic outlines for the new ports of

Luleå, Piteå, Sundsvall, Söderhamn, Umeå, and Tornio, as well as for Kokkola (Jacobstad) and Uusikaarlepyy (Nykarleby) in Finland.<sup>78</sup> He was also concerned with the city port of Göteborg, which was planned by the Dutch engineer Johan Schultz and was being laid out at the same time.<sup>79</sup>

In 1631 Gustavus II Adolphus issued an instruction that plans and drawings for all the towns in the country be prepared. Three years later a special instruction was issued to Olof Gangius, the surveyor in Finland, to prepare plans for towns showing all houses, buildings, streets, meadows, and tributary properties as well as roads in and out of the settlements. Examples of the type of map produced are provided by the plan of Turku (Swedish Åbo) by Anders Torstensson, Stockholm's first city engineer, the rather more detailed map of the Bothnian port of Raahe (Swedish Brahestad), and figure 60.19.<sup>80</sup> There is nothing precisely comparable for Denmark, although Johannes Mejer was responsible for drawing up plans of a number of Danish towns somewhat later.

Land surveyors were formally assigned to Finland in 1633, and by mid-century there were a number of geometrical maps available from Ahvenanmaa (Swedish Åland) in the west to Viipuri (Vyborg) in the east. They are similar in scale, content, and color to those of Sweden.<sup>81</sup> Their style is well illustrated in the maps by Anders Streng of the villages of Naappila and Rajalahti in Orivesi

74. John Svårdson, "Lantmäteriteknik," in *Svensk lantmäteriet*, 3 vols. (Stockholm: P. A. Norstedt och Söner, 1928), 1:135–256, esp. 177–81.

75. Wastenson, *National Atlas of Sweden*, 1:126–27.

76. Lönborg, *Sveriges karta*, 39–43.

77. As early as 1599, Johannes Bureus, cousin of Andreas and nominated the first *antiquarius regius*, had begun to record the distribution of rune stones. In 1628, an instruction was sent to all parish priests asking for their assistance in notifying the existence of local antiquities. There were no parallel recordings in Denmark, although the Danish antiquarian Ole Worm was much better known than Johannes Bureus. Compare Richter, *Geografiens historia i Sverige*, 73–74, and *Svenska lantmäteriet*, 1628–1928.

78. Richter, *Geografiens historia i Sverige*, 81.

79. Cartographic illustrations are given in Albert Lilienberg, *Stadsbildningar och stadsplaner i Götaälvus mynningsområde från äldsta tider till omkring adertonhundra* (Göteborg: Wald. Zachrissons Boktryckeri, 1928).

80. On Finnish urban cartography, see Juhani Kostet, *Cartographia urbium Finnicae: Suomen kaupunkien kaupunkikartografia 1600-luvulla ja 1700-luvun alussa* (Rovaniemi: Pohjois-Suomen Historiallinen Yhdistys, 1995), and Eino Jutikkala, *Finland, Turku-Åbo*, Scandinavian Atlas of Historic Towns, no. 1 (Odense: Danish Committee for Urban History [Odense University Press], 1977). The intensity of activity with which town plans were being prepared at mid-century is evident from Sixten Humble, "Lantmätarnas verksamhet inom städer och stadsliknande samhällen," in *Svenska lantmäteriet*, 3 vols. (Stockholm: P. A. Norstedt och Söner, 1928), 2:199–238, esp. 208.

81. *Suomen maanmittauksen historia*, 3 vols. (Porvoo: Werner Söderström Osakeyhtiö, 1933).

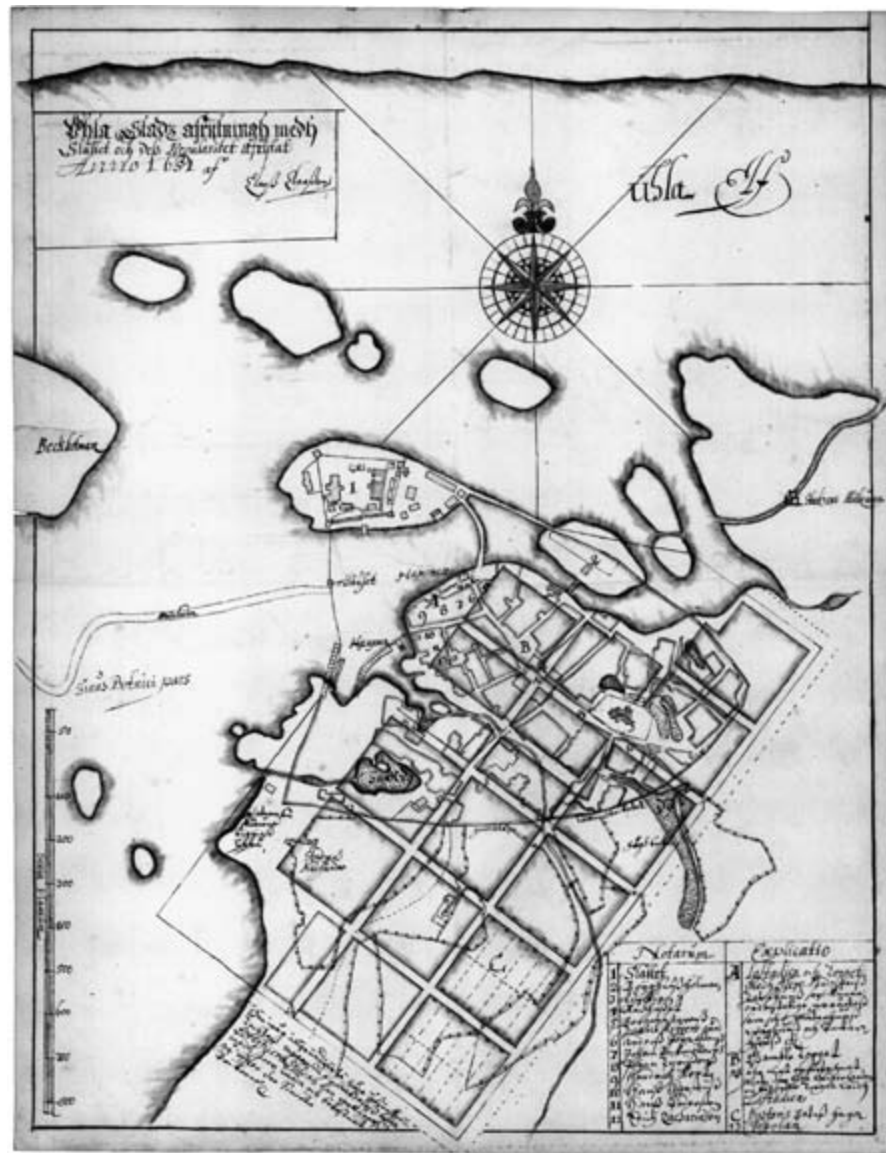


FIG. 60.19. EARLY TOWN PLAN PREPARED BY THE SURVEYORS OF THE LANTMÄTERIKONTORET IN FINLAND. This example is the town plan of Oulu (Swedish Uleåborg) on the east coast of the Gulf of Bothnia, by Claes

Claesson, 1651.

Size of the original: 46 × 35.6 cm. Photograph courtesy of the Riksarkivet, Stockholm (Ut känd proven nr. 438 [kartavd m form]).

parish in the southwest dated 1634 (plate 74) or the map by Hans Hansson of Hämeenkyrö (Kyrö) parish from the same area (scale 1:24,000). Before 1650 maps with accompanying profiles and sketches were also being made of parts of the Swedish possessions across the Baltic. They included areas in Ingria (Ingermanland) and Livonia.<sup>82</sup> In 1650, the civil mapping of Swedish Pomerania began.

### CHARTING THE SEA

With so much energy devoted to the cartographic representation of the land it is somewhat surprising that two

such maritime powers as Denmark and Sweden should have contributed so little to hydrographic survey. As late as 1650, for general purposes of navigation, there was continuing dependence upon Dutch rutters and, to a lesser extent, British maritime charts and local pilots to navigate the passage through what British hydrographers called “the

82. Nils Ahlberg, *Stadsgrundningar och planförändringar: Svensk stadsplanering, 1521–1721*, 2 vols. (text and maps) (Uppsala: Swedish University of Agricultural Sciences, 2005), and Gerhard Eimer, *Die Stadtplanung im schwedischen Ostseereich, 1600–1715* (Stockholm: Svenska Bokförlaget, 1961), 286.



dangerous sheres" (*skärgård*). The Dutch printed the first sailing directions about the coast of Norway in association with *De kaert va[n]der zee* (1532).<sup>83</sup> These were picked up and somewhat elaborated by the addition of coastal profiles (for example, of Gotland) and place-names in the Danish *Søkartet offuer Øster oc Vester Søen* printed by Lorentz Benedicht (Copenhagen, 1568). For Norway, the first significant statement on its coastal waters is found in Lucas Jansz. Waghenaer's atlas of 1584. The Dane Bagge Wandel prepared some elementary charts of Trondheim Fjord and Saltstraum in about 1650.<sup>84</sup> However, the only hydrographic publications of interest from Scandinavia before the late seventeenth century (when the Danish and Swedish schools of navigation came into being) were *Een siö-book som innehåller om siöfarten i Östersjön* (Stockholm, 1644) by Johan Månsson and a sea chart of the Baltic (without the Bothian Gulf) engraved by Sigismund Vogel (scale ca. 1:2,500,500), published in 1645.<sup>85</sup>

### ON THE THRESHOLD OF A NEW AGE

It was approximately two hundred years from Claudius Clavus's pioneering map of the north to the baroque picture presented by Andreas Bureus—rather more before Johannes Mejer set his seal upon the cartography of Denmark. By the mid-seventeenth century, Denmark and Sweden had acquired their own expertise in making and printing maps, and they were adding an increasing range of large-scale maps to complement their synoptic views of the Nordic world.

In general, cartographic developments in the two countries proceeded independently of each other. Where there was interaction, it tended to be associated with the legitimization of territory and, down to 1650, to be concentrated in the vulnerable frontier province of Skåne. Both countries looked to Germany for technical ideas, and Denmark had a distinctly closer relationship with Dutch cartographers than did Sweden.

By 1650, Sweden had developed a central mapping organization for which Denmark had no equivalent—in indeed, the *Lantmäterikontoret* was in some respects one of the foremost cartographic institutions in Europe. If the number of maps produced is any criterion, the tasks undertaken by the survey teams of twenty-six officers (eight of whom were assigned to Finland) were pursued with remarkable energy. Neither the simple methods employed

nor the inadequacy of available instruments seemed to inhibit their enterprise.

In each country talented leaders were working under royal patronage. The rift between the crown and Tycho Brahe, an originator both theoretically and practically, must have delayed Danish progress; although Johannes Mejer, who had already published his maps of Åbenrå (1639–41), was waiting in the wings. In contrast, the relationship between the Bureus family and the court was central to the success of the Swedish cartographic endeavor. Largely because of its marginal relation to the hearths of European mapmaking, the impact of Scandinavian enterprise was limited and indirect. The *Lantmäterikontoret* and its achievements were disregarded abroad. For the outside world, it was *Orbis arctoi* that mattered most. Its influence was transmitted through the atlases of Henricus Hondius and Johannes Janssonius, Claes Jansz. Visscher, and Willem Jansz. Blaeu and Joan Blaeu for the better part of a century. By the mid-seventeenth century, the political status of Sweden and Denmark in Europe was being fundamentally reassessed. Neither power was slow to employ its cartographic experience for propaganda purposes abroad. At home, the map was becoming a critical feature in national planning. In the field, it was indispensable for military campaigning.

83. *Norges Sjøkartverk, 1932–1982* (Stavanger, 1983), and Kristian Nissen, "Hollandernes innsats i utformingen av de eldste sjøkart over Nordsjøen og Norges kyster," *Foreningen "Bergens Sjøfartsmuseum" Årshefte* (1949): 5–20.

84. Johannes Knudsen, "Bagge Wandels Korttegnning," *Tidsskrift for Søveesen* 88 (1917): 413–20, and Ehrensvärd, *Nordic Map*, 267–68.

85. Månsson's work—covering the south Baltic Sea to Ahvenanmaa and the Gulf of Finland, printed by Ignatio Meurer, and based principally on Dutch sources—was reprinted in 1677 and 1725 and also appeared in German, Danish, and Russian editions. See Herman Richter, "Kring ålderstyrmannen Johan Månssons sjöbok 1644," *Föreningen Sveriges Sjöfartsmuseum i Stockholm, Årsbok*, 1943, 73–111, and Ehrensvärd, *Nordic Map*, 268–70. The book is discussed in Ulla Ehrensvärd, Pellervo Kokkonen, and Juha Nurminen, *Mare Balticum: The Baltic—Two Thousand Years*, 2d ed., trans. Philip Binham (Helsinki: Otava and the John Nurminen Foundation, 1995), 124–30, which also addresses the early history of charting the Baltic Sea. See also E. W. Dahlgren, "Sailing-Directions for the Northern Seas," in *Periplus: An Essay on the Early History of Charts and Sailing-Directions*, by A. E. Nordenskiöld, trans. Francis A. Bather (Stockholm: P. A. Norstedt, 1897), 101–10. A good copy of the 1645 Baltic sea chart can be found at Yale University Library, Map Department, New Haven; it was reprinted in 1712.