

THE HISTORY OF CARTOGRAPHY

VOLUME FOUR

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Cartography in the European Renaissance

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Cartography in the European Enlightenment

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Cartography in the Nineteenth Century

6

Cartography in the Twentieth Century

THE HISTORY OF CARTOGRAPHY

VOLUME FOUR

*Cartography
in the European
Enlightenment*

Edited by

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and

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Abbreviations

- HC 1 *The History of Cartography*, vol. 1, *Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean*, ed. J. B. Harley and David Woodward (Chicago: University of Chicago Press, 1987)
- HC 2.1 *The History of Cartography*, vol. 2, bk. 1, *Cartography in the Traditional Islamic and South Asian Societies*, ed. J. B. Harley and David Woodward (Chicago: University of Chicago Press, 1992)
- HC 2.2 *The History of Cartography*, vol. 2, bk. 2, *Cartography in the Traditional East and Southeast Asian Societies*, ed. J. B. Harley and David Woodward (Chicago: University of Chicago Press, 1994)
- HC 2.3 *The History of Cartography*, vol. 2, bk. 3, *Cartography in the Traditional African, American, Arctic, Australian, and Pacific Societies*, ed. David Woodward and G. Malcolm Lewis (Chicago: University of Chicago Press, 1998)
- HC 3 *The History of Cartography*, vol. 3, *Cartography in the European Renaissance*, ed. David Woodward (Chicago: University of Chicago Press, 2007)
- HC 6 *The History of Cartography*, vol. 6, *Cartography in the Twentieth Century*, ed. Mark Monmonier (Chicago: University of Chicago Press, 2015)

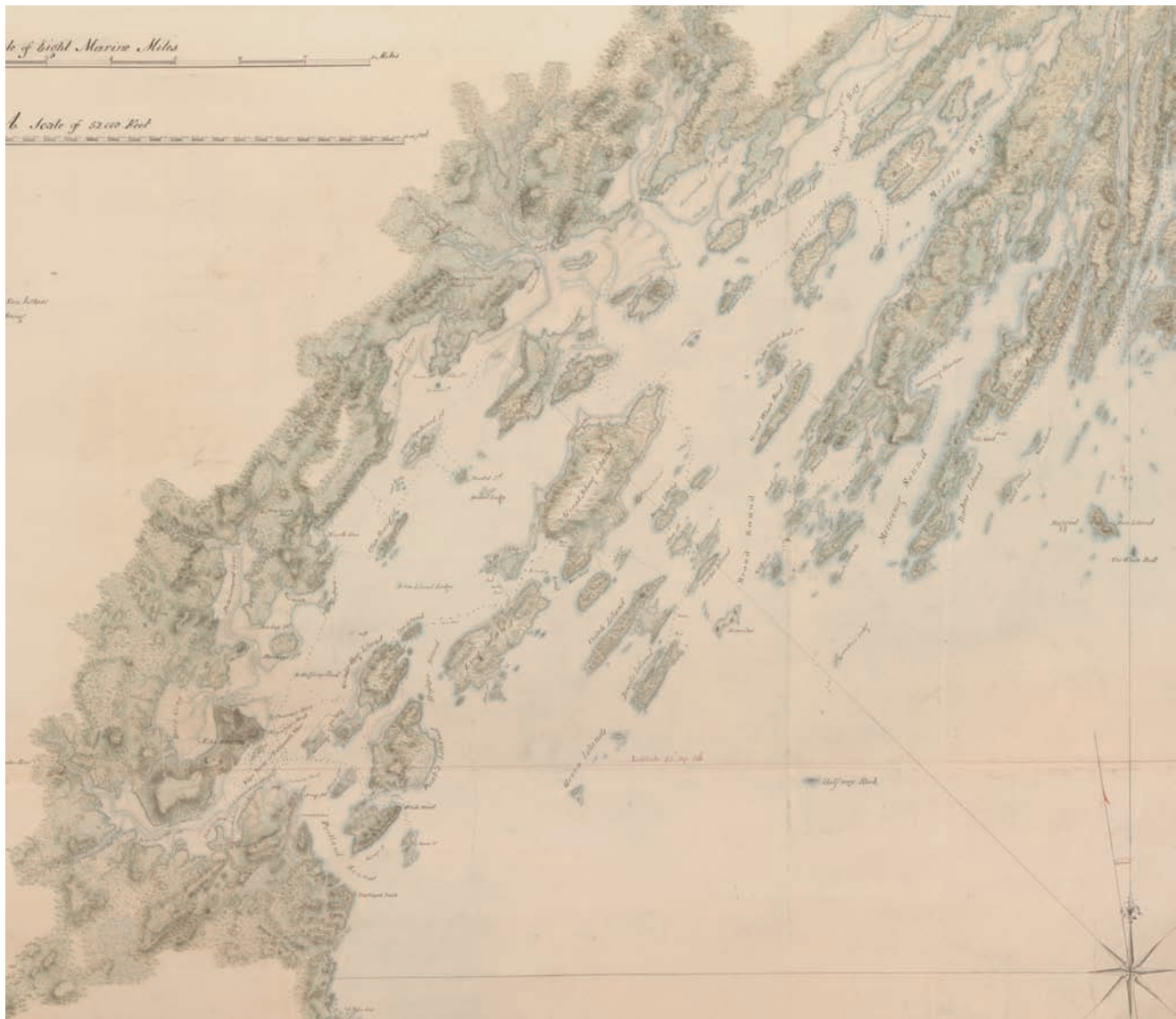


FIG. 839. DETAIL FROM GEORGE SPROULE, "A PLAN OF THE SEA COAST FROM CAPE ELIZABETH, TO THE ENTRANCE OF SAGADAHOCK, OR KENNEBECK RIVER, INCLUDING CASCO BAY," CA. 1772. Sproule was one of several surveyors working for Holland on the survey of

the northern district; this detail of the very large manuscript map covers much the same area as figure 837.

Size of the entire original: ca. 253.5 × 159.0 cm; size of detail: ca. 61.0 × 70.5 cm. © The British Library Board, London (Cartographic Items Maps K.Top.120.19).

ing and Marketing Maps in Eighteenth-Century France and England. Chicago: University of Chicago Press.

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Topographical Surveying in the Italian States. Chronologically and geographically, large-scale topographical maps produced in Enlightenment Italy defy description with a simple pattern of development; the inadequacy of that approach is demonstrated by maps made during the early Renaissance, based on instrumental measurements, which appear as innovative in content as carto-

graphic works from the late Enlightenment. Examples are Leonardo da Vinci's well-known map of Imola (1502), Leonardo Bufalini's equally well-known map of Rome (1551) (Ballon and Friedman 2007, 682–85), and the topographical maps of southern Italy commissioned by its Aragonese rulers around the mid-fifteenth century (Valerio 1993, 34–42).

The methods for creating large-scale topographical depictions of cities and larger territories varied and alternated according to subjective factors. Cultural models played a role, along with codes of figurative

representation, mechanics of visual perception, and the mapmaker's own technical and scientific ability. However, other factors included "the demands [made of such maps] by the practical requirements of the public" or the representatives of the political-economic powers "for whom the representation was intended"; urban maps displayed notable preference for an "image that gave the illusion of actual appearance" (Nuti 1996, 12)—that is, for renditions constructed using perspective views. These might involve a depiction from an artificially raised point of view, the equally artificial combination of two points of view (one oblique, one raised), or a panoramic representation as seen by a spectator from one particular spot.

Generally the point of view employed by large-scale terrestrial mapmaking fell between the two extremes: a zenithal point of view (as in marine charting) and a horizontal point of view (e.g., coastal elevations or the outline of landscape). Large-scale maps tended more often toward a bird's-eye perspective, which could depict territory obstructed from view in a panorama. Thus, the same drawing or map often combined azimuthal or geometric projections (used to depict the hydrography and coastline) and perspective views (rendering mountain elevations, inhabited areas, and vegetation) (Quaini 1994). The graphic language of mapping gradually moved away from artistic, pictorial representations typical of the Renaissance in part because of the foundation of a centralized corps of military (and, more rarely, civil) mapmakers. This shift was consolidated during the course of the eighteenth century as various Italian states began constructing cadastral maps that embodied geometrically based depictions of specific parcels of land.

A contribution to this process came from large-scale mapping of landed estates in the so-called *cabrei*, documents that not only played a role in the economic administration of property but were also a symbolic reaffirmation of the ideology of an ancient model of power, as can be seen from the fact that during the course of the seventeenth and eighteenth centuries there was an increasing taste for *cabrei* to include decoration, starting with the landowner's heraldic crest (Sereni 1990, 60). Although *cabrei* predate cadastral maps, they continued to be produced after the creation of the geometrically based cadastral maps in the middle of the eighteenth century (Sereni 2002b, 143–44). Their success in Italy is largely explained by their combination of pictorial depiction with geometrical land surveying based on simple triangulation.

The rural landscape as depicted in the cartography of the *cabrei* is essentially a two-dimensional landscape. Rigorously to scale, the terrain depicted by the land surveyor lies on a plane defined by measurements of length, width, and area. But the *cabrei* further embod-

ied a more subtle significance, which required that on this skeletal framework the configuration of the landscape should also be rendered—watercoloring and bird's-eye perspective being used in accordance with the rule of beauty as an imitation of nature. Thus, from a cartographic point of view, the *cabrei* map is a hybrid document, part geometrical survey, part pictorial rendition. (Sereni 1990, 61)

During the eighteenth century, measurements based solely on ad hoc visual evaluations slowly fell into disuse due to the gradual introduction of techniques of instrumental measurement (Galliano and Miroglio 2001, 219). Their ability to use these instruments distinguished the new land surveyors from the old, with many states laying down specific rules requiring practitioners to be skilled in such techniques and in the application of trigonometry in measurement. Nevertheless, up to the middle of the eighteenth century even the best small- or medium-scale maps were based more on empirical procedures of land surveying than on the dictates of astronomy and geodesy as sciences. In other words, it was only with regard to topography that such maps could be said to have "some geometrical basis, the representation of the forms of terrain were purely indicative, that is drawn up in accordance with a system known as *alla cavaliera* [providing a "horseman's view"] of mountains seen in semiperspective and with a total disregard for precision altimetry. . . . All such maps were drawn on a simple plane, with no account taken of the spherical form of the earth. Similarly, there was no standardized network of degrees, no attempt to pinpoint the location of sites on the earth's surface through the use of suitable astronomical points of reference" (Mori 1903, 19). The one exception in the seventeenth century appeared in the Piedmont House of Savoy when, in 1680, the state engineer Giovanni Tommaso Borgonio published his *Carta generale de stati di sua altezza reale* (ca. 1:190,000), constructed both from available official cartography and specific on-site surveying (see fig. 108) (Sereni 2007, 848–52; Massabò Ricci and Carassi 1987, 277).

Various Italian states witnessed the foundation of official mapmaking institutions during the Enlightenment. In the Kingdom of Sardinia, a military corps of topographical engineers was set up in 1738, specializing in surveys for military purposes and also in the representation of entire areas of territory; a similar corps of military engineers had already been established in Genoa between 1710 and 1717 to apply more advanced techniques toward the supervision of the state's defenses and borders. In the 1760s the Duchy of Parma founded a corps of military engineers in conjunction with the preparation of a geometrically mapped cadastre. In the Grand Duchy of Tuscany, the corps of

military engineers, headed by Colonel Odoardo Warren, was founded in 1739 but was concerned almost exclusively with fortifications until its disbandment in 1777. The other civil offices of state administration continued to use practitioners who received in-house training provided by the public administration. Naples had no specific body trained for cartography until Giovanni Antonio Rizzi Zannoni created the core of the *Officina Topografica* in 1781–84, which produced a number of innovative cartographic works from the late eighteenth to early nineteenth century. In Lombardy, the first body responsible for cartography was established in 1798 by the French occupying forces, the *Bureau topographique del Comando dell'Armata d'Italie*, initially staffed exclusively by French engineers under the command of Captain Léopold Berthier; in 1805, the Bureau became the *Deposito Generale della Guerra del Regno d'Italia* (Cantile 2007, 32–38; Quaini 1983, 26).

Though these attempts aimed at centralizing cartographic production as well as subordinating it to political requirements, by the end of the eighteenth century “production [within each Italian state] was still far from achieving standardization in procedures for the gathering and handling of geographical information and in the formats and techniques of representation. Such uniformity would become a concrete reality only after the unification of Italy” (Cantile 2007, 38).

Military maps were the newest and most expert form of the cartography produced at the time. They were distinguished by

a spatial rendering of the “landscape” that was represented figuratively in painting, their topography being based on a network of points not organized in relation to one specific point of view. . . . This is true both of the geometrical maps, based on measurements, and of “illustrational” maps, not infrequent even in military topography, which were based on rule-of-thumb visual assessment with no resort to a geometrical frame of reference. The legibility of such a territorial model, or *tipo*, as the map was called, required that the representation include a rendering of the landscape . . . understood not as a panorama as such but rather as a combination of territorial forms, depicted in outline and color. Not yet abstract in conception, neither were these maps pictorial representations. However, they did share the naturalism of contemporary landscape painting by drawing on both the latter’s techniques of representation and even the methods of preparing watercolors. (Sereno 2002a, 96n48)

Certainly from the middle of the seventeenth century, thanks partly to the work of Galileo Galilei and the experimental approach he championed, there were developments within the field of optics, which led to gradual

improvement in both the precision of information and the techniques used in rendering it cartographically. The old sighting tools and instruments using pinnules were replaced by telescopes with lenses equipped with right-angled grids that allowed ever more precise measurements. At the same time, the use of the plane table became widespread and the application of trigonometry meant that surveying procedures were simplified; it was no longer necessary to measure so many distances directly (Sturani 2002, 106). Although high costs initially restricted its use to scientists, the precursor to the modern theodolite, an avant-garde instrument from England that combined a quadrant and eyeglass with a half-circle for vertical measurements, slowly became widespread from the mid-eighteenth century (Sturani 2002, 109).

The progress of large-scale mapping during the Enlightenment, particularly in the measurement of private landed estates and the establishment of state borders, was partly linked to growing government legislation regarding the professional qualifications required of public land surveyors. Around Milan, the duties of both architects and land surveyors had been subject to definition as early as 1497, with a corporation (*collegio*) of such professions active in the sixteenth century. Here, as elsewhere, the “family dynasty” principle was soon established in the craft as technical know-how passed from father to son (Palmucci 2002, 50). The pattern in Lombardy was repeated in similar forms in other Italian states.

In the seventeenth-century, Italian engineer-architects and land surveyors practiced measuring angles, distances, and heights in order to survey fortifications, cities, and state boundaries and to map landed estates. Measuring instruments exploited Pythagorean and Euclidean theorems regarding right triangles and other geometrical figures: a prepared right-angled grid helped to calculate distances and surface areas (Sturani 2002, 104–7). The government of the Duchy of Savoy exerted control over these technicians through the *Misura generale* (or *perequazione* [reform]), legislated in 1677 and enacted from 1698 to 1711. The entire operation produced only descriptive data (based on both measurements and estimates of distances and areas), relying on the work of dozens of urban and rural land surveyors, expert and loyal individuals who employed topographical techniques and instruments that were innovative for their day. Nevertheless, the results exposed the errors and failings of many of the technicians involved, revealing the need to establish “the bases for the professional definition of a new type of technician” (Palmucci 2002, 50–51). Hence, the *Regolamento per gli ingegneri civili siano architetti, e militari, e misuratori ed estimatori* of 1724 was enacted, which instituted a professional register with exams for admission to the distinct professional categories of engineer-architect and land surveyor.

In the early eighteenth century, large-scale projects for a geometrically based cadastral register (initiated in Austrian-ruled Lombardy in 1718 and in Savoy-ruled Piedmont in 1739–40) provided engineers, architects, and land surveyors with a task that progressively challenged their professional abilities—even if many technicians found themselves in difficulties due to their lack of familiarity with the plane table (*tavoletta pretoriana*, an instrument more advanced than the more familiar *squadro agrimensorio*), the level, and the compass (Palmucci 2002, 50–54).

During the eighteenth century, topographical mapping in Italy began to mirror the situation elsewhere in Europe with regard to both techniques for constructing maps and the greater role of maps in determining or applying territorial policies. With increased frequency, maps began to consist of a geometrical representation that eschewed pictorial figuration; the mapmaker increasingly had to conform his abilities as a craftsman to the demands of an abstract and impersonal geographical knowledge that was becoming the new model of truth that maps were expected to respect. However, even though maps were no longer constructed on a rule-of-thumb visual assessment but by means of instruments used to calculate angles, distances, and sometimes even heights, perspective-pictorial depictions continued to coexist with horizontal projection during the first part of the century. For example, Matteo Vinzoni, a gifted and prolific cartographic engineer who worked for the Republic of Genoa from 1710 to 1770, produced very effective depictions that combined horizontal projections with the *alla cavaliere* perspective—a mix that became completely outmoded only at the beginning of the nineteenth century, when a system of horizontal projection also depicted mountain formations. Vinzoni's substantial output offers a paradigm for how the language of cartographic draftsmanship and the level of technical-professional ability developed throughout the Italian states during the century of Enlightenment.

Panfilio Vinzoni, Matteo's father and first teacher, had also worked for the Genoese Republic and had been appointed to map its territorial boundaries. However, his work embodied a sort of flat *vedutismo* on which Matteo innovated by striving to "include within a perspective view of the mountains a representation of the hidden side of such ranges, creating new systems of depicting mountain relief that made a more ample use of hatching and color" (Quaini 1986b, 92). The first signed cartographic work by the young Matteo was the so-called "Carta della Selva della Pertegara," 1711 (fig. 840). It clearly shows "progress . . . not so much in the rendition of settlements and vegetation as in the use of perspective drawing to render elevation, with pen-drawn hatching and shading created in black and red, the two colors that—as the legend points out—are also intended to distinguish between

the territories that fall under the two jurisdictions [of Genoa and Tuscany]" (Quaini 1986b, 93). The map also used planimetry to depict the largely cultivated areas at the bottom of the valley cut by the River Vara.

Nevertheless, Vinzoni's first drawings are still of the rule-of-thumb visual type rather than geometrical renditions: "measurements are almost entirely absent and, as a result, so is any sort of scale; in this particular case ["Carta della Selva della Pertegara"] there is also no indication of orientation" (Quaini 1986b, 96). And though in his large "Carta del Capitanato di Levante" (1712) (Genoa, Archivio di Stato [AS], Mappe e tipi cartografici vari, B. 10) Vinzoni gives a detailed account of settlements and watercourses (all named), he is still operating within the parameters of the pictorial view (Quaini 1986b, 102). It is no accident that the map lacks a scale and a wind rose. By 1714 the young man's work had matured substantially, as evidenced by a number of maps with a graphic scale, which embody "a move toward geometrical cartography, after beginning in a more freely pictorial mode" (Quaini 1986b, 98). Such works were, in fact, the fruit of direct on-site measurements and of reliance on guides who were familiar with the terrain in question (Quaini 1986b, 103–4).

The greatest problem facing Italian mapmakers before the nineteenth century was the depiction of relief and elevation. Renaissance mapmakers had resolved the difficulty of rendering complex orography by filling the space with conventional images of cones or "mole hills," dotted more or less equally. During the seventeenth century, brushstrokes and variations in shades of color rendered mountains more expressively and approximated the actual variation in the appearance of mountains. However, with the exception of a few prototype works in the late part of that century, in the eighteenth century cartographer-engineers increasingly resorted to fine, pen-drawn hatching and shading, the latter usually oblique. In short, in the second half of the seventeenth century it was the exception for mountains and hills to be rendered in a sort of frontal or perspective view; in the following century it became the general rule. This approach, which obviously created opportunities for imprecision, remained predominant until the century's end, the era of Napoleonic rule. Though susceptible to inaccuracies, the method did provide a visually immediate and relatively effective account of orography, as can be seen in a 1679 map of the territory of Piedmont that shows a projected road system extending from Turin to Nice (fig. 841) in which alpine uplands are rendered in perspective view, with fine hatching and raking light from the west. Only toward the end of the eighteenth century did orography begin to be rendered differently "from an azimuthal point of view, with some resort to careful shading to give a sense of elevation and relief" (Carassi 1984, 94), such as displayed in the mili-



FIG. 840. "CARTA DELLA SELVA DI PERTIGARA," BY MATTEO VINZONI, 1711. Manuscript, ink and watercolor on paper, no scale given. Within the constraints of the perspective view, Vinzoni attempts to represent the hidden slopes of the mountain area using more intense hatching and color,

demonstrating the evolution of a graphic language tied to the increased skills required.

Size of the original: 31.2 × 42.4 cm. Image courtesy of the Archivio di Stato, Genoa (Confinium, 190). Su concessione dei Ministero dei Beni e le Attività Culturali.

tary topographical map drawn by L. Bergalli in 1795 (fig. 842). By the late eighteenth and early nineteenth centuries, the French had adopted a method of using zenithal projections to construct contour lines, based on earlier techniques developed by the versatile mapmakers Luigi Ferdinando Marsigli and Nicolaas Samuelsz. Cruquius. In Italy, Pierre-Antoine Clerc, a leading figure in Napoleon's military bureaucracy from 1809 to 1814, introduced the contour system into the cartography of eastern Liguria and other areas of northern Italy (Rossi 2007, 65–73; Quaini 1983, 25–26, 32–34).

By the middle of the eighteenth century, large-scale topographical maps achieved the relatively rare honor of being printed with the appearance of works noteworthy for their content and metrical accuracy. Foremost was Andrea Chiesa's topographic map of the area around Bologna (1742 and 1762; ca. 1:30,000), prepared for administrative purposes in 1740–42 and based on sur-

veys and measurements carried out from 1732 to 1738 using a plane table (fig. 843). The map "depicts, with noteworthy precision and careful detail, the entire territory that stretches from the hill of Bologna to the boundaries of the provincial area. . . . Despite the fact that it does not indicate crops and cultivated land . . . , this is one of the first real topographical maps in Italy" (Barbieri 1949, 38; see also Catolfi 2006, 65–66; Giacomelli et al. 1992).

Other administrative maps of a high standard include the manuscript "Carta della Riviera di Ponente di Genova" (1746–47) (Turin, AS, Carte Topografiche segrete, A 15 nero), prepared from on-site surveys by the Piedmont military engineers Giovanni Giacomo Cantù, Antoine Durieu, Francesco Antonio Garella, Giambattista Sottis, and Coloniato (Quaini 1986a, 48). It displays orography (with shading and fine hatching), the network of watercourses and rivers, settlements and

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FIG. 842. "CARTA TOPOGRAFICA MILITARE DALLE SPONDE DEL MARE, DA VENTIMIGLIA SINO A DE-MONTE," L. BERGALLI. Manuscript, ink and watercolor on paper, no scale given. The orography is rendered from an azimuthal view with careful shading, which gives a sense of

the relief, a technique in widespread use only at the end of the eighteenth century.

Size of the original: 64.3 × 117.3 cm. Image courtesy of the Archivio di Stato, Turin (Corte, Carte topografiche segrete, Ventimiglia 22 BIS a VII rosso).

roads, woods and tree-lined areas of cultivation. The *Topografia del Monte di Brianza* (Milan), drawn and published by Paolo Antonio Sirtori in 1763, exploits the material available in cadastres (Pirovano 2001, 190).

After 1737 the Grand Duchy of Tuscany was ruled by a European dynasty open to innovations in territorial surveying and determined to construct geometrically based topographical cartography on an urban and territorial scale—that is, maps that could be used for urban, environmental, economic, and administrative reforms. The anonymous manuscript map of Florence (fig. 844) evinces the prolific workshop of the Giachi brothers (Antonio, Francesco, and Luigi, active from the 1750s to the 1790s in the service of the grand duke's administration). However, its original content may be the work of the mathematician and engineer Ferdinando Morozzi, whose works were reproduced by the Giachi atelier.

Drawn after 1765, it shows the entire territory around Florence, clearly distinguishing the plains from the hills. The mathematician Leonardo Ximenes produced one of the first truly modern topographies of Tuscany. His "Carta topografica generale del lago di Castiglioni" (1758–59, Florence, AS, Miscellanea di Pianta, 56), later published in Florence in 1769, was based on accurate measurements and on-site observations. The mathematician Pietro Ferroni supervised the "Carta corografica del Valdarno di Pisa," ca. 1:34,000, drawn by his young pupil Stefano Diletti in 1774 (Prague, Národní Archiv, Rodinný Archiv Toskánských Habsburk [NA, RAT Map], 215), which depicts the lower plain of the Arno, outlining the Pisa and Livorno hills using a planimetric layout. The territory is rendered with great precision, including indications of land use. In Tuscany, the map was unsurpassed until the appearance of the maps based

(facing page)

FIG. 841. "CARTA COROGRAFICA DOVE DIMOSTRA-TIVAMENTE SON SEGNATE LE STRADE," 1679. Manuscript, ink and watercolor on paper, ca. 1:23,000. This map shows relief with a frontal or perspective representational technique, that is, azimuthal, which predominated until the Napoleonic era. Though imprecise, it offers an immediate and relatively efficacious perception of the orography in the region

north of the Ligurian coast, using fine hatching and raking light to render mountain relief. Local routes are shown in red and yellow (much faded).

Size of the original: 143.0 × 95.5 cm. Image courtesy of the Archivio di Stato, Turin (Corte, Carte topografiche per A e B, Nizza n. 8).



FIG. 843. *CARTA DEL BOLOGNESE*, BY ANDREA CHIESA (BOLOGNA, 1742). Engraved on copper by Giuseppe Benedetti; ca. 1:30,000.

Size of the original: 198 × 192 cm. Image courtesy of the Archivio de Stato, Turin (Carte topografiche e disegni, Carte topografiche serie IV, mazzo 8).

on information gleaned from the geometric cadastral maps drawn up for the Lorraine administration in the 1820s.

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SEE ALSO: Italian States; Officina Topografica (Topographical Mapping Office; Naples); Rizzi Zannoni, Giovanni Antonio

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FIG. 844. "PIANTA DEI CONTORNI DELLA CITTÀ DI FIRENZE," POST-1765. Manuscript, ink and watercolor on paper, ca. 1:30,000. Though this map of the area around Florence is attributed to the *atelier* of the Giachi brothers, the content may be the work of Ferdinando Morozzi.

Size of the original: 89 × 93 cm. Reproduced with permission of the Istituto geografico militare, Florence (inv. N. 3650, Tordi n. 5) (authorization n. 6934 dated 03.15.2017).

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Topographical Surveying in the Netherlands. See Military Cartography: Military Cartography and Topographical Surveying by the Netherlands

Topographical Maps in the Ottoman Empire. Although topographical depiction occupied a long-standing place in Ottoman cartography, by the seventeenth century the number of examples incorporating the particular features of this style drastically decreased. During the seventeenth and eighteenth centuries, topographical depiction was largely restricted to urban views, reproduced from the classical works of the sixteenth century. Only in the first half of the eighteenth century did a clear divergence between panoramic projection and mapping emerge in the Ottoman Empire. European artillery officers, engineers, and mapmakers in the service of the Ottoman government attempted to gather topographical maps pertaining to different regions of the empire, albeit without a geodetic purpose. It was not until the beginning of the twentieth century that Ottoman engineers

took the initiative to create a complete topographical survey of the empire.

The seventeenth- and eighteenth-century copies of the "Kitāb-ı bahriyye" (Book of maritime matters) contain some maps that are not scaled; they may be primarily identified as panoramic or schematic images of documentary rather than cartographic value. There is limited information about the artists who drew these illustrations, such as the seventeenth-century map of the island of Crete (İstanbul Üniversitesi Kütüphanesi [İÜK], Nadir Eserler 6605, f. 347a) and the eighteenth-century map of the castle and gulf of Thessaloniki (İstanbul, Süleymaniye Yazma Eser Kütüphanesi, Ayasofya 2605, f. 15b), neither of which contains detailed information. These same copies of the "Kitāb-ı bahriyye" include maps of Istanbul and Cairo that show typical iconic features and are replete with iconic details. This same style was employed on itinerary maps for certain pilgrimage journeys. Manuscripts with titles such as "Menāsik-i Hacc," in which the sacraments of the Islamic pilgrimage are shown, include schematic maps of the halting places en route and holy places, particularly the cities of Jerusalem (Kudüs), Mecca (Mekke), and Medina (Medīne). (For the Mecca and Medina drawings in an anonymous manuscript recopied in 1146/1734, see İÜK, Nadir Eserler 6757, f. 3a–4a).

Among the works of the renowned Ottoman intellectual Muṣṭafā ibn 'Abdullāh Kātib Çelebi, the first and second drafts of the "Cihānnümā" and his translation of the *Atlas minor* of Gerardus Mercator and Jodocus Hondius ("Levāmi'ü'n-nūr fī zülmeti atlas minur") are especially abundant in topographical maps. The author's copy of the first draft of "Cihānnümā" (Vienna, Österreichische Nationalbibliothek, Cod. Mixt. 389) is adorned with rather simple maps in which towns, fortresses, rivers, hills, and bridges are marked by name; these are mostly placed in the margins of the page, sometimes contained in a circle. Among these are maps of Andalusian towns (f. 36a–40a); the Ottoman cities of Edirne (f. 47b), Sarajevo (f. 94b), and Belgrade (f. 99b); the residential/architectural plan of Mecca (f. 182a); and Azov and its surroundings (f. 220a). The maps of Rumelia in the "Cihānnümā" are much more detailed in the later copies, and some new maps in color are added, elaborated with further topographical details, such as the map of Szeged (copy date 1163/1750, Süleymaniye, Esad Efendi 2043, f. 111a). The author's copy of the second draft of the "Cihānnümā" included a number of topographical sketches as well (e.g., Istanbul, Topkapı Sarayı Müzesi Kütüphanesi [TSMK] R. 1624/1, f. 112b).

The rolled-up (scroll) maps of the courses of the Tigris and Euphrates Rivers of the mid-seventeenth century provide a thorough depiction of the holy places and sanctuaries along the pilgrimage route. By the same token, the scroll map of the Nile River (copy date