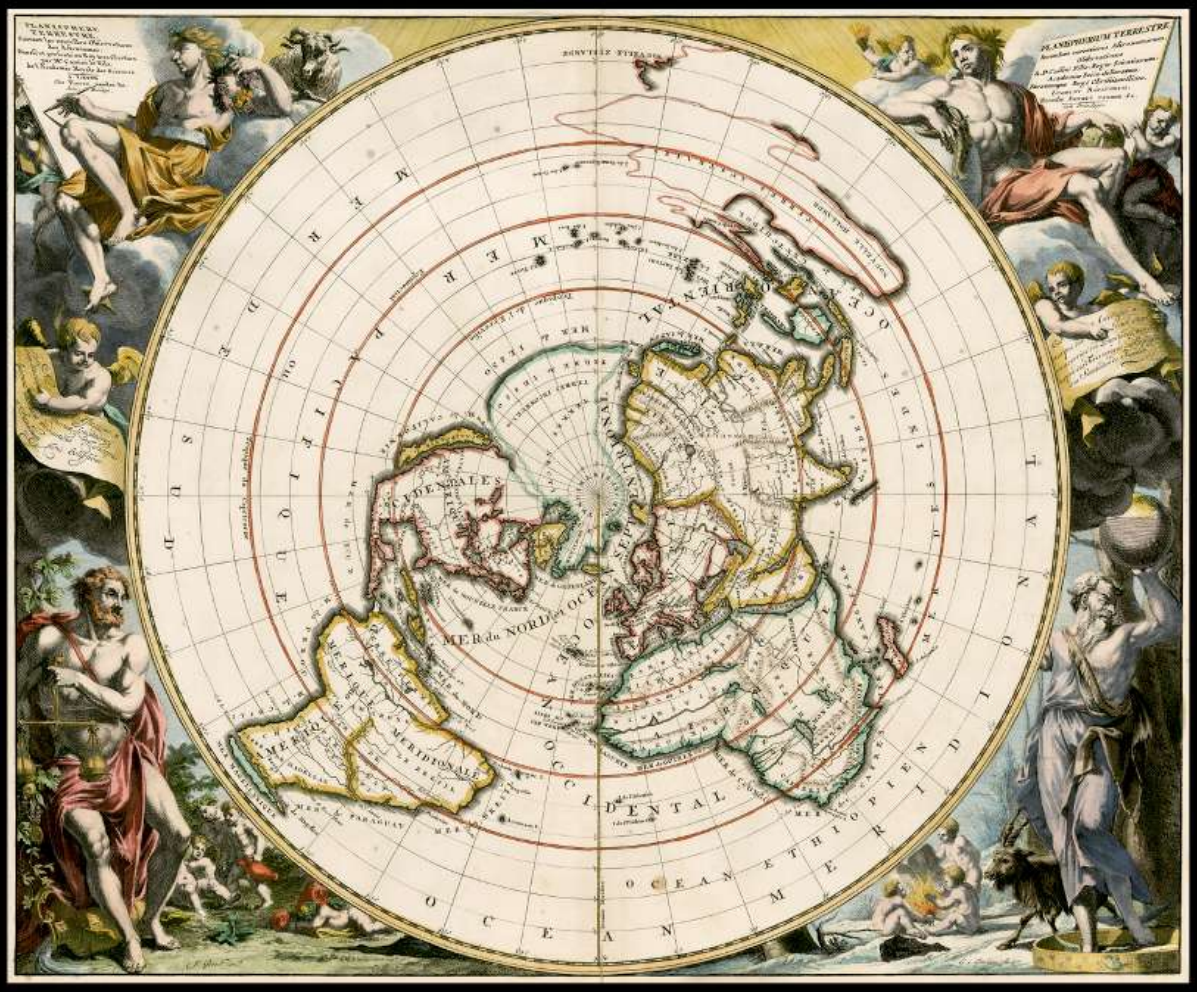
THE HISTORY OF CARTOGRAPHY



VOLUME FOUR

Cartography in the European Enlightenment

Edited by

MATTHEW H. EDNEY *and*
MARY SPONBERG PEDLEY

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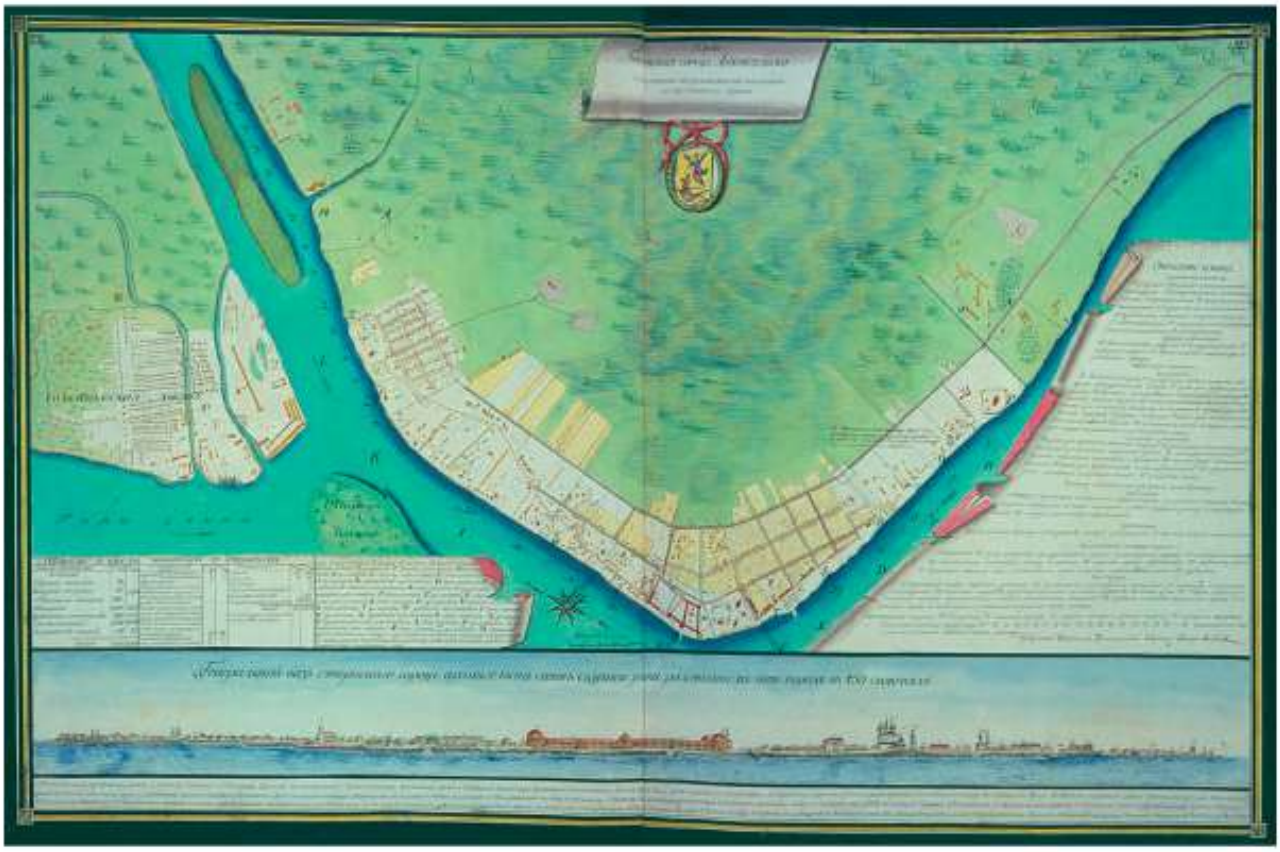

FIG. 926. PLAN OF A LOCAL CAPITAL FROM A REGIONAL ATLAS. Arkhangelsk (1792), from the manuscript atlas of Arkhangelsk *guberniya*, 1794. The manuscript is accompanied by a panoramic view of the town from the river. Size of the original: 64 × 99 cm. Image courtesy of the Rossiyskiy gosudarstvennyy voyenno-istoricheskiy arkhiv, Moscow (f. 846, op. 16, d. 18558, pp. 22–23).

SEE ALSO: Russia

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Urban Mapping in Spain. During the eighteenth century, urban cartography in Spain progressed both quantitatively and qualitatively as the Enlightenment's new scientific ideals met increased modernizing demands of the Bourbon monarchy's state apparatus. Following the War of the Spanish Succession (1701–14), the accession of the Bourbons with Felipe V in 1713 inaugurated a period of important structural reforms that accelerated during the second half of the century, particularly under Carlos III (r. 1759–88).

Urban plans in Enlightenment Spain functioned both as the necessary tools for such reforms, which required a precise knowledge of urban conditions, and as the cultural objects that embodied ideas of progress, public felicity, and the wealth of the nation. In addition, they often presented the utopian face of enlightened thought. Indeed, the eighteenth century saw the true beginning of geometric plans for Spanish towns, plans that were on a consistent scale throughout and produced an increasingly accurate image of the city with representational

as well as operational goals. These maps not only portrayed reality but at the same time looked toward the future and captured the city as geometrical, clear, and orderly.

This mapping impulse manifested itself concomitantly with an emergent intelligentsia of scientists, engineers, geographers, and geometers who were involved in projects that were sometimes purely individual pursuits (Tomás López's map of Madrid, Francisco Dalmau's map of Granada) and sometimes the collective product of an increasingly efficient state organization that could call upon a scientific elite—the Cuerpo de Ingenieros Militares.

The restructuring of the Spanish navy, directed by Zenón de Somodevilla y Bengoechea, marqués de la Ensenada, from 1749, produced an abundant and advanced cartography of *plazas marítimas* (port cities) that centralized these efforts, particularly for settlements along the bay of Cadiz and the port cities of Cartagena and El Ferrol. The vast number of military plans produced provided reliable representations for strategic purposes and territorial control, and they also reflected ambitious building programs of the Crown (sometimes anticipating construction projects that never came to fruition) (Bonet Correa 1991; Sambricio 1991).

The greatest project to provide a more complex and integrated understanding of Spanish territory was the initiative organized by Ensenada: the grand census of population, economy, and territory known as Catastro de Ensenada. Initiated by order of Fernando VI in 1749, the Catastro produced thousands of descriptions and images of a majority of the Crown of Castile's urban settlements. Although the images were almost always schematic sketches, the immediacy of these drawings allow them to be considered primary sources of knowledge. Even though the documentary corpus has suffered important losses, scholars have not utilized its full potential (Sambricio 1991; Durán Boo and Camarero Bullón 2006).

The same desire for detailed knowledge of Spanish territory appeared in the grand attempt at a Diccionario geográfico de España by Tomás López, the most renowned geographer of Enlightenment Spain. An enormous initiative that remained incomplete and unpublished, the content of the Diccionario was based on the answers to surveys sent to hundreds of cities and localities in Spain. Many responses were accompanied by planimetric urban representations of uneven quality that were frequently retouched by López himself. The wide gap between the goals of the project and the precariousness of the means used makes this group of images not only a unique source of information but a symbol of the great difficulties confronting the diffusion of enlightened thought throughout Spain.

Despite these problems, several Spanish cities enjoyed modern city plans produced for the first time by cartographic techniques based on observation and measurement that followed uniform standards. Within a short time Madrid, the seat of the Spanish court and the main arena for the reformist efforts of Carlos III, saw two large plans advantageously replace the baroque images by Frederick de Wit and Pedro Teixeira Albernaz: the *Plano topographico . . . de Madrid* (1769), engraved by Antonio Espinosa de los Monteros (fig. 927), and the *Plano geométrico de Madrid* by Tomás López (1785) (Molina Campuzano 1960, 455–90). The *Plano topografico* shows grand architectural projects that were never completed, such as the Hospital de Atocha; these and other features (such as its scale and dedication to Pedro Pablo Abarca de Bolea, conde de Aranda) associate it with José de Hermosilla y Sandoval, military engineer and architect and paramount figure in Spanish enlightened urbanism (Molina Campuzano 1960, 425–54; Ortega Vidal 2000, 75–77). The plan's reliance on the Planimetría General de Madrid and the organization of the city into the new *cuarteles* and *barrios* of the reform of 1768 attest to its administrative use (Marin 2008). The cartographic images of many other Spanish cities (e.g., Barcelona, Vitoria, Santander, and San Sebastian in northern Spain) united graphic descriptions of reality with proposals for urban reform (Montaner and Nadal 2010).

In Andalusia, the grand colonization of the Sierra Morena generated an abundant urban cartography of the new population centers, especially the most important settlement, La Carolina. Enlightenment Andalusia also offered two landmarks of urban cartography: the plan of Seville known as the *Plano de Olavide* (1771) and the *Mapa topográfico de la ciudad de Granada* (1796) by Francisco Dalmau. In 1771 the *intendente* of Seville, Pablo de Olavide, one of the main personalities of the Spanish Enlightenment, ordered the production of a plan of the city. Francisco Manuel Coelho designed the map, the precision of which created an innovative cartographic document, Seville's first truly topographic plan and not a pictorial urban view. Similar methods were employed a few years later for a subsequent plan by the omnipresent López (1788), thus providing Seville with two important examples of eighteenth-century urban cartography in a short time.

Dalmau initiated the proposal of the map project to the city of Granada. His written communication of 1795 (manuscript, Archivo Histórico de la Ciudad de Granada, leg. 1876, pieza 17) constitutes a theoretical defense of the urban map made on scientific principles,

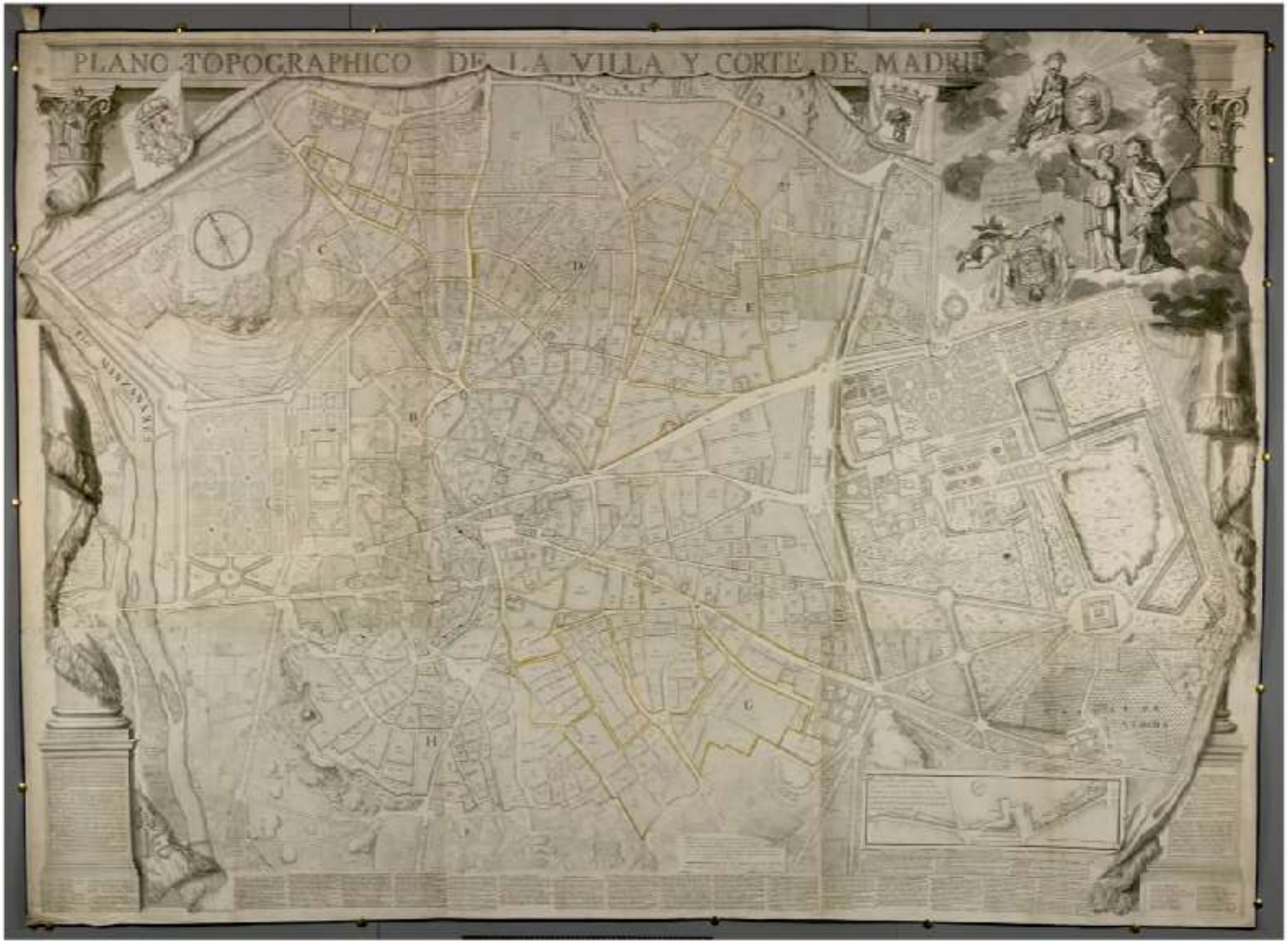

FIG. 927. *PLANO TOPOGRAPHICO DE LA VILLA Y CORTE DE MADRID,* BY ANTONIO ESPINOSA DE LOS MONTEROS, 1769. Engraving on copper, ca. 1:1,800, in nine sheets. Beautifully designed and engraved by Espinosa de los Monteros, this map may have been the work of José de Hermosilla y Sandoval, architect and captain in the Cuerpo de Ingenieros. Hermosilla had spent time in Rome (1747–56) learning architecture and may have encountered there Giovanni Battista Nolli's *Nuova pianta di Roma* (see fig. 609), to which this plan bears some similarity. Upon his return to Spain he composed a treatise on the scales to be used by the military engineers, at the direction of the Conde de Aranda, to whom this map is dedicated.
Size of the original: ca. 176 × 243 cm. © The British Library Board, London (Cartographic Items Maps K.Top.73.14.8 TAB.END).

FIG. 928. *MAPA TOPOGRÁFICO DE LA CIUDAD DE GRANADA*, BY FRANCISCO DALMAU, 1796. Engraving on copper, ca. 1:4,000. Dalmau's map combines a grid and an alphanumeric reference system (left margin) to increase the map's administrative usefulness. Size of the original: 63 × 102 cm. Image courtesy of the Archivo Municipal de la Ciudad de Granada (ES.18087.AMGR).

a product he understood not only as a descriptive device but as a tool for the transformation of the city. The use of a *cuadrícula* (grid) and an alphanumeric reference system, as well as the large amount of information displayed in its margins, turned Dalmau's plan into one of the great milestones of Spanish Enlightenment cartography (fig. 928) (Calatrava and Ruiz Morales 2005, 63–82).

Napoleon's invasion, the reign of José I Bonaparte, and the War of Independence (1808–12) provide a final episode in the urban cartography of Spain during this period. French military engineers produced numerous plans of Spanish cities, most of which are preserved in the archives of the Château de Vincennes and clearly reflect strategic considerations. Examples include the plan of Malaga (which displays bathymetry), four plans of Granada produced between 1810 and 1812 on the order of French general Horace Sébastiani, and a series dedicated to Barcelona, Cádiz, Fuenterrabía, and Pamplona (Calatrava and Ruiz Morales 2005, 83–90). The plans of Madrid used by Silvestre Pérez, one of the most important Spanish architects at the turn of the century, in 1811 to shape the ambitious urban projects of José I Bonaparte, which were as ephemeral as his reign, may be considered the closing documents of Enlightenment urban cartography in Spain (Sambricio 1991).

JUAN CALATRAVA

SEE ALSO: López de Vargas Machuca, Tomás; Property Mapping: Spain; Spain

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Urban Mapping in Spanish America. During the sixteenth century, most of the urban networks in Hispanic America were established following an orderly, clear, and regular pattern. In its most characteristic incarnation, the layout of settlements was configured in the shape of a chessboard with perpendicular streets and square or rectangular blocks around a *plaza mayor* that acted as the city's geometric and vital center. This classic model of the Hispanic American city was maintained with very little variation until the eighteenth century, when the size and density of city blocks and plots (or parcels) underwent modifications.

Following a decline in the seventeenth century, the eighteenth century, particularly from 1750 on, saw a renewed urban impulse propelled by colonial economic and population growth that was reflected in an increase in cartographic production. During this period, urban cartography continued to be centralized and state sponsored; it was produced by the Crown through different *secretarías de Estado* (government offices), in collaboration with American official delegate bodies, mainly town councils and municipal governments that were capable of urban planning and implementing the plans. Starting in 1764, other government officials, the *intendentes*, progressively took over roles in modernizing old cities as well as founding new ones. As for the authors of the maps, the participation of specialists and technicians (such as engineers, land surveyors, and hydraulic experts) increased, although informally trained individuals continued to be active.

Similar to other types of Spanish cartography in the Americas, urban cartography resulted from concrete projects pursuing utilitarian ends, such as fortification or supplying fresh water. These utilitarian maps had two characteristics: they remained in manuscript (although printing increased throughout the century) and they were designed for official administrative use, thus explaining their limited diffusion. The types of representation used were the panoramic view, the oblique or bird-eye's view and, most frequently, the planimetric or orthogonal plan, which sometimes incorporated features from a nonvertical perspective. Such mapping was not meant for decoration; it often appears quite aesthetically austere.

Following enlightened policies of the century, Spanish officials directed their actions toward improving living conditions by modernizing cities through the establishment or modification of infrastructure, including communication networks, such as roads and bridges to facilitate travel, pipes and fountains to supply fresh water, sewage treatment and paving of streets for cleanliness and sanitation, lighting streets, and works to prevent natural catastrophes. Urban mapping reflected all