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Ulloa, Antonio de, and Jorge Juan. The cartography of eighteenth-century Spain and Spanish America was buoyed by the work of two individuals: Antonio de Ulloa (1716–95) and Jorge Juan (1713–73). Ulloa and Juan were in many ways emblematic of the changes that Iberian geographical sciences underwent during this period and were themselves catalysts for transformations in the various fields concerned with geography, cartography, and terrestrial measurement. Their experiences in Spanish America—and especially their participation in the Franco-Hispanic geodetic expedition to Quito—were crucial elements in their professional trajectories as they moved from being barely trained young naval officers on an overseas mission to becoming full-fledged scientists, administrators, and founders of some of Spain's most revered eighteenth-century institutions. Although the specific cartographic legacy left by Juan and Ulloa was actually quite limited in scope and diversity, the institutions they promoted and the instructions they penned did much to centralize geographical knowledge in Spain and its overseas territories in the eighteenth century and beyond.

A native of Novelda, near Alicante, Juan studied mathematics, astronomy, and the navigational sciences at the Academia de Guardiamarinas in Cádiz prior to accepting a commission to participate in the expedition to South America to determine the shape of the earth. He was joined on this expedition by the Sevillian-born Ulloa, who graduated from the same academy. The two officers participated in nearly all of the measurements undertaken by the Franco-Hispanic expedition, although their role was later embroiled in controversy when it came time to memorialize their activities on commemorative pyramids that were erected (and subsequently destroyed by Spanish authorities) near Quito in 1740 (Safier 2008, 23–56). Nevertheless, Juan and Ulloa published a full account of this geodetic expedition in the *Relacion historica del viage a la America Meridional* (1748) (fig. 876), which appeared before the accounts penned by their French colleagues, which included Pierre Bouguer's *La figure de la Terre* (1749) and Charles-Marie de La Condamine's *Journal du voyage fait par ordre du roi* (1751).

In cartographic terms, the *Relacion historica* was a rich document. It contained original, elaborate, and finely printed plans of Cartagena de Indias, Portobelo, Quito, Lima, Callao, Chiloé, and Valparaíso, as well as a map of the Incan ruins of Cañar (in southern Ecuador), charts of the Magellan Straits and Tierra del Fuego, and a series of plans showing the triangulation points that were used in the Viceroyalty of Peru to determine the shape of the earth. By allowing maps of Lima, Quito, and other Spanish American cities to be published in the *Relacion historica,* the Spanish monarchy signaled a new attitude toward the graphic representation of its territories, lifting the traditional veil of secrecy imposed over most of its American possessions since the earliest days of exploration and colonization of the New World.

Juan and Ulloa also penned the *Dissertacion historica, y geographica sobre el meridiano de demarcacion entre los dominios de España, y Portugal* (1749), a treatise laying out the official Spanish position on the border dispute that would culminate in the monumental, if ultimately ineffectual, Treaty of Madrid (1750). The 175-page text outlined a series of geographical errors made by the Portuguese and discussed the manner by which the Portuguese had manipulated the continent's history and betrayed tested political principles in order to claim a much larger swath of South American territory than allowed by the earlier Treaty of Tordesillas (1494). While the account was not illustrated with maps, it nevertheless showed that important textual accounts were often produced along with maps and charts, emphasizing once more that maps and the texts that accompanied them should not and cannot be conceived as separate spheres.

Returning to Spain, Juan was able to secure from Zenón de Somodevilla y Bengoechea, marqués de la Ensenada, a commitment for the construction of a royal observatory in Cádiz, which functioned in the following decades as an important center for astronomical and nautical activities and placed Spain alongside France


LAMINA XII.
Nueva, y Correcta
CARTA
DEL MAR PACIFICO Ó DEL SUR
el año de 1744
LIMA

and England in sponsoring institutions that supported instrument-based observations. Ulloa founded and was the first director of the Real Casa de Geografía between 1752 and 1755, and then accepted two important commissions in the Americas: as governor of the then-Spanish colony of Louisiana in 1768, and later in New Spain, where he carried out hydrographic and cartographic surveys along the Atlantic coast from Veracruz to Tampico (1777).

After returning from Paris, Juan occupied himself with a general map of Spain, a large cartographic project modeled on the Cassini *Carte de France*, referenced in a series of manuscript documents from 1753 that included a set of instructions for the production of maps of the peninsula. Although the map of Spain was not completed in his lifetime, subsequent geographical projects were deeply influenced by his writings, such as "Método de levantar y dirigir el mapa ó plano general de España," published posthumously in *Memorias sobre las observaciones astronómicas, hechas por los navegantes españoles en distintos lugares del globo* (1809). At the time this document was originally written, Spain was widely perceived as plagued by inferior conditions for the production of works of geography. In the words of Ensenada, Spain lacked even the most basic elements required for producing quality maps, thus concluding that the Spanish "ignore the true situation of the villages and their distances from one another, which is shameful" (quoted in Ruiz Morales and Ruiz Bustos 2005, 21).

The twin though sometimes divergent careers of Jorge Juan and Antonio de Ulloa ensured that subsequent generations did not suffer from similar circumstances. Their personal itineraries from Spain to the Americas and back reflected a circuit of practical Spanish geographical experience that inspired mapmaking across the Atlantic for decades to come.

NEIL SAFIER

SEE ALSO: Academies of Science: Spain; Boundary Surveying: (1) Portuguese America, (2) Spanish America; Geodetic Surveying: Spain; Lapland and Peru, Expeditions to; Madrid, Treaty of (1750)

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United States of America. The United States of America was created only in the last quarter of the eighteenth century. The significant cartographic innovations made within this new national context were barely developed by 1800; their full treatment is therefore found in volume 5 of *The History of Cartography*. Overall, mapping activities in the fledgling United States continued in the patterns of the colonies of British America, even as politicians and citizens rapidly expanded their use of maps in an effort to exert control over their new territories.

Peace with Britain, in May 1783, allowed the Continental Congress to address territorial matters. Individual states progressively ceded to the federal government their indiscriminate claims to western lands in return for precise grants, notably the Virginia Military Tract (1784) and Connecticut's Western Reserve (1786), both in what is now Ohio. The remainder constituted the new "public domain." The 1785 Land Ordinance defined how land in the southeastern corner of Ohio territory was to be divided up into a regular grid of townships, each measuring six miles on a side, before distribution to veterans of the Continental Army (fig. 877). In 1796, Congress extended this land division to the rest of the public domain. While Thomas Jefferson and others revealed an Enlightenment rationality in the creation of this regular system, its systematic ordering of the landscape also supported a religious impetus to construct moral communities on the frontier (DeRogatis 2003). Further Enlightenment ideas about the structure of the new republic were manifest in Pierre Charles L'Enfant's

(*facing page*)

FIG. 876. *NUEVA Y CORRECTA CARTA DEL MAR PACIFICO Ó DEL SVR*. This copper engraving from the *Relacion historica* (1748) covers territory stretching from Acapulco in the north to Cape Horn in the south and was compiled from reports and astronomical observations that were carried out several years earlier. Divided in the middle to show an extraordinarily lengthy stretch of Central and South America in one folding map, it was produced prior to the return of Juan and Ulloa but nonetheless published for the first time in their account, exemplifying the new openness Madrid expressed through the publication of maps and other textual materials regarding its South American colonies. The map is shown here rotated so north is at the top to facilitate recognition of the geographical outline of the western coast of South America. From Antonio de Ulloa, *Relacion historica del viage a la America meridional*, 4 vols. (Madrid, 1748), vol. 4, between 484 and 485.

Size of the original: 69.3 × 43.1 cm. Image courtesy of the Department of Special Collections, Memorial Library, University of Wisconsin–Madison.


PART of LAKE ERIE
OHIO RIVER
Great Plains of SCIOTO
SCIOTO RIVER
OHIO RIVER
THE INDIANA TRACT
PART OF VIRGINIA
A MAP
of the Lateral Territory from the Western Boundary of PENNSYLVANIA to the SCIOTO RIVER laid down from the latest Informations and divided into Townships and fractional parts of Townships agreeably to the Ordinance of the Hon.ble CONGRESS passed in May 1785.
A PLAN of the CITY to be built on the MUSKINGUM RIVER.
Scale of English Statute Miles
Longitude West from PHILADELPHIA

plan of open spaces and radiating avenues for the new capital of Washington, D.C. (Stephenson 1993).

The U.S. Constitution, ratified and fully adopted by 1789, defined the specific and limited ways in which the new federal government could take precedence over the states. The result was a fragmented territoriality: while states soon commissioned new surveys—or at least the preparation of large, detailed maps—of their territories (Ristow 1985, 73–149), the federal government necessarily focused only on the detailed mapping of the public domain. The commercial map trade exploded to meet the growing public interest in the territories of the states and the Union. Of special interest were the attempts to use geographical texts and maps in the overtly nationalistic promotion of a new "American" identity that would unite the otherwise distinct cultures of the individual states (Brückner 2006). Of the approximately 770 maps printed in North America before 1800, excluding reissues, 80 percent were printed after the ratification of the Constitution and 70 percent depicted U.S. territory (Wheat and Brun 1978).

The U.S. market for printed maps did not, however, take off until well after 1800 (Brückner 2017, 51–82). It took several decades for the originally distinct regional economies to break free of transatlantic flows of trade and capital and to meld into a national economy. British maps, and especially sea charts, continued to be imported. Indeed, with no more than sixty new maps being printed annually, on average, the cartographic ferment of the early United States was in large part focused on the management of new frontier properties and the continued dispossession of native peoples. Almost all maps, whether printed or manuscript, were produced for local consumption so that the regional variations within all cartographic modes evident in the colonial era persisted well into the nineteenth century.

MATTHEW H. EDNEY

SEE ALSO: British America; Revolution, American

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Urban Map.

URBAN MAP IN THE ENLIGHTENMENT
URBAN PLAN
URBAN VIEW

Urban Map in the Enlightenment. The urban map as a specific genre of cartographic production dates back to the late Middle Ages, when the city developed as an independent political entity with a precise border and cultural identity. In the Renaissance, after the rediscovery of Ptolemy, who decisively separated geography and chorography, the urban map was associated with the latter and therefore was supposed to use pictorial language. It was called "portrait" or simply "chorography." Despite this definition, the urban map was expressed in a variety of ways: from the rough two-dimensional map to the view made from observation to a scaled plan and to the perspective view and the perspective plan.

The invention of the perspective plan promulgated a new genre of publication specifically devoted to urban representation, the book or "theater" of towns whose last productions were issued in the eighteenth century: both in the derivative theaters by Pieter Mortier and Pieter van der Aa, who recycled old plates with new additions, and in the innovative theaters, experimented with by Homann Heirs. In the same period, the Ptolemaic distinctions were completely blurred by a more unified concept of mapmaking as the expression of scientific observation and measurement. This tendency led to an increase and predominance of the urban plan, considered to be a scientific product, an instrument necessary for acquiring an exact knowledge of the city and for any rational planning or embellishment program.

Nonetheless, the demand for urban views continued because they satisfied a desire for the visual elements that had been removed from the plan; however, views were perceived as totally pictorial artefacts, free from scientific

(*facing page*)
FIG. 877. MANASSEH CUTLER'S MAP OF FEDERAL TERRITORY IN WHAT IS TODAY OHIO. The eastern portion of *A Map of the Federal Territory from the Western Boundary of Pennsylvania to the Scioto River*, 1787, was based on Thomas Hutchins's survey of the Seven Ranges, the precursor of the U.S. Public Land Survey System, from 1785 to 1787. To the north of this region lay Connecticut's Western Reserve, to the west, the Virginia Military Tract. The writing in the area just south of Lake Erie designated lands allotted to Native American tribes. Size of the original: 66 × 49 cm. Image courtesy of the Geography and Map Division, Library of Congress, Washington, D.C. (G4081.F7 1785 .C8 Vault).

concerns of precise measurement, even in terms of their perspective construction. Their format and general compositional formulas changed to share the new language of the pictorial *veduta*. The city was presented as seen from a lower vantage point, as if with a wide-angle lens, including a great expanse of sky and surrounding fields. It was just this impulse toward the infinite and the continuous vista along the horizon that led to the invention of the most spectacular form of urban view, the panorama.

Even though the publication of town books decreased, the commercial fortune of urban maps did not diminish. Local history books and guidebooks increasingly included both views and plans. Mounted on loose sheets, large and expensive plans and views satisfied public institutions and private collectors who wished to garnish their palaces, while more modest production in single sheets was directed to the tourist market expanding to lower classes. The needs of the typical tourist to find their way inside the city encouraged the production of pocket or folding maps, pirated and reduced from larger-scale works. Adding alphabetic and numeric references on a squared grid helped to identify the places, streets, and alleys listed in the annexed index.

While the perspective plan ceased to constitute a relevant mode of urban map by the end of the eighteenth century, the practice of rendering prominent buildings in elevation on a two-dimensional plane endured and is still practiced today.

LUCIA NUTI

SEE ALSO: Cities and Cartography; Urban Mapping; Urban Planning and Cartography

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Urban Plan. The term "plan" was borrowed by urban cartography from the field of architectural drawing, where it means "the horizontal arrangement of the parts of a building or a drawing or diagram showing such arrangements as a horizontal section" (Fleming, Honour, and Pevsner 1998, 439). The English, German, and French *plan*, probably derived from the Latin *planus*, is connected to the concept of a flat surface, as happens in the Dutch *plattegronde*. The obsolete "groundplot" and the German *Grundriss* hinted rather at the layout. The Italian language employs a more specific term, *pianta,* which passed to the Spanish and Portuguese *planta*. It was possibly coined by Raphael within an anthropomorphic vision of architecture: the plan is to a building what the sole of the foot (*pianta*) is to the human body (Raphael 1840, 32).

The urban plan distinguishes itself from all other two-dimensional maps as an abstraction rigorously constructed through a metrical code, as made clear by the scale, displayed in a verbal or linear form, ranging from ca. 1:2,000 to ca. 1:10,000. Thus, it is sometimes referred to as a "geometric plan" (Boutier 2002, 34–40).

Known and used since antiquity, the plan was revived as an urban representation mode in the sixteenth century (e.g., Imola by Leonardo da Vinci, ca. 1502; Rome by Leonardo Bufalini, 1551; and Vienna by Augustin Hirschvogel, 1552). In the same period, however, the perspective plan, which combined the measured plan with perspective elevation, found unrivaled fortune in the market. The urban plan was obscured as a commercial product and its use restricted mainly to military surveys kept secret in local archives.

During the seventeenth century, while perspective plans held sway, the first signs of a change appeared on them. The imaginary point of view rose higher and higher to the zenith, making the layout of each city clearly legible, while the buildings were rendered by isometric projection; the scale was sometimes displayed at the bottom. Adjectives like "exact" and "accurate" replaced the outdated "lifelike" and "true" in map titles, dedications, and legends, stressing the geometric qualities of the representation based on observation and measurement (e.g., Matthäus Greuter, *Disegno nuovo di Roma . . . in pianta esatta* [exact plan], 1618; Claes Jansz. Visscher, *Amstelodamum . . . formâ planâ* [flat form], ca. 1623; see fig. 173). The same term "plan" was strengthened by "geometric," "topographic," or, quite pleonastically, "ichnographic." The last adjective (sometimes misspelled as "iconographic") revealed a scholarly desire to quote Vitruvius, who used the Greek term *ichnographia* to mean the ground plan of a building (*De architectura*, 1.2.2).

In the second half of the century three valuable hybrid urban maps appeared, in which a large part of the city is rendered in plan together with perspective elements: Wenceslaus Hollar, *A Map . . . of London*, 1666; Jacques Gomboust, *Lutetia Paris*, 1652; and Daniel Stalpaert, *Amstelodami,* ca. 1670. These maps were not designed for mere contemplation of the existing city, but to provide detailed information for use in more rational urban planning.

Prominent three-dimensional buildings continued to appear in the plans; it seemed hard to surrender their visual appeal, especially when the maps conveyed a propaganda message, such as the plan of St. Petersburg, *Stolichnoy gorod S. Peterburg* (Ivan Truskott, 1753), which presented the new Russian capital to the European world. But in 1676, John Ogilby and William Morgan published *A Large and Accurate Map of the City of London*, possibly the first large printed urban plan with no perspective detail.

Not until the eighteenth century, however, did the plan surpass the perspective plan as a mode for urban representation, becoming available to a wider market as it satisfied the demand of private collectors and public institutions who required artifacts that displayed both scientific accuracy and artistic skills for embellishment of their palaces. Charles II recommended Morgan's 1682 map of London (see fig. 884) to the universities "to sett up in their Respective Halls or other Publique Roomes" (Glanville 1972, 29).

Large multisheet eighteenth-century urban plans were engraved after years of careful surveying using the most recent instruments and trigonometric techniques. Preliminary works included: John Rocque, *A Plan of . . . London* (1746) (fig. 878); Richard Horwood, *Plan of . . . London* (1792–99); abbé Jean Delagrive, *Nouveau plan de Paris* (1728) (fig. 879); Giovanni Battista Nolli, *Nuova pianta di Roma* (1748) (see fig. 609); Giovanni Carafa, duca di Noja, *Mappa topografica . . . di Napoli* (1775) (fig. 880); and Antonio Espinosa de los Monteros, *Plano topografico . . . de Madrid* (1769) (see fig. 927).

While the perspective plan aimed at a lifelike appearance, the urban plan was directed by exact observation and measurement. The claims of mathematical precision and scientific methods are widely stressed in titles and writings on the maps, as well as in explanatory pamphlets and published advertisements. The methods used were extensively documented, sometimes verified by influential supporters as eyewitnesses, such as Martin Folkes (president) and Peter Davall (secretary) of the Royal Society, who guaranteed the work of John Rocque and John Pine (*An Alphabetical Index* 1747, vi).

Although their recommendation was not fully supported by the results, the claims to absolute accuracy were due not to new methods but to the improved measuring instruments already in use and to the system of cross-controls, methods already used in topographical surveying. The first step was a survey on the ground with measurements of distances and angles taken with chain and compass. In northern Italy, cadastral surveys used the plane table, introduced and considerably improved by the mathematician Johann Jakob Marinoni (see fig. 399). Its use became very widespread, its merits even acknowledged in the *Encyclopédie*, where the *planchette* is described (La Chapelle 1765). Measurements on the ground were combined with trigonometric calculations from high points such as church steeples or towers. The multiplication of such elevation points allowed the map to achieve a new level of exactitude. From the sixteenth to the eighteenth century, the distortions in the plans of Paris dropped from more than 40 percent to 6 percent (Boutier 2002, 31).

The concept of exactitude was not the same everywhere. London mapmakers came from a long tradition of estate surveying, strengthened by the experience acquired in the rebuilding after the great fire of 1666. Paris mapmakers relied on a good geographic education and practice in methods of cartographic compilation. Guillaume Delisle was possibly the first to maintain that any reliable plan of the capital should be oriented along the meridian, with north at the top. Consequently, the urban plan entered the domain of mathematics, geography, and astronomy. The Ptolemaic division between chorography and geography, which had dominated the Renaissance, was totally eclipsed (Boutier 2002, 20–21).

Exactitude was also regarded as evidence of superiority, fueling a competition between London and Paris over mapping methods and the geographical extent of the two capitals. Delisle had raised the question in a presentation published in 1727 in *Histoire de l'Académie royale des sciences (Mémoires)* and had proposed an answer (Boutier 2002, 20). In 1746, John Rocque introduced his survey of London with this statement: "The Point of Comparison may be now fixed by any unprejudiced Examiner. . . . greatly in Favour of *London*, not only with Respect to *Paris*, but to all the other great Cities in the World, Antient and Modern" (*An Alphabetical Index* 1747, III–IV).

Since there was no public official appointed for urban surveys at the time, the task was carried out by experienced but private technicians who could not sustain by themselves the considerable costs of a large survey. Gomboust seems to have been commissioned by Louis XIII through his chancellor Pierre Séguier. Samuel Pepys's diary from 22 November 1666 describes a similar situation for Wenceslaus Hollar: "the King hath commanded him to go on with his great map of the City, which he was upon before the City was burned, like Gombart [*sic*] of Paris, which I am glad of" (Pepys 1953, 2:365–66). Unfortunately, Charles II did not provide material support, and after seven years of work Hollar was in debt. His "great map" was never published (Hyde 1976). Espinosa's plan of Madrid, dedicated to Pedro Pablo Abarca de Bolea, conde de Aranda, minister of the king of Spain, also seems to reveal an official commission.

In England, support through subscription became very popular up to the early nineteenth century. The subscribers, whose names were usually published in accompanying pamphlets containing the indexes to the maps, could range from the king himself, as the engraving in the Morgan map (1682) depicts, to princes and dukes, public offices and corporations, parish vestries, and educated men and women. It is quite obvious that the biggest subscribers determined the subjects to be depicted, be they estate owners, as for Rocque's plan, or the Phoenix Assurance Office, to which Horwood's plan is dedicated. In France, Delagrive was possibly the first to launch a subscription for his Paris plan, even advertising

FIG. 878. JOHN ROCQUE, *A PLAN OF THE CITIES OF LONDON AND WESTMINSTER, AND BOROUGH OF SOUTHWARK*, 1746. A plan in twenty-four sheets from a survey of the cities and borough with contiguous buildings, engraved by John Pine. London: J. Pine and J. Tinney. Size of the original: 203 × 386 cm. Image courtesy of the Geography and Map Division, Library of Congress, Washington, D.C. (G1819.L7 R6 1746 Map Vault).

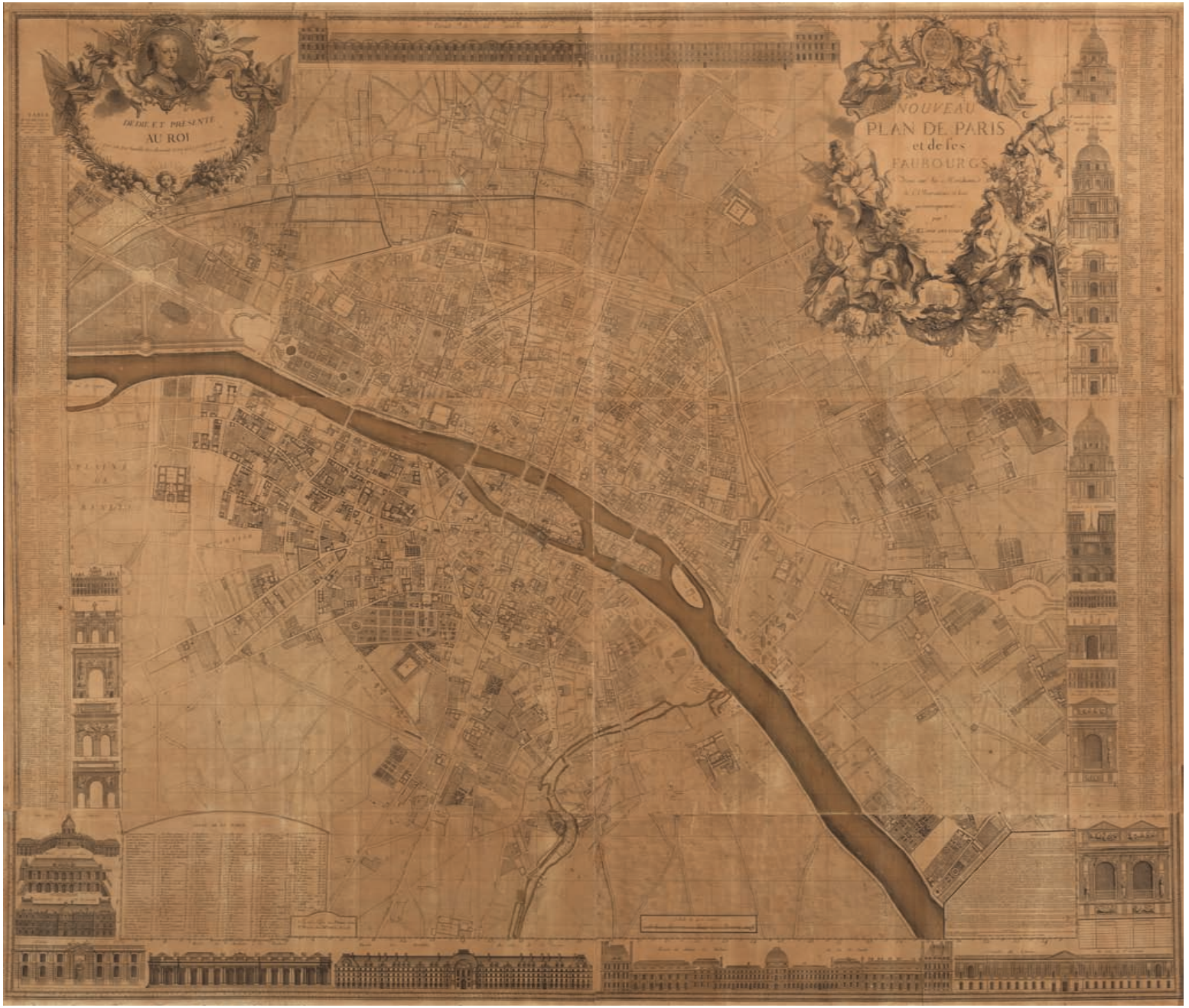

FIG. 879. JEAN DELAGRIVE, *NOUVEAU PLAN DE PARIS ET DE SES FAUBOURGS DRESSÉ SUR LA MERIDIENNE DE L'OBSERVATOIRE ET LEVÉ GEOMÉTRIQUEMENT,* 1728. Paris: L'auteur, Cloître Saint Benoît. Size of the original: 155.5 × 194.0 cm. Image courtesy of the Bibliothèque nationale de France, Paris (Cartes et plans, Ge A 1401).

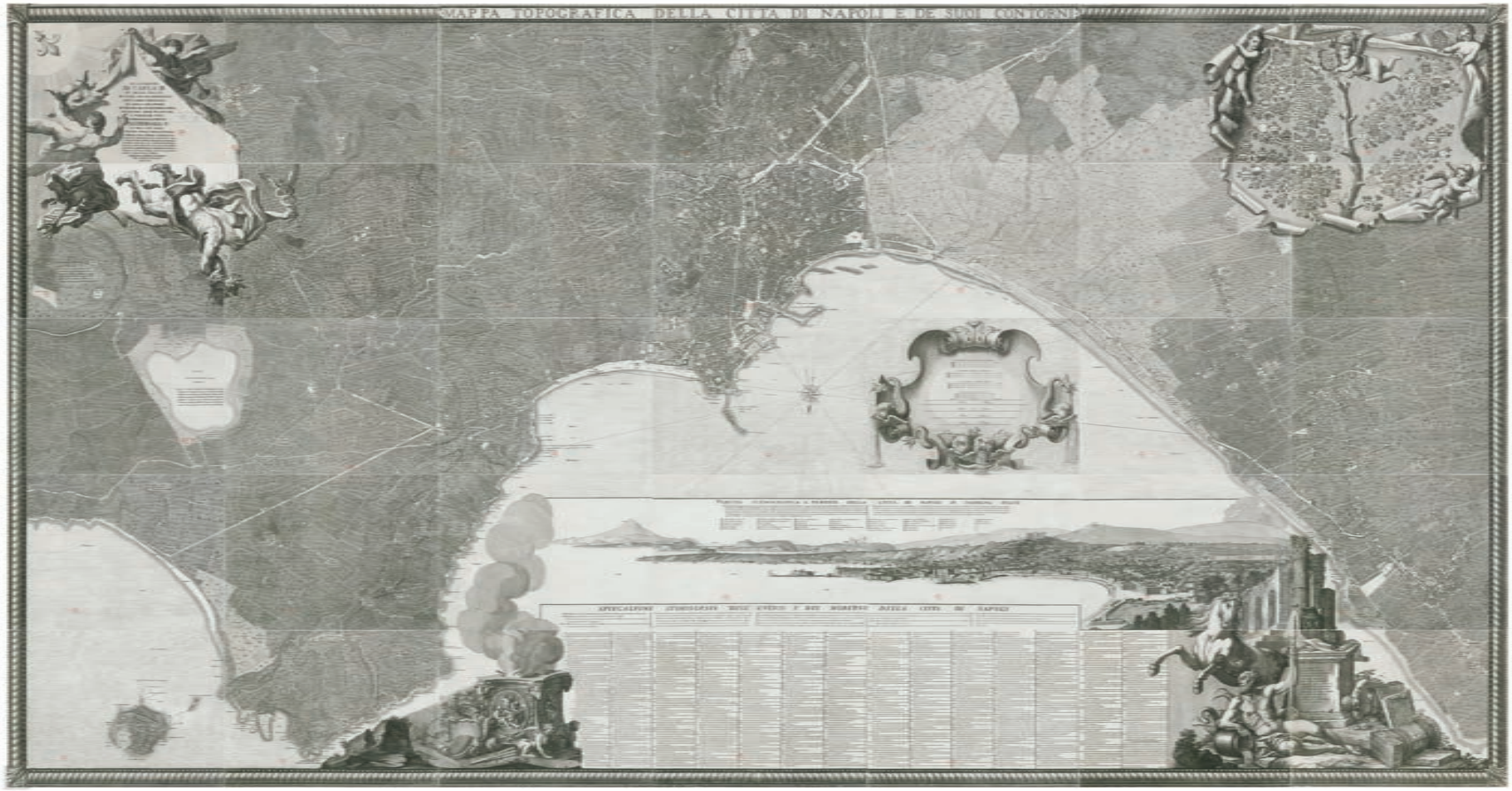

FIG. 880. *MAPPA TOPOGRAFICA DELLA CITTÀ DI NAPOLI E DE SUOI CONTORNI,* 1775. Copper engraving on thirty-five sheets; 1:2,000. This monumental map (often referred to as the Duca di Noja map of Naples) was the Neapolitan answer to Nolli's map of Rome (see fig. 609). It was intended by its patron, Giovanni Carafa, duca di Noja, as an essential instrument for administrators to develop programs of reform and social improvement.
Size of the original: 237.5 × 502.0 cm. © The British Library Board, London (Cartographic Items Maps 184.a.1).

across the Channel in the May 1727 issue of the *New Memoirs of Literature* (Boutier 2002, 240)

In other countries the subscription system failed or was not practiced at all. In Italy, Nolli's project began as a subscription promoted by a society of antiquarians but ended as a joint venture between Nolli himself and a Milan banker. Elsewhere, the financing came from local patrons, wishing to update the image of the city in their name, or, at best, to offer the plan as a valid instrument for a future program of urban and social improvements, as Carafa explained in his *Lettera ad un amico* (1750).

It would be completely misleading to assume that the "geometrically exact" plan provides an objective or impartial image. The urban plan can be just as selective as the perspective plan, by including some information and omitting other. The use of points and lines or stylized symbols instead of visual illustrations does not diminish the subjectivity of the operation. On the material structure of the city are superimposed lines arranged to outline the immaterial structure of administrative, religious, or social entities, or to define projected works, or to provide an astronomic grid or the simple squared grid where reference letters and numbers identify even the smallest alleys and courts. The result is a sophisticated image, which allows different levels of reading and interpretation.

In London plans, wards and parish boundaries are recorded; Paris plans show the limits of the quarters by which troops were organized. Lines inside the city blocks in Horwood's plan delineate each house, also identified by a number, as Parliament decreed, but the system was incomplete on the map, as it was at the time. Similarly, in Madrid, numbered tiles were applied to each house. In Espinosa's plan, based on the existing cadastral survey, lines marked the administrative structure, Roman and Arabic numbers marked the city blocks and the houses, while letters and colored margins identified the quarters, as the legend explains. Lines and dots also outline the buildings that were to be demolished to make way for new squares and avenues.

Nolli's map of Rome, designed to satisfy antiquarian interests, boasted the unique feature of not only showing the surveyed contemporary buildings, but also the re-creation of ancient ones, completing fragmentary ruins based on surviving documents and archaeology. He provided a diachronic image of the city, where the marvels of the present and the past were indissolubly linked.

When urban plans were engraved and marketed, they had to meet the demands of buyers interested in ornamental objects. Thus, some three-dimensional features, such as bridges and ships, or small hardly perceptible details continued to be shown. To satisfy the demand for a visually rich product, decorative schemes framed the map or filled the margins, including views of monuments, prospects of the city, portraits of monarchs, allegorical compositions, and coats of arms.

The urban plan itself, however, boasted its own aesthetic values, depending on the quality of the engraving or etching. Before the introduction of color printing, the plan was a triumph of grey tones, modulated by a great variety of signs: vertical and horizontal shading, differentiated stippling and intensities categorizing buildings, blank surfaces, and symbols. Thus with a palette of grey animating the flat surface, the urban plan rendered cities in a variety of textures.

LUCIA NUTI

SEE ALSO: Cities and Cartography; Military Map: Fortification Plan; Topographical Survey Map; Urban Mapping

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FIG. 881. GIUSEPPE VASI, *PROSPETTO DELL'ALMA CITTÀ DI ROMA VISTO DAL MONTE GIANICOLO*, 1765. Copper engraving from twelve plates. This view, engraved by the author as an appropriate conclusion to his views of modern Rome, was one of the last old-style scenographic views to be launched on the market. Size of the original: ca. 102.5 × 263.0 cm. Image courtesy of the Getty Research Institute, Los Angeles (Acc. No.: 2001. PR.2*).

Urban View. The term "view" has its equivalent in many modern languages: *vue*, *vista*, *Prospect/Ansicht*, *veduta/prospetto*. It still means "portrait of a site taken from life," as it did in the eighteenth-century definition of the *Dictionnaire des arts* (Watelet and Lévesque 1792, 5:832).

During the eighteenth century, the urban view attained its stature, finally acknowledged as an independent category of painting. It assumed the Italian name *veduta* and developed within the pictorial genre called *vedutismo*, alongside the landscape view and the *capriccio*, a pictorial invention where fantastic and realistic elements are mingled. Yet as a cartographic mode of urban representation, the view dates back to the end of the fifteenth century (Florence, attributed to Francesco Rosselli, ca. 1471/82), when artists pursued new standards of naturalism, and the demand for a direct relationship with reality became a must for any figurative expression.

City portraits, drafted from observation, developed during the seventeenth century according to two different visual cultures. The profile view, rooted in northern Europe, was taken at a distance, from a very low viewpoint at ground level, thus embracing a wide, open horizon. Though limited as a description of an entire city, the profile view could be artificially expanded into a long, continuous view by assembling several views taken from different viewpoints. The oblique view, practiced in Italy, was drafted from an elevated viewpoint that allowed less extension of breadth but greater depth. In order to show even more of the urban fabric, direct observation was integrated using measurements from instruments and perspective devices. The artifice became total with the creation of the perspective plan. Although more generally known as the bird's-eye view, this rendition should not be properly called a view, because there is no real viewpoint from which it is generated. However, as a mode of urban representation, the perspective plan was increasingly popular.

In the eighteenth century the perspective view developed decisively into two forms: the geometrical and the pictorial. Projections and measuring instruments became the prerogatives of surveyors, who aimed at exactness in the former. In the latter, the view was perceived as a totally pictorial artifact, free from scientific concerns of measurement and verifiability, and the city became a subject of its own in the array of subjects for painters. Once it broke with rules of perspective construction, the view seemed to claim greater freedom in its relationship with reality, yet did not give up presenting itself as a reliable documentation of the city.

Cultured amateurs used microscopes, telescopes, and spyglasses widely, for purposes beyond the mere scientific, as they had previously used other measuring instruments. Accustomed to dividing work into squares or using perspective points, artists were fascinated by the new possibilities offered by magnifying lenses and became increasingly familiar with the camera obscura, which allowed a brighter vision across a wide horizon and an emphasis on details, thus replacing complex geometric constructions of perspective with the much simpler act of framing and tracing an image reflected on a plane. As Francesco Algarotti put it, the camera obscura "is in great use among the most famous painters of views; otherwise they couldn't represent things so astonishingly naturally" (Algarotti 1764–65, 2:154).

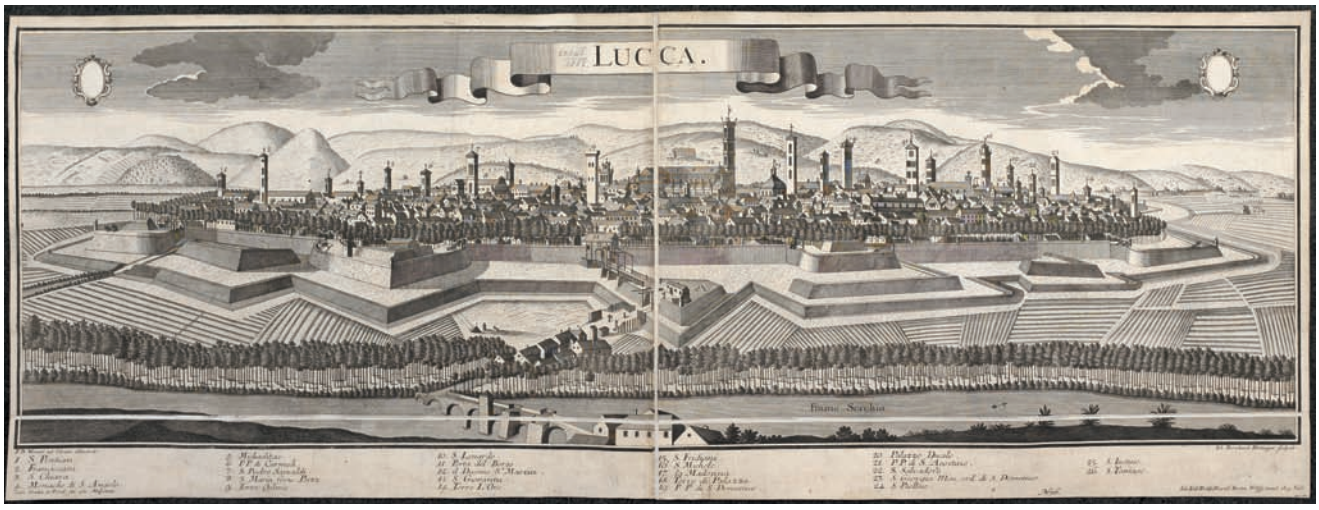

FIG. 882. FRIEDRICH BERNARD WERNER, *LUCCA*, 1729. Werner's popular views are the best examples of the eighteenth-century compositional formula for city portraits. © The British Library Board, London (Cartographic Items Maps *22148[1]).

FIG. 883. FREDERICK BIRNIE AND HENRY ASTON BARKER AFTER ROBERT BARKER (PAINTER), *PANORAMA OF LONDON*, 1792–93. Robert Barker's original panorama was painted in distemper on canvas and rendered in aquatint in six plates by Birnie after sketches made by Barker's son Henry Aston. The panorama looks north across Blackfriar's Bridge toward St Paul's Cathedral. The panorama was a completely new form of urban view that was created and patented on the threshold of the nineteenth century.
Size of the original: 49 × 342 cm. Image courtesy of the Yale Center for British Art, New Haven (Paul Mellon Collection, folio B D 5).

Freed from the limits and distortions of the perspective system, artists also had to beware of distortions and errors resulting from the use of optical aids. Undoubtedly, these instruments influenced the ultimate look of the urban view, and lesser artists modeled their efforts on the work of major producers, such as Gaspar van Wittel.

As the outstanding intermediary between Dutch and Italian traditions, Van Wittel is the most important of the artists who created the language of the eighteenth-century urban view. Trained as a surveyor, he moved to Italy in 1674, where he made a career by painting valuable city views commissioned by popes, kings, and notables of many different countries. His views encompassed wide lateral extensions, with a base twice as wide as the view was high. The texture of the city and its architecture, the color and shade of the urban fabric, the features of the landscape—such precise details offered the beholder a lifelike, almost photographic, appearance.

Despite the increasing success of the urban plan, the view was not entirely abandoned as a mode of urban representation for topographic concerns. There was a continued demand for the visual component absent from the urban plan; thus, the view enjoyed a new popularity. Only the format and general compositional formulas changed to share the new language of the pictorial *veduta* and the new trends in taste. The city was presented from a lower vantage point, within a wide-angle frame that included a great expanse of sky and surrounding fields. The new standards are apparent even in the late eighteenth-century attempts to reintroduce the grand style of perspective view, such as the *Prospetto . . . di Roma* (fig. 881).

The expansion of the Grand Tour in the eighteenth century encouraged production and trade of views. The Grand Tourists, whose habits included drawing from life, were enthusiastic buyers and collectors of drawings and engravings. Moreover, their increasing interest in archaeology and history stimulated the printing of illustrated books as well as guidebooks, where urban views appeared in both large and small formats. An extremely favorable market allowed the development of serial compilations, dedicated to single regions or countries, whose views were published separately, on single sheets, in a standardized format with general features in order to be bound into a uniform document.

Friedrich Bernard Werner, a Bohemian scenographer trained in military engineering, was a prolific draftsman of views of Central Europe and Italy, which, when engraved, enjoyed great popularity. Helped by the camera obscura, he framed the city as the new standards of realism required, putting the title, i.e., simply the name of the city, at the top in a ribbon and a detailed legend at the bottom. Yet he could not refrain from shaping all the architectural elements of bell towers, domes, and palaces with Nordic proportions and features, even for the Italian cities (fig. 882).

In England, support from the Society of Antiquaries promoted the blanket production of city portraits. The brothers Samuel and Nathaniel Buck started a serial production, sketching their pencil drawings from life and passing the work to their staff to be completed and engraved. From 1721 to 1753 they successfully published some one hundred views of towns in England and Wales, financed by local subscriptions (Hyde 1994).

In general, urban views were marketed as single images or in composite sheets, offering combinations that had already been developed in the seventeenth century in the Netherlands. An overall prospect would be framed by views of the monuments on one sheet, or a set com-

bining plans, profiles, and global and partial views with the various components printed from separate plates, so the whole, or only some parts of it, could be assembled according to demand.

At the very end of the eighteenth century, the hunger for visualizing an ever wider expanse of space led to the creation of a completely new form of urban view, the spectacular panorama. It may be considered the latest response to the long-held desire for a continuous view along the horizon, described by the term purposely coined from the Greek words *pan orama* (an all-embracing vision). In fact, *La nature à coup d'oeil* was the name given to the first panorama of Edinburgh by Robert Barker, who patented the invention in 1787. He drafted different sketches from a single elevated point and joined them together to produce a continuous vista in a sequence arranged on a cylindrical surface. Later, he enhanced the striking effect of the image by providing special viewing conditions: the large-scale cylinder image was displayed in specially designed and illuminated buildings, such as one built in Leicester Square (fig. 883).

Technically, the panorama took advantage of newly available devices, such as the perspective frame, the camera obscura, and later the photographic camera itself. Illusion was the purpose of the perspective plan in representing the city in one static glance from one imaginary point above it in the sky. The ultimate goal of the panorama was the illusion of an eye in motion. This explains its success as popular entertainment. The London *Times* of 10 January 1792 stressed this aspect in advertising the exhibition of the London panorama: "The observers of this Picture being by painting only deceived as to suppose themselves on the Albion Mills, from which the view was taken" (Pragnell 1968, 12).

Conceptually, the panorama owes something to both perspective plan and profile view, but it also diverges from both. The vantage point is a single elevated one and purposefully chosen, as in the perspective plan. The vision unrolls in a time lapse at a constant eye level, as in the profile, but a significant change occurs in the way the object is focused. The observer becomes integral to the object and inspection is made from inside the city, rather than from a distance. The circular frame of the visual horizon swallows the urban shape, while the urban body is enlarged and projected toward the infinite.

LUCIA NUTI

SEE ALSO: Art and Design of Maps; Cities and Cartography; Topographical Survey Map; Urban Mapping

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Urban Mapping.

Urban Mapping in the Enlightenment. Urban mapping is the observation, measurement, and representation of the organization and nature of an urban place at medium to large scale. Rendering the city in plan or view reflected an informed choice rather than any evolution of skills, techniques, or instruments. The shift away from the dominance of the oblique view or perspective plan in various forms to the geometric urban plan as the representation of choice has been described by some as an evolution of the view into the plan, or a progress from the pictorial to the abstract, or as a conquest of science over art, or the measured over the pictorial. Yet since antiquity and certainly during the Renaissance, the techniques of rendering the limited space of the city as either a view or a plan were known and employed equally by artists, draftsmen, architects, surveyors, engineers, and geographers (Ballon and Friedman 2007). The view and the plan served different purposes and met different needs, depending on the context of production. Although measuring and observation instruments improved and the use of magnifying instruments increased, no new instruments, discoveries, or techniques played significant roles in the urban mapmaker's work; the continuous improvement of instrumentation allowed for increased accuracy in measurement, which affected both the veracity and verifiability of both the plan and the view. The complex intersection of the needs of the instigators of urban projects, the skills of the producers, and the map reading abilities of the anticipated audience for such endeavors all help to explain the choices of representation, as explored below.

In the period of the Enlightenment, as in earlier periods, urban representation relied on the techniques and instruments of direct observation and measurement of townscapes, buildings, surrounding environment, and urban infrastructures such as roads, bridges, waterways, walls, and entry gates. These techniques and apparatuses were similar to those used on other larger-scale modes of cartography, such as topographical surveying, boundary surveying, property mapping, geodetic surveying, and some aspects of military mapping (especially fortifications).

Like property maps, urban maps were often drawn at very large scales, with some as detailed as Johann Jakob Brenner's map of Bern at ca. 1:200 (1757–65) and the thirty-four sheet plan of Geneva at ca. 1:240 (1726; see fig. 934). During the long eighteenth century, scales for urban maps in general ranged from ca. 1:400 to ca. 1:25,000, with the majority of detailed plans and views drawn at ca. 1:1,800 to ca. 1:2,200. The scale at which the map was created determined the medium in which it was disseminated: very large-scale maps usually remained in manuscript, especially if they were designed for administrative or military purposes. If printed, large-scale maps often became large multisheet wall maps, frequently with decorative frames, illustrated borders, and cartouches, intended for public display. Such decorative wall maps employed representations in either plan or view, or a combination of both. Well-known large wall maps drawn in plan include those of London (John Rocque, *A Plan of the Cities of London and Westminster,* 1746; see fig. 878), Rome (Giovanni Battista Nolli, *Nuova pianta di Roma*, 1748; see fig. 609); Vienna (Joseph Nagel, *Grundriß der Kayserlich-Königl.[en] Residenz-Stadt Wien,* 1780–81; see fig. 888), and Madrid (Antonio Espinosa de los Monteros, *Plano topographico de la villa y corte de Madrid*, 1769; see fig. 927). Large perspective plans competed for wall space, too, in Paris (Louis Bretez, *Plan de Paris,* 1739; see fig. 174) and Vienna (Joseph Daniel von Huber, *Scenographie*; see fig. 889). The plan and view were occasionally combined, as in the case of the ichnographic *London &c. Actually Survey'd* by William Morgan (begun by John Ogilby), with its optional pendant of *A Prospect of London and Westminster* (fig. 884) (Howgego 1978, 62–64), and the *Mappa topografica di Napoli,* sponsored by Giovanni Carafa, duca di Noja, which incorporated a scenic view of the city (1775; see fig. 880). Maps at smaller scales (1:10,000 to 1:25,000) were often printed in one, two, or four sheets and were intended for wider dissemination and popular consumption.

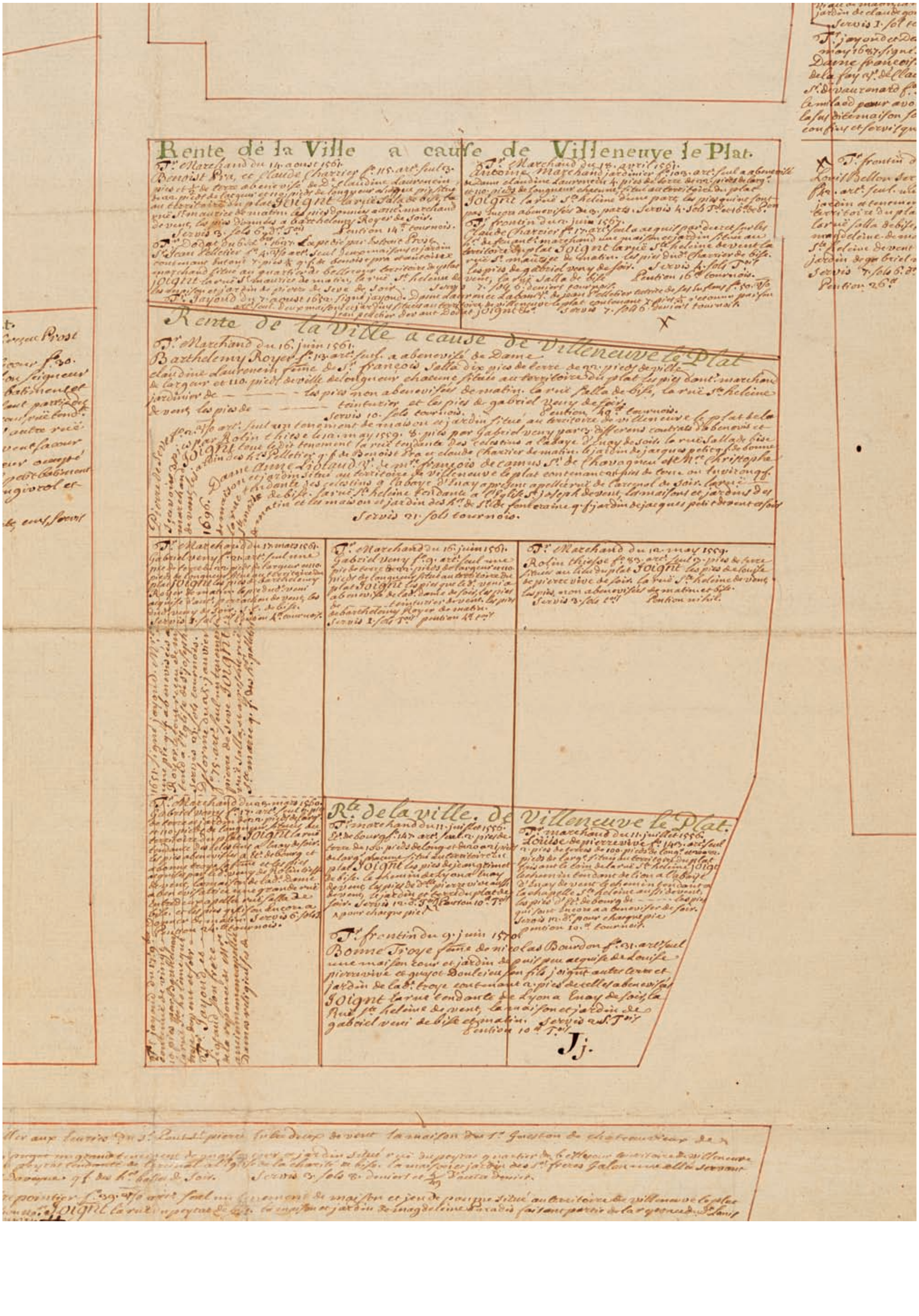
While the most well-known urban maps tended to represent the cityscape of large towns (in France and

FIG. 884. *LONDON &C. ACTUALLY SURVEY'D* [AND] *A PROSPECT OF LONDON AND WESTMINSTER,* 1681–82. View of London and Westminster, produced in conjunction with a twelve-sheet map of London, both by William Morgan. The plan of London was based on a larger-scale map by Morgan and John Ogilby published in 1676. The 1681–82 map shown here was assembled with a new title and available with or without the view, according to an advertisement in the *London Gazette* of 19–23 January 1682. Hand-colored copper engraving.
Size of the original: 153 × 244 cm. Image courtesy of Det Kgl. Bibliotek; The Royal Danish Library, Copenhagen (KBK London-0-1682).

Switzerland, towns with populations of about 10,000 or more), the size of a town as a determinant of mapping was a concept relative to overall population, as will be clear in each of the regional entries. Thus in Sweden and Finland, Denmark and Norway, Italy, and Great Britain, the mapping of small towns (populations under 2,000) was not uncommon. A useful reference for scholarship on a wide range of European cities may be found in the work of Jean Boutier (2007, 404–29).

The graphic representations usually employed in Enlightenment urban mapping were variations of the urban view and the urban plan. The view persisted in the oblique or cavalier (e.g., Henri Verdier, "Vue cavalière de la Guillotière," 1697; Bruyère, Chiron, and Dureau 1997, pl. 8.1), the prospect (e.g., Giuseppe Vasi, *Prospetto dell'alma città di Roma,* 1765; see fig. 881), the profile (e.g., João Francisco de Souza e Almeida, "Prospeto da cidade da Bahia," 1782; see fig. 923), and, late in the eighteenth century, panoramas (e.g., Frederick Birnie and Henry Aston Barker after Robert Barker, *Panorama of London*, 1792; see fig. 883). The perspective plan, a combination of geometric plan and perspective drawing, so popular in the Renaissance, continued to hold its appeal as it was simultaneously accessible and astonishing, ensuring a maximum impact for the celebration of the city. Yet the orthogonal plan, confined largely in the earlier period to military mapping, came to be the more frequent choice of the urban cartographer for reasons explored below. Finally, the city could also be represented not graphically but verbally, in a manner that arranged textual information spatially on the page (fig. 885).

Urban projects manifested various cultural contexts and requirements. Throughout the Enlightenment, increasing military needs for border fortifications and defensive architecture concentrated on urban spaces, either newly created or newly fortified, especially evident in


Rente de la Ville a cause de Villeneuve le Plat.
Sr. Marchand du 14 aoust 1561.
Benoist Pra, et Claude Charrier
Servis 3. sols 6. dr. Tois
Pention 14tt tournois.
Sr. Marchand du 18. avril 1561.
Antoine Marchand jardinier
Sr. frontin du 17. juin 1567.
Claude Charrier
Pention 16tt tournois.
Rente de la ville a cause de Villeneuve le Plat
Sr. Marchand du 16. juin 1561.
Barthelemy Royer
Servis 10. sols tournois.
Dame Anne Liotaud
Servis 21. sols tournois.
Sr. Marchand du 17 mars 1561.
Gabriel Veny
Sr. Marchand du 16. juin 1561.
Gabriel Veny
Sr. Marchand du 12. may 1559.
Robin Thiese
Rte. de la ville. de Villeneuve le Plat.
Sr. marchand du 11. juillet 1556.
Louise de pierrevive
Sr. frontin du 9. juin 1570
Bonne Troye fme de nicolas Bourdon
Jj.

the colonial settings of European nations. The military engineers who planned, drew, and supervised these constructions were trained to create images for their work in plan, elevation, and view. The dominance of military cartography in urban planning and mapping permeates the regional essays that follow this entry.

With the growth of cities in this period, both on the continent and in colonial regions, civic administrators became increasingly concerned with aspects of the city that affected communications (streets, roads, entrance and egress through city gates), public health (access to water; sewage control) and safety (maintenance of streets, roads; street lighting), and risk management (flood and fire control). Administrators also saw potential revenues from the taxation of urban properties; urban plans helped the quantification of such revenue as cadastral registers relied increasingly on the graphic imagery of the map (e.g., the Catastro de Ensenada, 1749–56). Legal disputes over property boundaries and other jurisdictions also created a demand for urban mapping. Most important for the eighteenth century, administrators used urban maps, particularly the large-scale plans, as a tool of reform as they encouraged designing new neighborhoods, redistricting for increasing population and for maintaining public order, numbering houses, building new structures, and planning for urban expansion and beautification in the form of plazas, gardens, and other public spaces. The reform movement is exemplified in Carafa's *Mappa topografica di Napoli* (1775) and Francisco Dalmau's *Mapa topográfico de la ciudad de Granada* (1796) (see fig. 928). Dalmau's request for civic support of the Granada map argued strongly for the role of urban mapping as a tool of transformation.

Another cultural encouragement of urban mapmaking emanated from local worthies (city councils, merchants, imperial and ducal overseers) concerned with the city's image. Maps served to glorify the city as a microcosm of civic values, to celebrate its beauty, or to commemorate a significant moment in the city's history, a holdover of Renaissance treatment of the city as emblematic of magnificence. The eighteenth-century extension of this desire may be found in utopian schemes for urban space. Here the view and the plan served different agendas. While the urban view offered the aesthetic pleasure of a portrait drawn from life, revealing as it did the accumulating problems the medieval city faced with growth, geometric plans revealed solutions to these problems by envisioning the creation of an Enlightenment city of alignment and attractive features, as discussed by Voltaire in *Des embellissements de Paris* (1749).

The orthogonal plan also served the historian interested in the urban past. Nolli's *Nuova pianta di Roma* was initially designed to meet the needs of antiquarians who wished to locate ancient and medieval remains in that city. In the text accompanying his *Tablettes Parisiennes* (1760), Didier Robert de Vaugondy urged urban surveyors to note ancient walls and other structures in order to enhance understanding of the city's long life (Pedley 1992, 105–8).

The economic fortunes of the city rested on commerce and the changing nature of tourism: pilgrims and travelers were replaced by the culturally curious, the antiquarian, the naturalist, and the scientist and academic with historical interests. Wayfinding urban maps for tourists and other visitors promoted the clarification of the network of streets, the identification of buildings or the remains of buildings, the vestiges of earlier elements of the city's built environment. Civic leaders responded to these demands with improvements to the infrastructure (street signs, access to water, road planning), and mapmakers responded by adding to urban plans street names and alphanumeric indexes for locating important landmarks.

The financing of urban mapping by civic organizations, state institutions, the military, and distinguished patrons may be found in local archives, although the evidence is often widely scattered. Superficial knowledge may be gleaned from information contained in the legends of printed maps, and, in some cases, the subscription list and prospectus provide further details of funding. Titles and signatures may reveal the names of the authors (mapmaker and engraver, sometimes one confused for the other, sometimes one and the same) and the dedicatee, but little more. However, since the operations required to produce a map, such as surveying, preparing a manuscript, and engraving for publication, were long, labor intensive, and therefore costly, the problem of financing was fundamental. Public authorities of the region or the city were often invited to contribute financially because of their vested interest in a map that could facilitate city administration. However, in cases where public monies were not forthcoming, mapmakers became businessmen, searching to raise capital from other sources, often turning to subscriptions.

(*facing page*)
FIG. 885. DETAIL FROM A *CARTE TERRISTE* OF VILLENEUVE LE PLAT, LYON, FRANCE, [CA. 1732]. This example of a large-scale verbal map sets out a chronology of property ownership and income liabilities as text placed within the spatial arrangement of the area. Manuscript, brown ink. Size of the entire original: 175 × 92 cm; size of detail: ca. 37.5 × 28.0 cm. Photographic credit: Gilles Bernasconi. Image courtesy of the Archives municipales, Lyon (DD 207, Pièce 11).

The creators of urban maps, as with other modes of large-scale cartography, were a mix of architects, designers, draftsmen-engravers, surveyors, self-styled and state-endorsed geographers, and military engineers. In comparison with earlier periods, the absence of the artist is striking. Training of urban mapmakers was as diverse as the occupations represented, but for an observed and measured survey of the city, the instruments and skills of the topographical surveyor, the military engineer, and the property surveyor were required: the plane table, compass, chain and rod, an angle-measuring instrument (graphomètre or theodolite), and more rarely, the telescope. In preparing a geometric orthogonal plan, urban surveyors increasingly established a baseline along a local meridian and triangulated by measuring angles to the tallest structures in their sight lines (fig. 886). Such survey instruments and techniques were used to produce orthogonal and perspective plans, although special instruments had been developed in the Renaissance to aid in the creation of perspective views, such as the *distanziometro*, designed by Baldassarre Lanci in 1557 for drawing curvilinear perspective (Bagarolo and Valerio 2007, 128–29). A map produced by careful surveying often included a description of the technique in the title: *Plan de la ville et fauxbourgs de Paris dressé sur les observations astronomiques de l'Academie royale des scien.*[ces] *et sur les opera.*[tions] *geom[etriques]* (Guillaume Delisle, 1716); *Nouveau plan de Paris et de ses faubourgs dressé sur la méridienne de l'Observatoire et levé geométriquement* (Jean Delagrive, 1728); *A Plan of the Cities of London and Westminster . . . From an Actual Survey, Taken by John Rocque, Land-Surveyor* (1746).

Urban mapmakers needed sufficient mathematics to understand the laws of perspective that were used to create the elevation of buildings in the urban view and to create orthogonal plans; such training was found in either the apprentice system of private surveyors and architects or within military institutions and academies. In many ways the fortification plan, rendered in plan, view, and elevation, was the urban map in miniature. Military urban cartographers flourished in regions where military academies offered training in surveying (Portugal and Spain both maintained academies in their colonial settings as well). Other regions relied more heavily on local land surveyors who learned their craft through apprenticeship (in Sweden and Finland only 10 percent of the plans were produced by the military; 70 percent were created by local surveyors). Yet other regions employed a mix of militarily trained and privately trained surveyors when the size and scope of the enterprise warranted. For example, the Catasto Teresiano in the Duchy of Milan under Habsburg rule used local surveyors as well as military engineers. The training and experience of these local practitioners translated into many orthogonal plans of towns throughout Italy. Architects

FIG. 886. DETAIL FROM *PLAN DE LA VILLE DE CONSTANTINOPLE,* BY FRANÇOIS KAUFFER, 1786. The meridian of Santa Sophia compared to the longitude of Paris is shown. From Marie-Gabriel-Auguste-Florent, comte de Choiseul-Gouffier, *Voyage pittoresque de la Grèce* (Paris, 1782–1822), vol. 2, pt. 2, pl. 68.
Size of the entire original: 46.0 × 66.2 cm; size of detail: 19.4 × 8.3 cm. Image courtesy of the Stephen S. Clark Library, University of Michigan, Ann Arbor (DF 721 .C54).

(whether military, administrative, or private) were also well equipped to produce urban plans. Whatever their professional training, urban mapmakers also compiled a wide variety of information beyond the measured data to incorporate in the final map. Nolli, trained as a surveyor on the Catasto Teresiano, drew on the efforts of scientists, archaeologists, literary scholars, and educated laymen to construct the *Nuova pianta di Roma,* creating a visual encyclopedia of ancient and modern Rome.

The role of commercial mapmakers and geographers was usually restricted to compiling material that had already been surveyed and reorganizing it at a smaller scale for engraving, printing, and publication. To facilitate the task and lessen the cost of surveying, many cartographic publishers built on the foundation of preexisting maps, contenting themselves with merely changing the scale and updating the civic and topographic content by showing new neighborhoods and buildings.

In addition to on-site surveying and measurement, the Enlightenment urban mapmaker also relied on information about property ownership and property values taken from cadastral registers and local informants. Mapmakers employed qualitative information on the nature of buildings; verified the names of streets; used questionnaires to inquire about the names of buildings, institutional structures, important monuments, and public squares; and surveyed streets and roads. By the early eighteenth century, the work of geodesists in determining the shape of the earth exerted an influence on urban mapping. The careful measurements required for establishing a degree of latitude along a given meridian provided the measured baseline for triangulation, especially in European cities where the meridian had been previously determined.

Not all urban maps were printed. Manuscript maps, whether military or administrative, were limited in circulation and sometimes restricted in use. Russia and the Austrian monarchy both offer examples of printed versions of urban maps that omitted details retained in the manuscript version. If manuscript plans were used frequently, the maps simply wore out. When they survived, they were often separated from the written record in the archive, making the reconstruction of their context difficult; yet reuniting text with map almost always reveals important aspects of the map's construction and use. Printed and published maps naturally reached a much wider audience, since their expensive production was offset by the potential sales in the market. Compiled, engraved, and distributed commercially, the printed map passed through numerous editorial hands, making authorship more difficult to determine; unless noted within the printed legends on the map, a publisher's name or the name of the engraver rather than that of the initial surveyor or surveying team might be associated with the map.

The choice of mode of graphic representation was made to serve either the tastes of the consumer or the needs of the user. The mathematical construction of the urban plan lacked the lifelike quality of the view, but it sharply focused certain details with the abstract aesthetics of its representation. The urban plan diminished relief, which the urban view accentuated. Topographic expression on the plan was usually absent, except in those areas that were not built upon, or it was rendered abstractly and vaguely with shading or hachuring. At the same time, the plan valorized and enlarged the city's roads and streets in a way that was impossible for the view to show. By contrast, urban views focused primarily on buildings, and perspective plans highlighted them even more by rendering them in proportion to their geometric plot. The orthogonal plan focused on city blocks or built space within the city, less on individual structures, with principal buildings distinguished from ordinary ones by shades of gray. Even when certain public buildings remained clearly marked or labeled, they were shown in footprint only, rendering the built city sometimes as an indistinct mass of gray. Streets, alleys, roads, and plazas appeared in their true shapes with dimensions that became more precise as the scale of plans increased, underscoring the growing importance of traffic in the design and management of cities.

The depiction of property divisions was another attribute of the orthogonal urban plan, although initially ownership parcels appeared only on very large-scale plans of certain areas of the city or the city's periphery, where there was little construction. In maps at medium scales, urban blocks in city centers were often shown as fully constructed, the spaces within them no longer represented. Parcellary divisions, which indicated shared buildings or gardens in the middle of blocks, were rare in orthogonal urban plans, while the perspective plan, though not designating such divisions in themselves, showed them implicitly by placing each building on its respective plot. As cadastral surveys increased throughout Europe during the eighteenth century, parcellary or plot divisions began to appear more regularly in large-scale urban maps, although the survey and map by Ogilby and Morgan represents an early example of the inclusion of such divisions (*A Large and Accurate Map of the City of London Ichnographically Describing all the Streets, Lanes, Alleys, Courts, Yards, Churches, Halls and Houses, &c.,* 1676) (Howgego 1978, 14–16).

Thus, urban planning, whether for beautification, fiscal control, maintenance, improvement, or extension, communicated the necessary information through the orthogonal plan. The plan's printed aesthetics aided the planner by showing public spaces in white or blank, clearly separated from constructed areas, which were shaded gray and on which other information of ownership, categories of structures, infrastructure, and re-

sources could be shown by color, shading, symbol, or alphanumeric keys.

The growing predominance of the orthogonal plan did not mean an abandonment of decoration. A large-scale printed multisheet wall map of a city remained a luxury item, and many were surrounded by a printed frame or border engraved with symbolic human figures, portraits of important persons, the flora and fauna of the region, or significant monuments. Panoramic views of the city might also surround the map or provide an addition to it (as in the case of Morgan's 1682 map of London), along with the arms of the city, the heraldry and pedigree of the dedicatee, the attributes of the city's resources, and its eminent buildings. The instruments of survey themselves, manipulated by humans and putti, reinforced the mapmaker's assurance that the plan was based on systematic measurement and instrumental observation, along with supporting adjectives such as "new" and "exact" or phrases like "based on recent observations" in the title. The decorative embodiment of science was combined with other devices such as scales, north orientation, occasionally the notation of magnetic north, as well as the clear marking of a local meridian, which had served to orient the map (fig. 887). Other features of the urban plan were rendered in an aesthetically attractive way while emphasizing the reliability of the survey techniques employed.

The urban map of the Enlightenment endeavored to meet standards of beauty combined with utilitarian and pragmatic demands of the era. The abbé Delagrive listed the attributes of the Enlightenment plan in the "Observations" (lower right) on his 1728 *Nouveau plan de Paris* (see fig. 879): the plan should "respect the same rules as a geographical map" (that is, employ a mathematical construction, in contrast to the pictorial devices used for large-scale chorographical maps, in the Ptolemaic definition): it should be oriented north along a meridian; it should rely on triangulation to calculate the high points of the city; it should be all-inclusive, incorporating all neighborhoods and all streets, representing the road network as true to size and direction as possible; and it should be based on direct observation, never copied from others (Boutier 2007, 240–41). By redefining the attributes of the plan as mathematical and geometrically based, Delagrive advocated the creation of a city image that met the Enlightenment standards of objectivity and verifiability, shifting large-scale urban mapping away from the predominantly pictorial mode of the Renaissance.

Since the contents of a map, whether in view or plan, assumed a level of cartographic literacy and familiarity with the rhetoric of visual representation, it could be argued that the increased incidence of the orthogonal plan as the preferred method of representation suggested a more cartographically literate public who could understand the geometric abstraction of the plan as easily as the lifelike view or perspective plan (Ballon and Friedman 2007, 696). This opinion is supported by the correspondence between Guillaume Delisle and his publisher in Amsterdam, Louis Renard, who suggested that Delisle would do well to represent cities on his geographical maps with a symbol that looked like a geometric plan rather than the more conventional symbol that showed town buildings in elevation (Pedley 2005, 181–82). There is, however, evidence of a certain popular distaste for the large-scale plan in England in the early nineteenth century; as Humphry Repton observed, "Those who perfectly understand a Drawing in Perspective, have sometimes no idea of a Plan or Map, and are not ashamed to confess they do not understand either" (Repton 1816, 124). The feeling that the plan could be "difficult" may account in some part for the rise in popularity of a new form—the panorama—at the eighteenth century's close and its apogee in the nineteenth.

Another increasingly common feature of the urban map was the alphanumeric grid that overlay urban

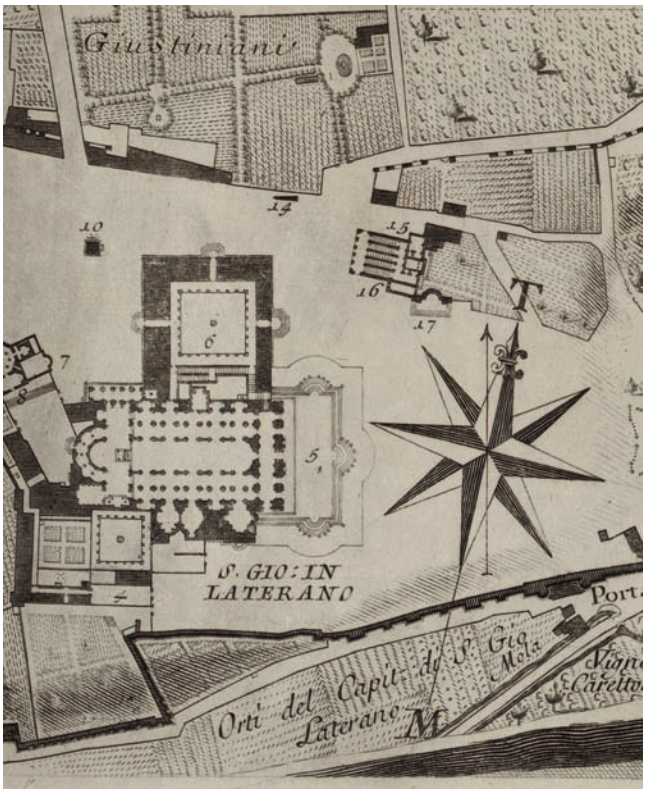


FIG. 887. DETAIL FROM SHEET 9 OF THE *NUOVA PIANTA DI ROMA,* BY GIOVANNI BATTISTA NOLLI, 1748. Nolli places two north arrows on his large map of Rome. An inscription nearby indicates that the north-south arrow in the windrose, marked T-M, lies along the astronomical meridian, and the shorter thinner arrow shows magnetic north. Size of the detail: ca. 20 × 13 cm. Image courtesy of the Stephen S. Clark Library, University of Michigan, Ann Arbor.

plans and its accompanying key to buildings, institutions, public spaces, and infrastructure. This grid with its legend signaled a different kind of reading and use of the map. Urban maps at the end of the seventeenth century usually employed legends that were numeric, listing numbers with the names of buildings or other features as found in the map. The list could be used by the viewer by starting with the map, finding the number, then referring to the list for identification. Since the list was numeric and not alphabetical, going from list to map to find a feature was tedious and inefficient. In this way features on the map were designed to be looked at, not found, making the map only to be viewed, not exploited as a synthetic experience and as a substitute for visiting the city. From the turn of the century, at least for plans of Paris, the legend became not a list but an inventory, which used the printed grid on the plan as a finding device, adding numbers and letters to the top and side of the grid's plan. The legend's list of buildings, streets, squares, and other important features, could be organized in any of several ways (alphabetical or categorical), with each item given an alphanumeric key by which the reader could find the feature on the map. This enabled the reader to move in two directions: from plan to list or from list to plan, allowing the plan to become an analytical device to be used and studied rather than experienced and an instrument to serve the multiple purposes of management, policing, improvement, travel, and beautification (Boutier 2007, 53–54).

The grid of the urban plan served the larger demands of the Enlightenment (Bevilacqua 1998, 102–4). The plan quantified space and simplified the image of the city as full or empty. It functioned as an instrument of knowledge and the catalyst for public debate by administrators, jurists, architects, planners, and reformers by virtue of its claim to exactness and verifiability. The unifying logic of the urban plan—its single scale, consistent symbols, and ostensibly objective abstraction—allowed it to become a cognitive device, a tool for the inventory and rationalization of urban space.

MARY SPONBERG PEDLEY, WITH MATERIAL FROM PIERRE PINON

SEE ALSO: Antiquarianism and Cartography; Cities and Cartography; Modes of Cartographic Practice; Travel and Cartography; Urban Map; Urban Planning and Cartography

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Urban Mapping in the Austrian Monarchy. Of all the urban maps in Austria, those of the city of Vienna have been most comprehensively studied by researchers and thus provide the core of our knowledge of urban mapping. The earliest go back to the fifteenth century ("Albertinischer Plan," 1421–22). A dramatic increase in urban mapping of Vienna came immediately after the first Turkish siege of the city in 1529, when new fortifications were built and urban surveying became in-

creasingly important. Thus, a series of maps of Vienna was produced in the 1540s, for example, the urban plan by Bonifaz Wolmuet (1547) and the circular map of the city of Vienna by Augustin Hirschvogel (1547). Then the production of city maps of Vienna decreased until a renewed burst of activity in the 1670s and 1680s triggered by two events. First, the completion of Vienna's fortifications entailed their necessary documentation. In 1671–72, the engineer Daniel Suttinger, a native of Saxony in the service of the Habsburgs, was commissioned to produce a wooden model of the city, completed in 1680 (Fischer 1995b, 24). Second, the second Turkish siege of Vienna in 1683 also intensified production of city maps. Suttinger's 1684 map of the inner city ("Wienn in Oesterreich auff Ihro Keyserliche Mayest: Allergnädigsten Befehing in Grundt gelegt und in gegenwärtigen Riß verfertiget," ca. 1:2,300) made him the founder of the great tradition of surveying Vienna in the opinion of the art historian Max Eisler (Wawrik and Zeilinger 1989, 342–43). Various colors differentiate between buildings belonging to the Crown, church, estates (political representations of the upper classes), or private citizens. Tax assessment records provided Suttinger with the names of building owners, which also were entered on the map. In addition to these details, this map also provided the first geometrically measured view of the city in about 130 years (Zeilinger and Kratochwill 1989, 197; Fischer 1995a, 10).

At this same time, Suttinger produced *Türckische Belagerung der Kayserlichen Haubt und Residentz Statt Wien in Oesterreich. 1683* (ca. 1:2,700), which shows the network of communication trenches and batteries of the Ottoman army (Opll 2004, pl. 9). In 1688, he followed with another map of the siege of Vienna titled *Grund-Riß und Situation der kayßerl. Haupt und Residentz-Statt Wienn in Oesterreich* (ca. 1:18,000), in which Suttinger depicted the ring of suburbs encircling the city center at a larger scale for the first time (Fischer 1995a, 10).

Several maps of the same period by the imperial engineers Leander Anguissola and Bartholomeo Camuccio are equally noteworthy, as they also show fortifications around Vienna and parts of the suburbs with communication trenches and the destruction caused by the battle. Their *Vienna à Turcis obsessa & Deo dante a Christianis eliberata* and *Castrametatio Turcarum exercitus ante Wiennam geographice descripta* were designed to supplement Johann Peter von Vaelckeren's 1683 commemorative book on the siege, *Vienna à Turcis obsessa, à Christianis eliberata* (Fischer 1995b, 25).

After the Ottomans had been finally repelled, Vienna experienced an enormous construction boom. Many citizens left the walled city and moved to the suburbs, where they built gardens and palaces, such as Schönbrunn Palace, begun in the 1690s. By the early eighteenth century, these suburbs featured in urban plans of Vienna with increasing frequency (Opll 2004, 35).

The *Accuratissima Viennæ Austriæ ichnographica delineatio* (1706, ca. 1:5,400) by Anguissola and engineer Johann Jakob Marinoni probably owes its existence to the Linienwall, the second fortification line around the imperial capital, built in 1704 in response to Prince Eugene of Savoy's proposal to protect Vienna's suburbs against enemy incursions, especially the threat of the Kuruc rebels. In 1705, Emperor Joseph I commissioned Anguissola and Marinoni to survey Vienna's suburbs and publish a map. They used Suttinger's wooden model of 1680 as a base map for areas inside the city walls. They represented houses, palaces, vineyards, fields, parks, and gardens in the suburbs in great detail. Anguissola and Marinoni marked buildings with letters and numbers and put explanatory tables in the margins to avoid overloading the map visually with written notes (Wawrik and Zeilinger 1989, 343; Dörflinger 2004, 102–3).

The Anguissola-Marinoni map was reengraved several times and widely copied. In 1712 in Nuremberg, Johann Baptist Homann produced a reduced version, *Prospect und Grund-Riss der Kayserl. Residenz-Stadt Wien mit negstanligender Gegend und Neuen Linien umb die Vorstädt* (1:18,500). Matthäus Seutter in Augsburg, Georges-Louis Le Rouge in Paris, and Josua Ottens and Reinier Ottens in Amsterdam also copied this map. Even in Vienna, other maps based on the Anguissola-Marinoni map were published until 1770; some constituted improvements on the original, for example, the first representation of the new structuring of Vienna into four city quarters by Thomas Messmer, *Grund Riß von der Kayserl. Königl. Haubt- und Residenz Stadt Wienn* (1730) (Opll 2004, pl. 17). Etienne Briffaut further corrected the Anguissola-Marinoni map in 1737 by adding newly constructed buildings (Mokre 1995, 30–31).

In 1710, Werner Arnold Steinhausen, who had participated in preparing the Anguissola and Marinoni map, created a colored drawing of Vienna with the fortification glacis and adjoining sections of the suburbs at a scale of 1:864 ("Iosepho Augusto ichnographiam hanc imperialis suae sedis Viennae Austriae"). The enormous precision of this map was not surpassed for more than a hundred years; its use of color to show building ownership, as Suttinger had done, was also impressive. Moreover, the map used a grid network and marginal table to facilitate identification of buildings and streets. It has been as yet impossible to determine why this map of Vienna was never printed, especially because of its clear administrative purposes. Since it remained in manuscript, it did not influence the development of urban mapping in Vienna (Fischer 1995a, 12; Mokre 1995, 29, 31; Opll 2004, pl. 16).

The same can be said for the manuscript "Plan von der Kayserl. Königl. Residenz und Festung" (1750, scale

FIG. 888. SHEET 7 OF JOSEPH NAGEL, *GRUNDRIß DER KAYSERLICH-KÖNIGL.EN RESIDENZ-STADT WIEN, IHRER VORSTÄDTE, UND DER ANSTOßENDEN ORTE* (VIENNA, 1780–81). Copper engraving on sixteen sheets, 1:2,680. Nagel's ground plan employs the engraving techniques of line work and stipple to show various buildings and types of terrain. Size of the entire original: 226 × 237 cm; size of sheet: ca. 54 × 71 cm. Image courtesy of the Woldan Collection, Österreichische Akademie der Wissenschaften, Vienna (Sammlung Woldan, K-V: OE/Vie 177/7).

1:1,800) by the military cartographer Constantin Johann Walter, also based on trigonometrical surveys and offering a more accurate rendering of the city center of Vienna than the Anguissola-Marinoni map. It may be that the military context of this document prevented its publication, especially because Walter represented fortifications in great detail (Mokre 1995, 32).

The eighteenth century saw the first population increase of the city since the late Middle Ages, and the first census was organized in 1754. A second census of 1770 recorded a population growth of 10 percent over the 1754 total. In order to obtain an overview of the many buildings in the city, a city *Urbar* (register of all buildings) was created in the mid-eighteenth century based on topographical principles. Around the same time, numerous new edifices led to the renumbering of Vienna's buildings. All these measures resulted in the Imperial Court commissioning two new maps, not to be based on the Anguissola-Marinoni map, from Joseph Nagel and Joseph Daniel von Huber. These maps provide an excellent source for Vienna's architectural history (Opll 2004, 46, 50, pls. 21–26).

After studying at Paderborn University, Nagel came to Vienna around 1740. By order of Emperor Francis I, he traveled extensively through the Habsburg realm, mainly exploring karstic caves and collecting fossils for the imperial Physikalische Kabinett (a kind of *cabinet des curiosités*). In 1748, he was appointed court mathematician and served as the director of the Physikalische Kabinett from 1772 to 1792. Since an accurate map of

FIG. 889. DETAIL FROM JOSEPH DANIEL VON HUBER, *SCENOGRAPHIE ODER GEOMETRISCH PERSPECT: ABBILDUNG DER KAŸL: KÖNIGL: HAUPT U: RESIDENZ STADT WIENN IN OESTERREICH* (VIENNA, 1778). Copper engraving on twenty-four sheets, 1:1,440. Size of the entire original: 350 × 415 cm; size of detail: ca. 27.5 × 43.0 cm. Image courtesy of the Woldan Collection, Österreichische Akademie der Wissenschaften, Vienna (Sammlung Woldan, K-V: OE/Vie 166/1).

Vienna was essential for urban development, the emperor commissioned him in 1767 to resurvey Vienna. The manuscript map was completed in 1773, and sections of it were engraved on copper by Johann Ernst Mansfeld in the following year (1:1,340). In addition, Nagel drew a map of the city center of Vienna at 1:864. Due to funding problems, another seven years went by until the entire set of maps was printed (fig. 888). The new numbers of the renumbered buildings were also entered into the map. Although Nagel's map is very attractive and displays a high technical standard, its accuracy does not surpass that of the Anguissola-Marinoni map (Dörflinger 2004, 110–11; Mokre 1995, 34–35).

In the succeeding decades, Nagel's map was reengraved several times. In 1783, Maximilian Grimm published a widely affordable reduction at ca. 1:19,200 titled *Grundriss der kk. Residenzstadt Wien mit allen Vorstädten und der umligenden Gegend*, which was republished nine times, sometimes with slight modifications. Later Grimm products included the *Grundriss der K: K: Haupt und Residenzstadt Wien mit ihren Vorstädten nach den neuen Hausnummern 1797* of 1796–97 at 1:4,320 and the *Grundriss der Kaiserl. Königl. Haupt und Residenz Stadt Wien eingetheilt nach seinen Grundbüchern* of 1799 at 1:2,700, both of which were republished (Mokre 1995, 36).

The second map of Vienna commissioned by the Imperial Court was created by Joseph Daniel von Huber, who attended the Militär-Ingenieurakademie in Vienna from 1751 to 1754 and participated in the Seven Years' War as a draftsman of camps, positions, and troop movements. His skills were rewarded with a post in the officer corps of the quartermaster general's staff, and he participated in the compilation of the Josephinische Landesaufnahme. While in Bohemia in 1765 Huber produced a large perspective plan of Prague at ca. 1:4,060. Empress Maria Theresa was so impressed by this view that she requested Huber produce another of Vienna and its suburbs. In 1773, Huber prepared the manuscript map, which is considerably more accurate than the engraving, and the view was printed in 1778 (fig. 889) (Dörflinger 2004, 108–9; Heinz and Mokre 1992, 102). The often-

maintained opinion that Huber's map is based on the Nagel urban plan has been disproved by Markus Heinz and Jan Mokre (1992, 107–16), who showed that the bird's-eye view is much less accurate, with buildings and streets in open terrain deviating up to seventy meters from their representation on Nagel's map.

Both the Huber and Nagel maps present marked differences in the representation of fortifications when compared to their respective manuscript maps. For reasons of state secrecy, military orders required certain details to be changed before printing. For example, Huber's printed map shows fortifications as more massive than they actually were. Another shared trait of both maps is that they were advertised for sale to the bourgeoisie, which exemplifies the growing commercial importance of maps in the second half of the eighteenth century (Mokre 1995, 36).

So far, little careful research has explored the urban mapping of other cities of the Habsburg monarchy. The small number of these maps that were printed and published were mainly compiled in connection with military events. For example, in 1742 Franz Anton Knittel produced a map of Linz as a result of the military conflicts related to the War of the Austrian Succession (*Accurater geographischer Plan u. Grundris der Königl. und Landsfürstl. Haubt Stadt Linz,* ca. 1:5,200); this work shows the capture of the city by field marshal Ludwig Andreas von Khevenhüller (Dörflinger 1984, 50). The *Neuer und Accurater Original Plan der Königl. Haupt Stadt Prag* by Johann Jacob Lidl was created in 1743 as a consequence of the capitulation of French troops (Dörflinger 1984, 52). Maps of other cities and towns of the Habsburg monarchy began to be prepared and published only in the late eighteenth century.

PETRA SVATEK

SEE ALSO: Austrian Monarchy

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Urban Mapping in Denmark and Norway. Between 1650 and 1800, several published topographical accounts of Denmark were illustrated with town maps and prospects. These images had much in common, being rarely based on new surveys. Many derived from the detailed manuscript maps of Danish territories prepared by Johannes Mejer between 1647 and 1674 or from the works of military engineers, so the published maps reproduced images that could have been over a hundred years old. However, these urban maps were not intended for way finding—almost all Danish and Norwegian towns had fewer than two thousand inhabitants even in 1800 and were readily navigable—but were emblematic in function. Foremost among these topographical accounts was Peder Hansen Resen's *Atlas Danicus*. Most of this huge work remained in manuscript at the time of Resen's death in 1688, except for one exemplary volume published in 1677 (fig. 890). Resen's huge collection of materials formed the basis of later works, including Erik Pontoppidan's *Theatrum Daniæ* (1730) and seven-volume *Den Danske Atlas* (1763–81) (Resen 1974; Kejlbo 1969).

Military maps may or may not have included detailed information about towns, as fortifications were in most cases erected outside the actual urban area. In the late eighteenth century, urban mapping began in earnest. It was undertaken partly by the towns themselves for fiscal (*grundtakstkort* [land tax map]) or technical reasons, and partly by the government in connection with the building of a new road system throughout Denmark (*vejkort* [road map]) (Korsgaard 2006, 94–95, 98–99). Apart from topographical works and road maps, mapmaking was not well planned. Even when the work was done under government auspices, no attempts were made to make the cartographic material uniform. In many instances, the maps arose from a specific occasion, such as when King Christian VI's travels through Norway in 1733 generated some of the best maps of towns in that country.

The map history of Copenhagen is different. The city was much larger than any other city in Denmark and Norway, with 100,000 inhabitants in 1800, and it was imaged in many more maps, many of them of better

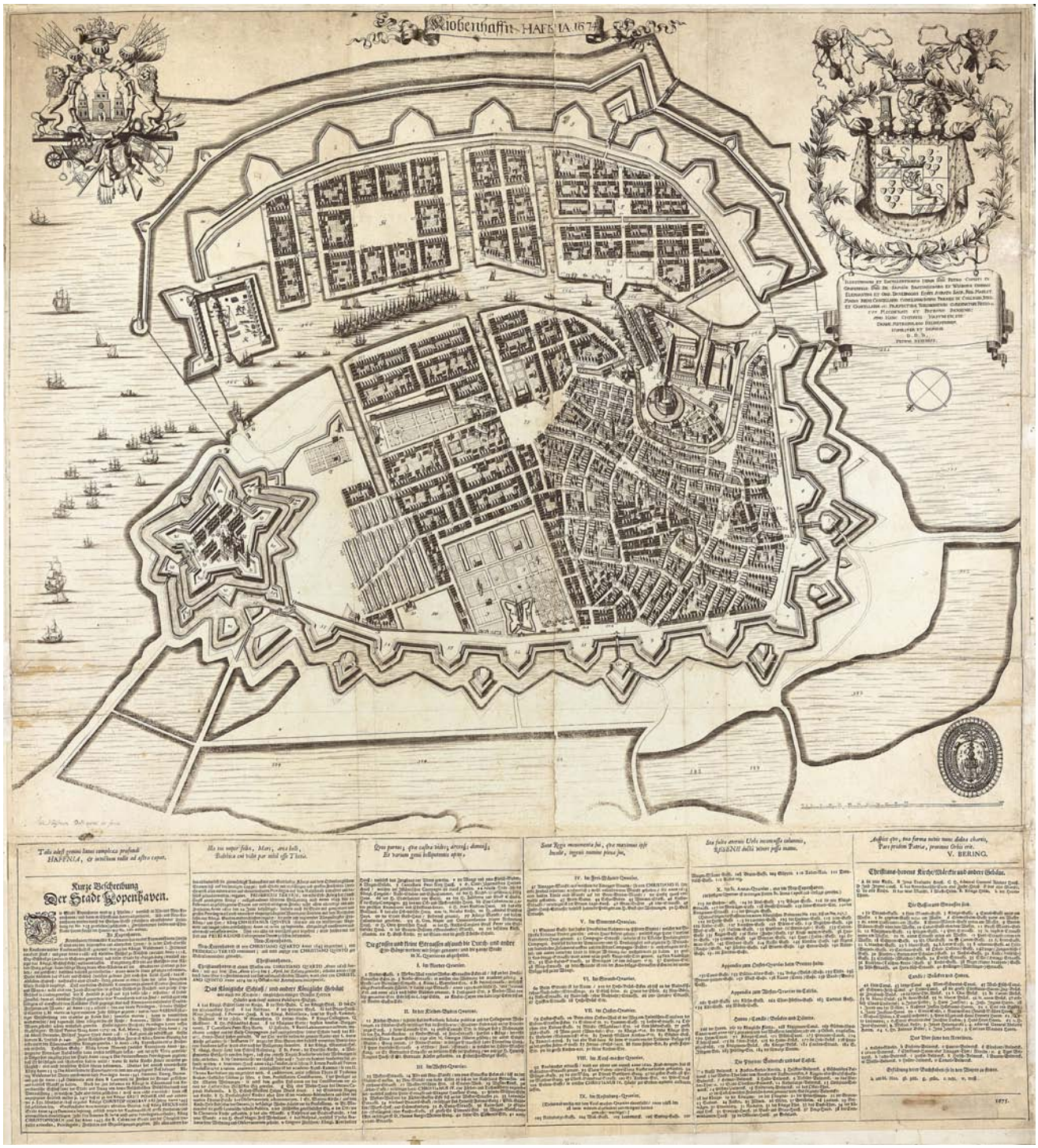

FIG. 890. COPENHAGEN IN THE *ATLAS DANICUS*. Johan Huusman drew *Kiobenhaffn. Hafnia 1674* and engraved it in copper in 1675; it was included in Peder Hansen Resen's *Atlas Danicus* (Copenhagen, 1677), pl. 13. Size of the original: 86 × 77 cm. Image courtesy of Det Kgl. Bibliotek; The Royal Danish Library, Copenhagen.

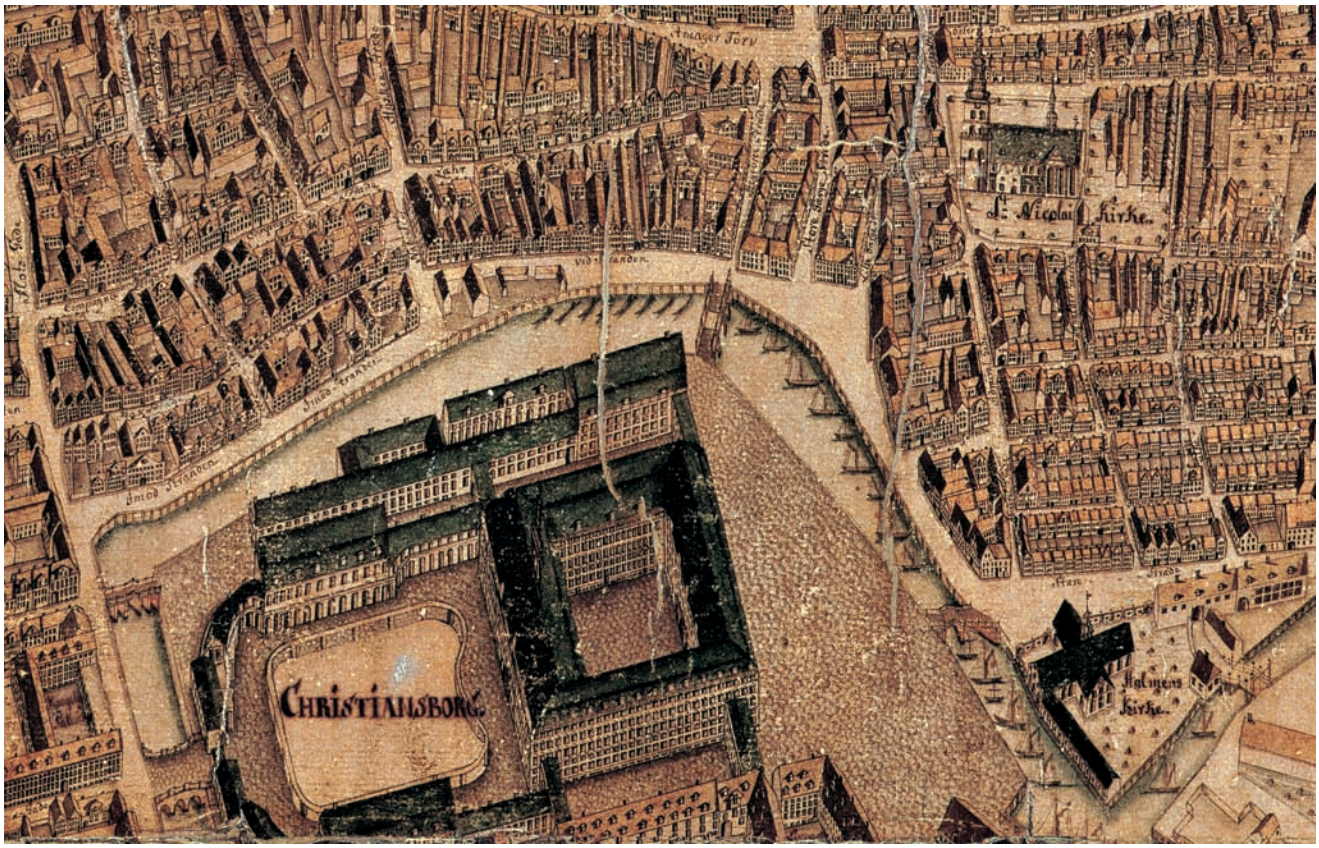

FIG. 891. DETAIL OF MANUSCRIPT PERSPECTIVE PLAN OF COPENHAGEN. Christian Gedde, "Charta over den Kongelige Residencestad Kiöbenhavn med dens omkringliggende Egne efter Kongelig Allernaadigste Befaling," 1760–61. Size of the entire original: 2.49 × 2.51 m; size of detail: ca. 17.5 × 27.0 cm. Image courtesy of the Københavns Stadsarkiv. Permission courtesy of Bergiafonden, Humlebæk (Kort nr. I B 1761).

quality. The first good maps were made for Resen, especially the perspective plan of 1674, showing buildings rising from the ground. Central were the maps for fiscal purposes, for which surveying began in 1742. The military engineer Christian Gedde made a series of manuscript maps of twelve districts during the 1750s, showing property parcels with the names of owners; he also made a perspective plan of the city from these maps in 1761 (fig. 891). Most of the printed maps of Copenhagen were made by the military, but the yearly town directory, begun in 1770, was in 1789 supplemented with a map. It was a lightly revised edition of the map from *Den Danske Atlas* of 1764 and was not reprinted for some years. This is a telling example of the citizenry's lack of need for urban maps.

PETER KORSGAARD

SEE ALSO: Denmark and Norway

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Urban Mapping in France. By around 1700, nearly 80 percent of major cities in France—the roughly one hundred cities with more than 10,000 inhabitants by 1790—had been the focus of a map: 32 (34 percent) in the sixteenth century, 25 (26 percent) in the years 1600–1650, and 16 (17 percent) in the second half of the seventeenth century. As the fruits of local initiatives rather than royal interventions, the first urban maps were often editorial projects, such as those of François de Belleforest in his adaptation of *La cosmographie universelle de tovt le monde* of Sebastian Münster (1575) or of the engineers Christophe Tassin (*Les plans et profils de toutes les principales villes et lievx considerables de France*, 1634) and Claude Chastillon (*Topographie francoise*, 1641–55).

In the eighteenth century, local projects, generally at the initiative of municipal bodies, had three major conse-

FIG. 892. FRANÇOIS CLÉRIC, *VUE D'UNE PARTIE DE LA VILLE DE LION DESSIGNÉE DANS LA MAISON DE M^RS LES CHANOINES REGVLLIERS DE S^T ANTOINE*, 1720. Urban maps were often designed to display the monumental character of cities, resulting in profiles like this one of Lyon, which is almost two meters wide. Size of the original: 63.5 × 190.5 cm. Image courtesy of Geographicus Rare Antique Maps, Brooklyn.

quences. First, maps of the city extended their coverage to include the entire urban network, extending all the way to the outlying large rural villages. The engineers of the Ponts et Chaussées, who mapped the road network of France at the initiative of Daniel-Charles Trudaine, contributed to this effort by systematically mapping all the cities on these routes (Blond 2014). Subsequently, the publication of urban maps increased throughout the period, particularly for the capital and the large cities of France. In all, 72 maps of Paris were produced in the sixteenth century, 221 in the seventeenth, and 568 in the eighteenth century. The 1760s marked a turning point when publications increased in number from around 30 to 40 per decade to around 100 (Boutier 2007, 63). This evolution was repeated on a more modest scale in Bordeaux, Lyon, Marseille, and Toulouse. Finally, the eighteenth century saw the geometric plan overtake the urban view as the preferred graphic representation.

Between 1670 and 1750, maps, in their great diversity, remained linked to the monumental character of cities, which helps to explain the attraction of profile or bird's-eye views, often of large dimensions—many one and a half to two meters wide. In Marseille, a profile commissioned from Jean Randon by city officials and published in Marseille (1694–96) was followed by that of Pierre-Jacques Duret Aulagnier, published in Paris (ca. 1750–60), which showed all the city's transformations (Morel-Deledalle 2005, 98, 103). The panorama of Lyon by the draftsman François Cléric was dedicated around 1720 to the governor of the city (fig. 892). In 1738 the magistrates of Bordeaux commissioned "La vue et perspective du port et de la ville de Bordeaux," designed by the royal

engineer Antoine-Alexandre Marolles and presented to Louis XV so that he might admire the new embankments around the new royal square (Labadie 1910, 117–18). In the same period, the *Plan de Paris* (1739), commissioned by the *prévôt des marchands* Michel Étienne Turgot from the draftsman Louis Bretez was similarly concerned with monumentality (see fig. 174). The increase of relief plans of fortresses and fortified cities, which the king ordered from his military engineers, expresses related concerns in a military context. In 1697 Sébastien Le Prestre, marquis de Vauban, counted nearly 150 relief plans; several dozen more were produced between 1690 and 1790. Nevertheless, the unique character and size of these objects prevented their reproduction and limited their circulation to the sphere of the powerful (Faucherre, Monsaingeon, and Roux 2007).

The growing predominance of the geometric plan was a major development in this period, arising from a transformation in the use of maps, so that "from a symbolic space, the city became a managed space" (Lepetit 1988, 70). Understood from the 1450s, the survey techniques required to produce an orthogonal plan were used in the sixteenth century, as the numerous maps of the *Civitates orbis terrarum* (1572–1618) of Georg Braun and Frans Hogenberg bear witness. However, this approach became dominant in France only beginning in the 1640s. Military engineer Jacques Gomboust was one of the first to undertake a systemic operation to triangulate the urban space of Paris (1652) (Boutier 2007, 147–49). Recognized in 1649 by the king as *ingénieur pour l'élévation des plans des villes et des maisons royales*, Gomboust applied his skills in Rouen (1655), then in seven cities

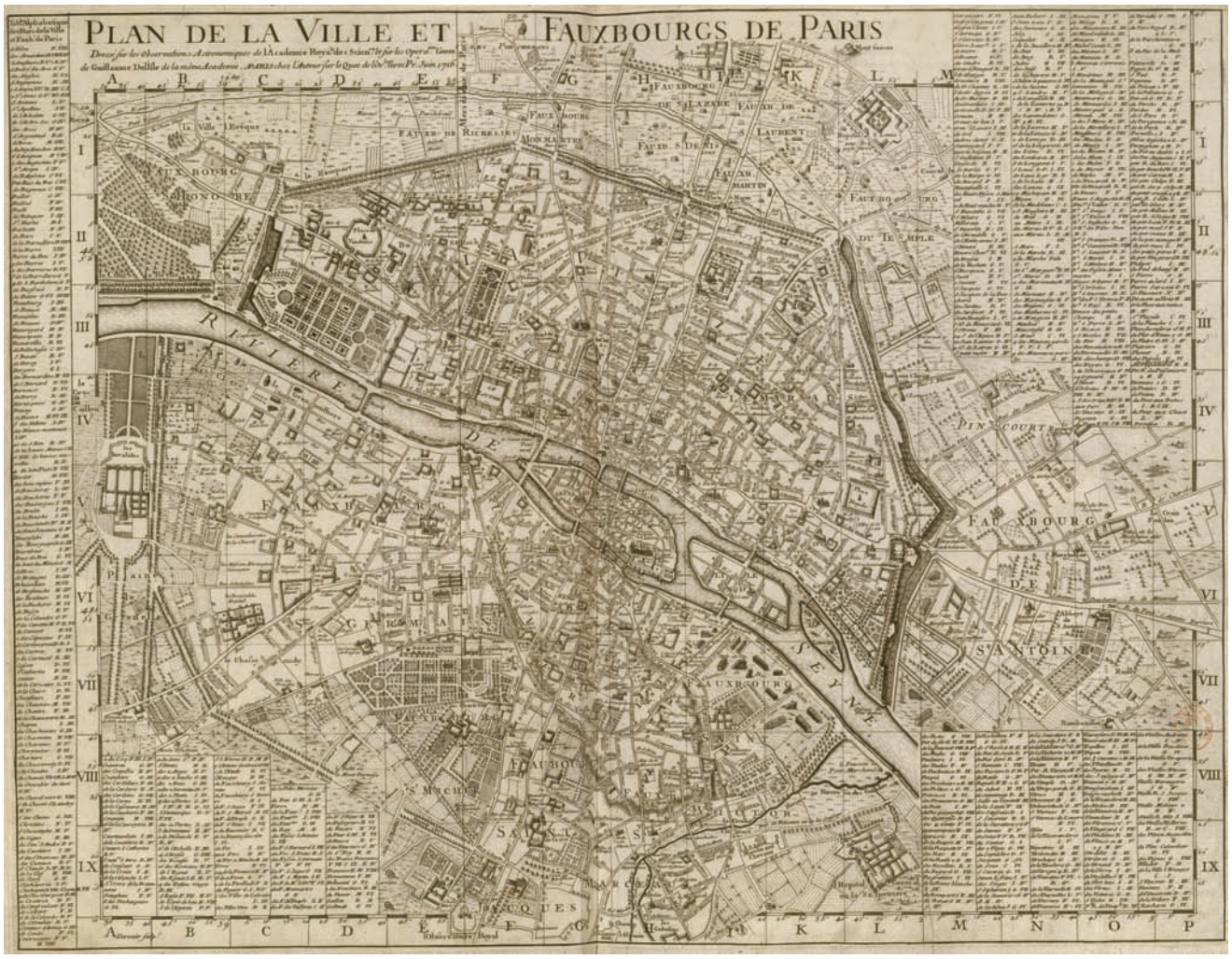

FIG. 893. GUILLAUME DELISLE, *PLAN DE LA VILLE ET FAUXBOURGS DE PARIS* (PARIS: "CHEZ L'AUTEUR SUR LE QUAI DE L'ORLOGE," 1716), COPPER ENGRAVING. Delisle also supplied a rectangular grid keyed to a finding aid to the streets ("Tab.le alphabetique des Rues . . .") around the margins. Size of the original: 48 × 64 cm. Image courtesy of the Bibliothèque nationale de France, Paris (Cartes et plans, Ge DD 1374 [4]).

of Normandy (Caen, Cherbourg, Dieppe, Granville, Le Havre, Honfleur, and Pont-de-l'Arche), whose plans appeared in volume eight of the *Topographia Galliæ* (1657) of Martin Zeiller. Albert Jouvin de Rochefort, an administrator of finances whose biography remains unknown, produced another geometric plan of Paris (ca. 1672) before making a series of city plans, either engraved (Limoges, ca. 1676; Toulouse, ca. 1680; Troyes, 1679) or in manuscript (Angers, Blois, Bordeaux, Tours) (Boutier 2007, 164–66). While of modest dimensions, the map of Paris published in 1716 by Guillaume Delisle, astronomer and geographer of the Académie royale des sciences, marked a decisive change. As the first map constructed on the Paris meridian, it conformed to the demands of geographers and thus placed urban cartography within the broader cartographic enterprise of the Enlightenment (fig. 893).

While it was recognized as a standard of reference, the surveying of a geometric plan required technical skills that, in the eighteenth century, belonged to engineers—*ingénieurs des fortifications*, *ingénieurs des Ponts et Chaussées*, *ingénieurs du Génie*, or the corps of *ingénieurs géographes*—who lived on site at the disposition of *intendants* or traveled as their work demanded. The topographic plan of Toulouse (1772) was prepared by Jean-Louis Dupain-Triel and his colleague Lalande, both *ingénieurs du roi* who drew up the Languedoc portion of the Cassini *Carte de France* in the years 1769–75. The large manuscript map of Caen (1778; Vincennes, Service historique de la Défense, GR 1 Vh 490) was the work of

Armand Bernardin Lefebvre, chief engineer of the Ponts et Chaussées, just as the map of Rouen (*Plan de la ville et faubourg de Rouen*), dedicated to the *intendant* of the *généralité* and published by Jean Lattré in Paris in 1782, was surveyed by the engineers of the Ponts et Chaussées working in the *généralité*. The large map of Marseille and its outer regions was prepared in 1785 at the order of the king by Lieutenant Colonel Elie Marie Pierron, officer of the Corps du Génie. The development of technical corps, both civil and military, facilitated these productions. An officer of the Régiment d'Harcourt Dragon, residing at Clairac, a small city in Guyenne, prepared a geometric plan of that city in 1755 (Archives nationale de France [AN], N/III/Lot-et-Garonne/6).

On a more modest level, local property surveyors (*arpenteurs*) and specialists in feudal law, very active in the countryside, used their knowledge of surveying to draw maps. Examples include Jean-Baptiste Crochet at Châteauroux (1783; AN, N/I/Indre/1), [Louis] Bussat at Saint-Étienne (1767; AN, N/II/Loire/1), and the *arpenteurs* Nicolas Dufour at Saint-Pourçain in the Bourbonnais (ca. 1780; AN, N/II/Allier/1) and Léonard Tramond, who drew up the first map of Tulle at the request of the city in 1767 (fig. 894). The production by Edme Verniquet of a large plan of Paris (1775–90), one of the masterpieces of urban cartography during the Enlightenment, drew on all these skills. Verniquet, the son of a property surveyor, was himself *arpenteur du roi dans la maîtrise particulière des eaux et forêts* in Châtillon-sur-Seine as well as an architect. For his Paris plan, he benefited from three generations of astronomers who had verified the meridian and latitude grid as well as from the work of the engineers of the Ponts et Chaussées (Boutier 2007, 373–78).

The geometric urban plan was useful to anyone who wanted to manage, transform, or utilize the space of

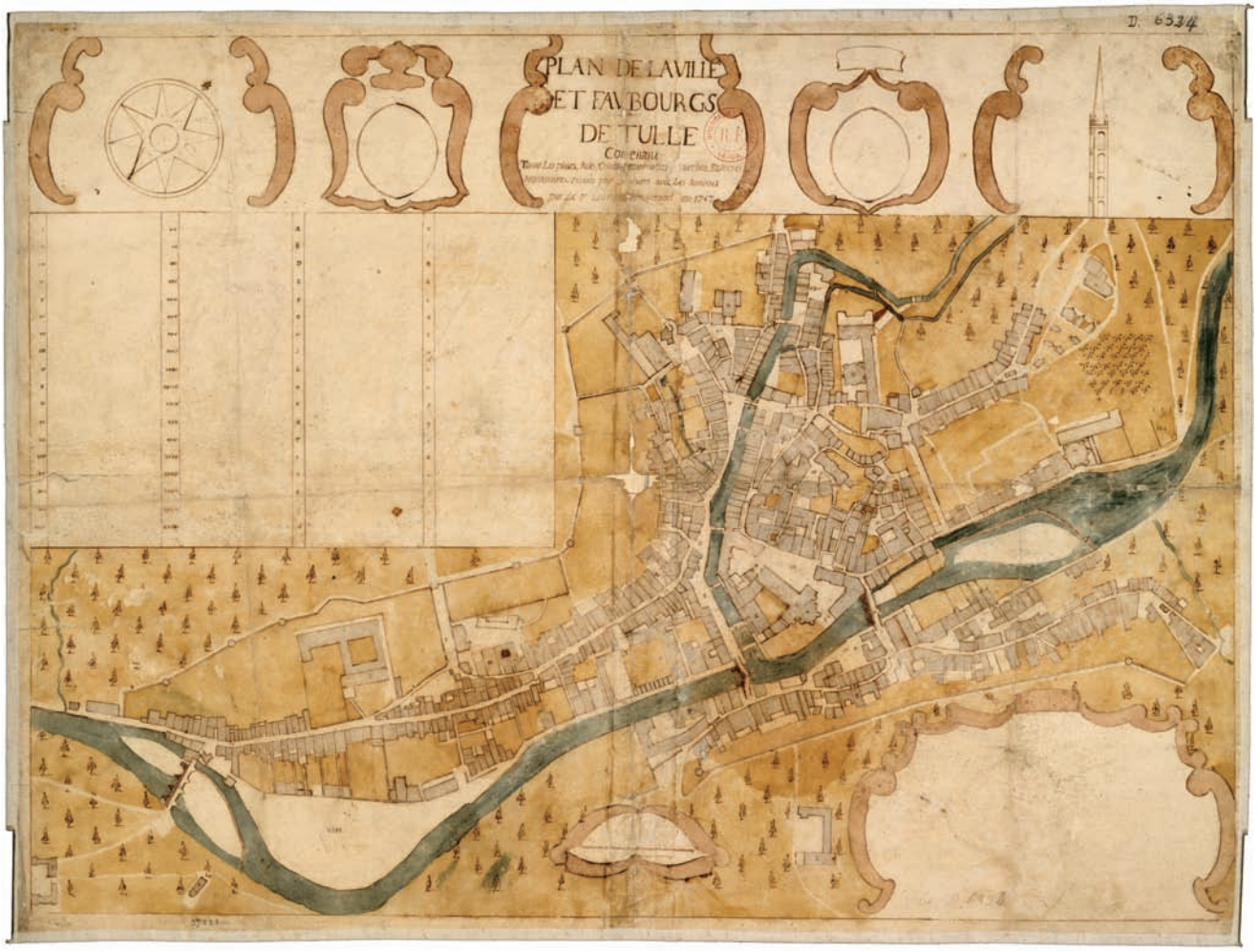

FIG. 894. LÉONARD TRAMOND, "PLAN DE LA VILLE ET FAVBOURGS DE TULLE," MANUSCRIPT, 1767. Size of the original: 50 × 67 cm. Image courtesy of the Bibliothèque nationale de France, Paris (Cartes et plans, Ge D 6324).

the city. It became an essential tool for administration, including the police. When, around 1700, Louis XIV adopted a reform that divided Paris into new neighborhoods, he called for "the representation of the said city and suburbs" (déclaration du roi, 12 December 1702; La Caille 1714, unpaginated preface). Marc-René de Voyer de Paulmy, marquis d'Argenson, the lieutenant general of police in the capital, was determined to ensure that each *commissaire de quartier* (neighborhood commissioner) understood precisely the territory in his charge. He commissioned from Jean de La Caille the first map of the city by neighborhoods, the twenty-two plates making up the *Description de la ville et des fauxbourgs de Paris* (1714) (Boutier 2007, 215–17 [no. 176]). Neighborhood by neighborhood, the maps inventoried everything that concerned policing the city, including jurisdictions, parishes, religious communities, hospitals, cemeteries, bridges, entry gates, markets, horse troughs, and even lantern services, which the 1702 royal declaration had specified.

For cities, the establishment of a cadastre or its equivalent provided a means to know the names of property owners and the value of their holdings for the purpose of revenue. The abbé Jean Delagrive, *géographe ordinaire de la ville*, envisaged such a cadastral project in 1735 with a proposal to join large-scale parcellary plans with an inventory of every building in the city, including the names of property holders, the amount of water allocated to each, and the annual rental value of each building's apartments (Boutier 1995). Several manuscript plans, such as that of Saint-Étienne, produced by Bussat in 1767 (mentioned above) or of Bergerac in 1783 (anonymous; AN, N/IV/Dordogne/1), contained such complete lists of property holders and their location within the city.

As a tool for administration, maps became necessary to plan and produce numerous urban embellishments. They were particularly effective in the aftermath of great fires, as at Rennes in 1720 (where two-thirds of the upper city was destroyed) or at Châteaudun in 1723. Saint-Dizier, struck by a severe fire in 1775, was meticulously mapped by a certain Baligand. All the burned houses were numbered and identified, and a list of property holders was established. This large effort was undertaken, as the map's title says, "in order to aid in the project of reconstruction" (AN, N/II/Vosges/1), for, as the municipal officers of Caen wrote in 1768, "without a general plan, work always proceeds haphazardly" (Perrot 1961–62, 72).

As a tool for planning, the map also helped in the presentation of projects. Thus, a series of enlargements of Lyon were advanced by Jacques-Germain Soufflot, who promoted the new neighborhood of Saint-Clair on the right bank of the Rhône between 1746 and 1760; by Antoine-Michel Perrache, who proposed a new neighborhood to the south of the Presqu'île in 1769; and by Jean-Antoine Morand, who wanted to extend the city into the area of Les Brotteaux on the right bank of the Rhône. The last proposal was the subject of the *Projet d'un plan général de la ville de Lyon et de son agrandissement en forme circulaire dans les terrains des Brotteaux* (1764–68) (Bruyère, Chiron, and Dureau 1997, pl. 12.1), while a group of projects (alignments, division into lots, squares, and quay) was presented in the *Plan géométral de la ville de Lyon* that Louis Martin Roch Joubert dedicated to city officials in 1773.

The publishing success of the printed urban map lay, without question, in its everyday use. Plans printed since the 1670s on folded, canvas-mounted sheets that slipped easily into a pocket became indispensable for anyone navigating cities, where urban growth made way-finding more difficult. In the 1690s, maps of Paris were equipped with a rectangular keyed grid designed for locating places that were named and arranged alphabetically in the margins of the plan (see fig. 893). Produced in a convenient format (ca. 50 × 60 cm), editions of such way-finding maps multiplied. Beginning in the 1760s, when cities (Paris in particular) underwent powerful expansion, reprints of urban maps with updated information became a regular feature. Louis-Charles Desnos published his *Nouveau plan de Paris* every two years beginning in 1762, and every year beginning in 1766. Jean Lattré imitated him in 1768 with his *Plan routier de la ville et faubourgs de Paris,* published annually beginning in 1772. Other publishers soon followed: Jacques Esnaut and Michel Rapilly from 1772, Jean Le Campion and Pierre Le Campion from 1782, and Louis-Joseph Mondhare and Pierre Jean from 1788. This publication technique, well-adapted to its utilitarian functions, also applied to other large cities, but their markets were smaller and the reeditions more irregular. Lattré published his *Plan de la ville et faubourgs de Bordeaux,* in 1760, and updated it in 1787; it was pirated, probably in Bordeaux, with a London imprint in 1776 and 1787 and copied by Filliatre Frères in Bordeaux in 1791 and 1800 (Labadie 1910, 121, 123, 126). The *Etat present de la ville de Lyon* by the Parisian Maurille Antoine Moithey, published in 1773, was reissued in 1778, 1783, and 1786, while the *Plan géométral de la ville de Lyon,* surveyed by Lyon native Joubert in 1773, was reprinted numerous times between 1783 and 1806. The *Plan topographique de la ville de Toulouse et de ses environs* by Dupain-Triel and Lalande saw three editions (1772, 1780, 1782). This phenomenon did not reach Marseille.

Despite local initiatives, Paris dominated French cartographic production of plans of cities both in France and abroad. In all, few urban maps were published locally; among them were that of Marseille by Jacques

Maretz (1644–45; Fournier-Antonini 2012, 672), that of Orléans by Pierre Corbierre (1641; AN, N/III/Loiret/115), and that of Rennes by François-André Forestier (1726). Thus, in the course of the eighteenth century, only ten (13 percent) of the seventy-nine maps of Marseille were published in Marseille (as compared to twenty-four [30 percent] published in Paris) (Fournier-Antonini 2012), and no map of Paris was published in France outside the capital. This dominance is explained by the concentration of publishing expertise in Paris, particularly of those technical skills required for surveying and map printing. Few cities possessed technicians capable of producing a map. Even if engineers were widely dispersed from this time on, copperplate engravers competent in map design and lettering were more rare. Louis-Urbain Aubert de Tourny, an *intendant* of Bordeaux, thus had to turn to Lattré in 1753 to produce and publish the geometric map surveyed by two local engineers, Santin and Jean Mirail, on orders of the city council. Through the dominance of Paris map publishing, urban cartography underwent a real process of homogenization without the direct intervention of the state.

JEAN BOUTIER

SEE ALSO: France

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Urban Mapping in New France. In contrast to the Spanish colonies in the New World, where the establishment of cities stemmed from the *ordenanza* of Felipe II from 1573, the creation of cities in New France—here understood as comprising only the French colonial possessions in North America—reflected the need for ports and a system of defense. No regulation governed the establishment of the first French colonial cities, armed and fortified shelters on a coast or an estuary (fig. 895). The construction of a fort and a quay were the first stages in urban development, for during the initial period of colonization the interior of the land was generally unknown. Although the priority of shelter and defense was legitimate at first, securing water, producing food, and establishing land communications were of course necessary for the development of the city itself. Certain settlements, established initially for military purposes alone, proved disastrous. Thus, in 1605 Saint Croix Island (Maine) had to be abandoned for Port Royal (Nova Scotia) because of the poor winter shelter it offered. Likewise, a catastrophic flood carried away Mobile in French Louisiana in 1711, forcing the relocation of the city, while a devastating hurricane necessitated the reconstruction of New Orleans in 1722.

The cities that established themselves as economic centers were not necessarily the political capitals where a governor resided. The king and the Compagnie des Indes desired large cities that would facilitate control of a majority of the population. The colonists, for their part, mistrusted authoritarian desire for power, preferring to live on their plantations, where they were the sole masters. Because of these conflicting wishes, the foundation and layout of the cities of New France (in Canada and Louisiana) resist systematic analysis. Each of the sizable cities (Quebec, Montreal, and Louisbourg in the north, Mobile and New Orleans in the south) are the result of individual particular histories. The period of their founding stretches over a century, from 1608 (Quebec) to 1719 (Louisbourg), and each was the result of an urbanization process that culminated in an intervention that regularized the city shape during the same decade in every case. Sometimes this intervention involved reorganizing an original plan that had been badly conceived at the outset or that had proved ill-adapted to the development of the city (Quebec, Montreal, Mobile). Sometimes it entailed the execution of an organized plan from the moment of the city's foundation (New Orleans, Louisbourg). Military engineers were responsible for these refinements to the urban plans during a period of just less than ten years, between 1711 and 1720.

When the city and fort of Mobile were moved, a

military engineer was responsible for producing a plan for the new establishment, an "agro-ville," based on a simple and regular plan, with a small proportion of the space devoted to construction. However, the symmetry of the engineer's plan yielded to topographical realities, and the southern half of the city, which had been projected into an area subject to flooding, was never built. In 1734, the military draftsman Valentin Devin proposed an ambitious plan involving fortification and the consolidation of parcels in the northern part of the city, but it was never realized, partly due to shortage of finances and partly because of property owners' opposition to any alignment of their concessions.

The projects of Gaspard-Joseph Chaussegros de Léry in Canada unfolded differently. When he was entrusted with the military reorganization of Quebec and Montreal, they were already large and prosperous cities. Moreover, Sébastien Le Prestre, marquis de Vauban, had been trying since 1684 to accomplish his goal of a systematic fortification of the cities of New France. Because of extensive concessions and numerous gardens, Montreal (like Mobile) lacked density and was not easily defendable. Chaussegros de Léry proposed establishing and maintaining the city within its walls and offered a plan that proposed denser constructed areas and a larger number of roads in a network organized around a central axis more than a kilometer in length. In Quebec, where he lived for forty years, the engineer proposed an extension of the grid in the upper city, which would be protected by a fortified enclosure. Although

FIG. 895. JEAN BOURDON, "VERITABLE PLAN DE QUEBEC COMME IL EST EN LAN 1664 ET LES FORTIFICATIONS QUE LON Y PUIS FAIRE," 1664. This manuscript plan, showing the regularization of the upper town on the heights, proposed a fortification wall (upper town) and bastions (lower town) for the defense of the city. See also figure 664.
Size of the original: 44.4 × 58.0 cm. Image courtesy of the Archives nationales d'outre-mer, Aix-en-Provence (DFC Amérique septentrionale 4C, pièce 342).

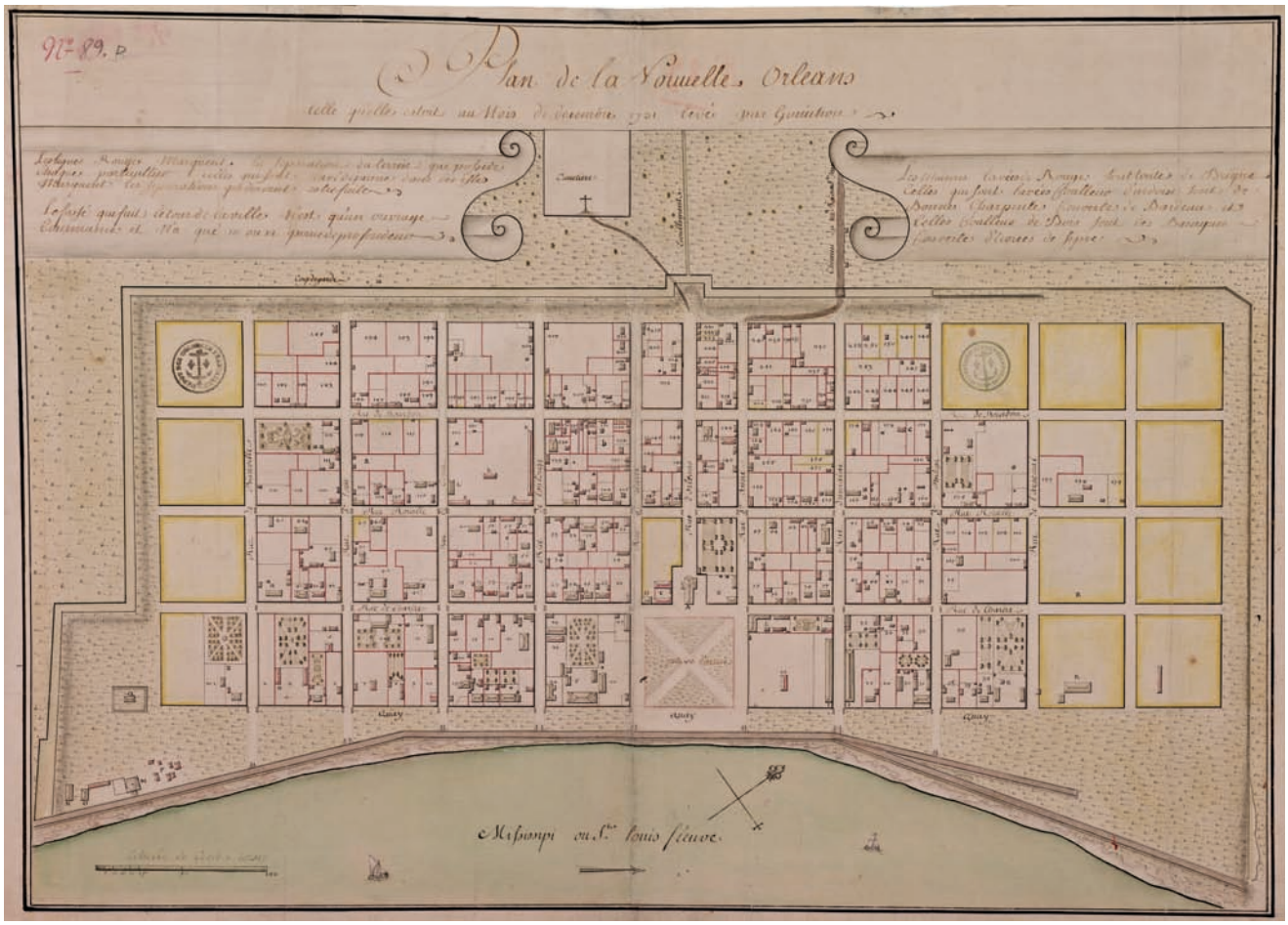

FIG. 896. GONICHON, "PLAN DE LA NOUVELLE ORLEANS," 1731. Gonichon served under the engineer Ignace-François Broutin, and his manuscript plan offers a well-known image of colonial New Orleans in a period when the Compagnie des Indes was beginning to lose its exclusive trading rights. Size of the original: 41.5 × 57.0 cm. Image courtesy of the Archives nationales d'outre-mer, Aix-en-Provence (DFC Louisiane 6B, pièce 89).

relatively modest, the plan of Quebec by Chaussegros de Léry, adopted in 1718, was applied with some modifications only in 1745 (fortifications) and 1752 (upper and lower city). As in Montreal, the military regularization of the plan was accompanied by the creation of a parade ground, as well as streets and parcels that often overlapped with existing properties.

Yet new cities, which engineers created based on their own conceptions of a regular plan, fared differently. In New Orleans, Adrien de Pauger created a new plan in 1721, which he would have had difficulty imposing on undisciplined and powerful colonists had he not enjoyed the support of his superior, the engineer Louis Pierre Le Blond de la Tour; of the commander Jean-Baptiste Le Moyne de Bienville; and of the Compagnie des Indes, which paid him. In 1722 a hurricane struck, opportunely destroying the houses in the way of his plan; the city could now be rebuilt on the grid laid out by the engineers such as Ignace-François Broutin, Pauger's successor (fig. 896). Nevertheless, the original parcels, which were quite large (800 square m) were soon subdivided by shifts in property ownership.

Louisbourg, in contrast to New Orleans, was conceived from its beginning in 1719 as a fortified city, the only one in North America, and reflected the ambitions of Vauban. The king's fortress, centrally positioned in the grid of city blocks, overlooked a parade ground but no principal road formed a symmetrical axis as in New Orleans. Located on Île Royale (Cape Breton Island), Louisbourg was neither the metropolis of a colony at the height of its growth nor a symbol of the Campagnie des Indes. Rather, it was the advance post of New France facing Europe, charged with containing the power of its English rival. Ironically, it was this city, fortified with the

greatest care and expertise, that would be completely destroyed by the English forty years after its establishment.

GILLES-ANTOINE LANGLOIS

SEE ALSO: New France

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Urban Mapping in the French West Indies. As in New France, the creation of cities in the French West Indies—understood here as comprising only the Caribbean Islands claimed by France and French Guiana—reflected the need for ports and means of defense. They followed no standard rule for their establishment as armed and fortified shelters on a coast or estuary; the construction of a fort and a quay were the first steps in their development. Certain settlements established with only military concerns in mind proved disastrous: for example, the flooding in Petit-Goâve (Saint-Domingue) and Baillif (Guadeloupe) and the absence of potable water and agricultural land at Fort-de-France (Martinique).

As in New France, cities that became economic centers were not necessarily political capitals with a governor's residence. Despite the desire of the king and the Compagnie des Indes for large cities as a means to control the population, the colonists mistrusted such authoritarianism, preferring to live as sole masters on their own domains. Thus, cities during the initial period of colonization in the seventeenth century appear to have been built without an established plan and developed amidst a certain disorder (Basse-Terre in Guadeloupe, Saint-Pierre in Martinique, Le Cap-Français in Saint-Domingue, Cayenne in Guiana), while those that were constructed or reconstructed under the king's orders at the end of the sixteenth and during the seventeenth centuries followed the regular and rational plans of military engineers, who received orders for a specific mission. Examples of such rational plans include Pointe-à-Pitre (Guadeloupe), Fort-de-France (Martinique), and Port-au-Prince (Saint-Domingue), as well as the reestablishment of Cayenne in Guiana. These plans were generally drawn with the same features: an indication of north, though not necessarily at the top of the plan, and a scale that allowed the reader to know the size of squares, lots, properties, and building. As with the color on military fortification plans, built houses were colored red; projected buildings, yellow. Gardens and the environs of the cities were frequently represented in an imaginative way, as evidenced by the differences between plans of same date. Since all these towns were based on a regular and geometrical design, there is no grid of longitude and latitude.

The oldest foundations were Cayenne (1634), Saint-Pierre (1635), Basse-Terre (1643), and Le Cap-Français (1670). A commercial company from Rouen founded a small fort at Cayenne, which was captured successively by the Amerindians and the Dutch. In 1676 the French recaptured the fort and the city, and Sébastien Le Prestre, marquis de Vauban, reorganized its plan and defense in 1689. Later Étienne François Turgot, governor of Guiana (and brother of the eminent minister Anne Robert Jacques Turgot), ordered the engineer Jean-Pierre Béhague to create a regular plan for the city's outlying areas in 1763, an urban network still visible in Cayenne.

Saint-Pierre and Basse-Terre were established without plans and witnessed rapid development due to their strategic position south of the trade winds and the nearby cultivable lands. However, ships had protection neither from strong westerly winds nor hurricanes. The two cities were each spread out essentially along a single road that ran beside the sea. Badly positioned and poorly constructed forts were their only safeguard. The vast concessions made to religious orders prevented urban extension inland. The colonists, meanwhile, remained occupied on their plantations, rarely coming into the cities except to attend mass, for they often conducted their commercial transactions directly onboard ships.

In Martinique, only in 1680 did Governor Charles de Courbon, comte de Blénac, order a regular plan to urbanize Fort-de-France, whose fort had been designed by the architect François Blondel. Military engineers Benjamin Descombes, Nicolas Payen and his brothers Germain and Marc, and Jean-Baptiste de Giou de Caylus prepared the plans and construction. However, the site was not of their choosing, having been located solely for the establishment of a port; the surrounding swampy terrain was ill-suited for a city. Draining and drying this marshland took more than a century. Thus, Saint-Pierre remained the economic capital (fig. 897) while Fort-de-France, the product of a classical ideal, remained only an administrative city. Less prosperous than Saint-Pierre, Basse-Terre remained Guadeloupe's only city until 1768, when, after numerous aborted projects, Governor Vic-

FIG. 897. [NICOLAS?] PAYEN, "PLAN GÉOMETRIQUE DU BOURG ET FORT S[t]. Pierre," 1685. The Payen brothers (Nicolas, Germain, and Marc), all engineers, were sent to Martinique in 1680. This manuscript plan, probably the work of Nicolas, the *ingénieur du roi* at that date, shows the landscape from the sea, with the city on both banks of the river and the fort above. The insets show enlarged details of proposed fortifications. Size of the original: ca. 48 × 95 cm. Image courtesy of the Archives nationale d'outre-mer, Aix-en-Provence (DFC Martinique 15C, pièce 43).

tor-Thérèse Charpentier d'Ennery created on Grande-Terre the new city of Pointe-à-Pitre, which developed rapidly on a geometric plan.

Saint-Domingue (the western part of Hispaniola), the richest of the French West Indies, was naturally the most populated. By 1789, when this half-island produced more sugar than all the British West Indian possessions combined, the population comprised about 31,000 whites, 28,000 free blacks, and 465,000 black slaves. A fourth of the foreign commerce of France was the product of slavery in the Antilles. Coffee was the second resource of Saint-Domingue, but the exportation of sugar brought in more than twice the revenue. Regulated urbanization in commercial and administrative cities took hold as growth in both population and the production of goods rendered the king's political control of the colonies inevitable. Its many cities were established mostly along the coasts, including Le Cap-Français (Cap Haitien), Port-au-Prince, Port-de-Paix, Saint Marc, Les Cayes, Môle Saint-Nicolas, Léogâne, Jérémie, and Jacmel. As with other French possessions, the pattern of cities created without advance organization subsequently yielded to planned urbanization as in the principal cities of Port-au-Prince and Le Cap-Français, including the planning of roads and urban blocks, the division and attribution of parcels, as well as the placement of religious and administrative buildings (fig. 898). The plans were drawn on the grid pattern by military engineers and sometimes based on the geometrical boundaries of old plantations, as in Port-au-Prince. There were no civic buildings in the modern sense but positioned centrally were the church, the guards' post, the governor's house, the prison, and the barracks, with the hospital, marketplace, and cemetery usually set at the city's limits. Almost all these plans are housed today in the Archives nationales d'outre-mer (ANOM) in Aix-en-Provence (see the ANOM online database, IREL).

Whatever the discrepancies in wealth between Saint-Domingue and the other French West Indies, city planning everywhere was based on the same rules. The only differences consisted in the presence of a public garden and a theater, for example, at Le Cap-Français, where private initiative relied on a location fixed by an engineer. The urban forms and early architecture in the cities of Saint-Domingue have changed little since the eighteenth century, in spite of the extraordinary growth of their extent and population and the all-too-frequent natural disasters of earthquakes and hurricanes.

GILLES-ANTOINE LANGLOIS

SEE ALSO: French West Indies


PLAN
DE LA VILLE DES.
CAYES,
DANS l'ISLE SAINT DOMINGUE.
DÉDIÉ
A MONSIEUR CESAR HENRI
COMTE DE LA LUZERNE,
General des Isles sous le Vent.
A.P.D.R.
RADE
ANCE DE LA TOURTERELLE
PLACE ROYALE
RADE DE CHATEAUDIN
HAUT FOND DE SABLE
RENVOIS.
B. l'Eglise et les maisons qui l'entourent apartenant à la Fabrique
C. Batterie en terre de 8 pièces de Canons.
D. Autre Batterie idem de 3 pièces de Canons
E. La nouvelle Poudrière
F. Magasin d'Artillerie
G. Pont d'entrée de la Ville
H. Le Palais de la Jurisdiction
K. Casernes
Echelle de quatre cent Toises
Echelle de huit cent pas de 3 pieds

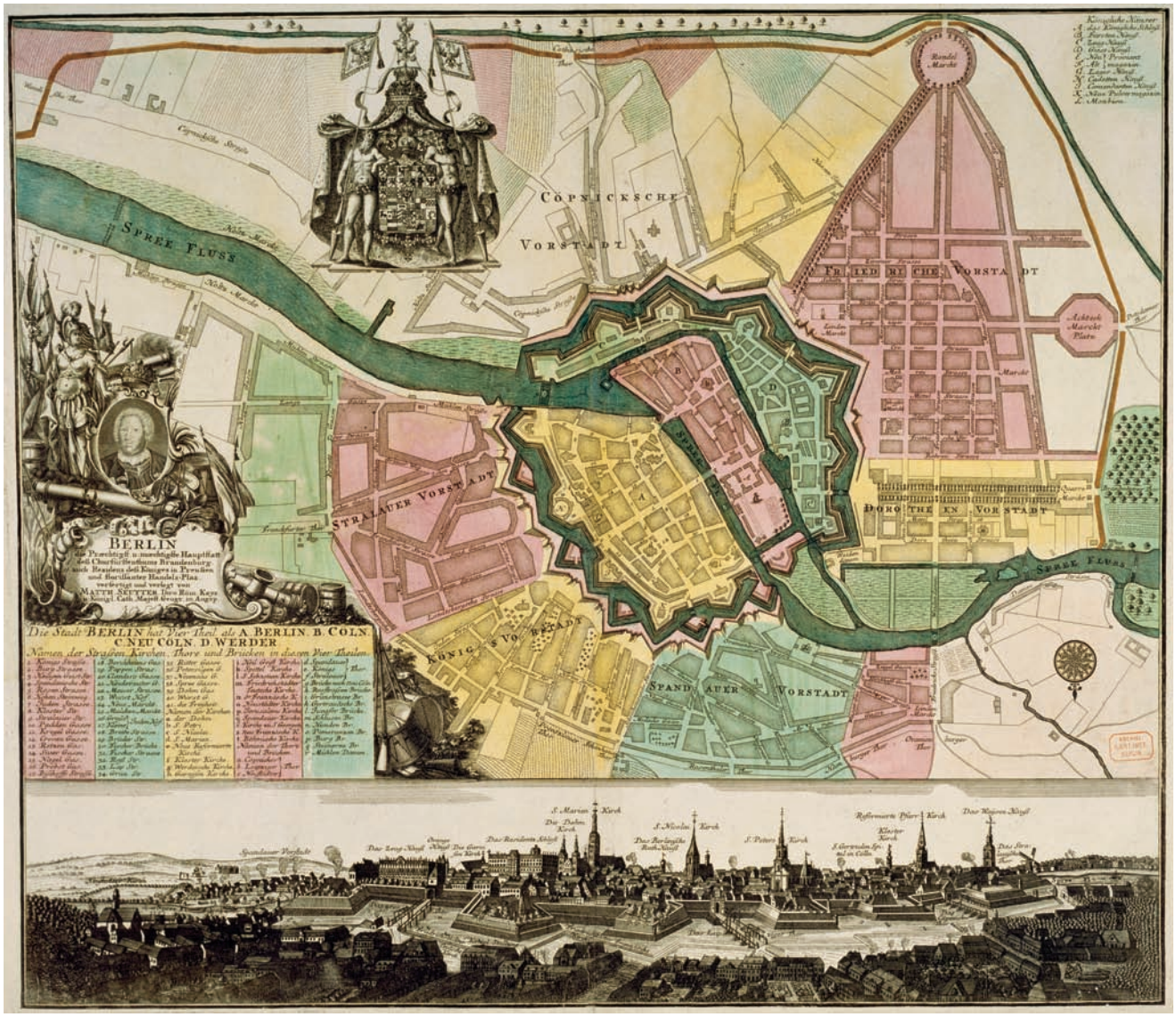

FIG. 899. PRINTED MAP OF BERLIN BY MATTHÄUS SEUTTER (AUGSBURG, 1737). The title, *Berlin die Præchtigst. u: mæchtigste Hauptstatt deß Churfürstenthums Brandenburg auch Residenz deß Königes in Preußen und florissanter Handels-Plaz*, sits below a portrait of Friedrich Wilhelm I flanked by Mars. The map is a copy of earlier work by the military engineer G. Dusableau; the prospect in the lower register is copied from that by Johann Christoph Haffner. Copper engraving. See next entry, p. 1566.
Size of the original: 49 × 56 cm. Photograph by Jürgen Schacht. Image courtesy of bpk/Staatsbibliothek zu Berlin, Stiftung Preußischer Kulturbesitz (Kart. X 17328)/Art Resource, New York.

(*facing page*)
FIG. 898. ANONYMOUS, *PLAN DE LA VILLE DES CAYES DANS L'ISLE SAINT DOMINGUE*, 1786. This printed and colored plan of the city of Les Cayes in Saint-Domingue shows the limit of the planned grid, stopped short by the plantation boundaries to the northwest. The large-scale map (ca. 1:4,500) shows the swamps remaining in the city center, and the lots, designed but still empty, to the east. It was published in Paris by the *ingenieur géographe* René Phelipeau, embellished with elegant cartouche, dedication, and ornate tromp l'oeil frame.
Size of the original: 99.5 × 72.5 cm. Image courtesy of the Bibliothèque nationale de France, Paris (Cartes et plans, Ge B 2117 [RÉS]).

FIG. 900. EARLY PERSPECTIVE PLAN OF NUREMBERG, 1648. This map—titled *Norenberga. Nürmberg*—was included in Matthäus Merian's *Topographia Franconiæ* (1st ed., 1648; 2d ed., 1656), one part of the sixteen-volume *Topographia Germaniae*, an account of the towns of Germany with many urban maps and views derived from a wide variety of sources. This map features an emblematic cartouche and detailed legend; as depicted, the roads are generally out of proportion with the urban fabric.
Size of the original: 29 × 38 cm. Image courtesy of the Universität Bern, Zentralbibliothek, Sammlung Ryhiner (Ryh 4905:23).

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Urban Mapping in the German States. Although old maps serve as a major source for historical research on urban development and spatial culture, there is not yet a complete outline of the history of urban mapping in the German states. This subject has, however, gained in popularity with the publication of facsimiles of townscapes and city maps that permit interdisciplinary studies. Exemplary detailed analyses have been made of Berlin (Schulz 1998–2002) (fig. 899, p. 1565) and the free imperial cities of Nuremberg (Schiermeier 2006) and Cologne (Dieckhoff et al. 1995); because of the destruction of Hamburg by fire in 1842, elucidation of its early mapping is particularly important (Frank 1995). Other analyses have been completed of Munich (Schiermeier 2003; Horst 2006) and, although incomplete, Dresden (Zumpe 1995). Yet studies of other German cities, such as Frankfurt am Main or Leipzig, remain lacking. Alois Fauser's register of urban maps (1978) can serve

as a fundamental source for further research. It is to be expected that in the near future the research of urban mapping in the German states will play a major role in the history of cartography.

The cartographic representation of urban landscapes in the German states began with the turning point between the Middle Ages and the early modern period. The major German towns were the imperial cities; most other towns remained as relatively small settlements that developed around princely residences. However, the forms of urban maps show no difference between the two categories of town. Urban maps were produced in manuscript for administration, in sacral landscape art, and independently in printed city books published for a general audience (Behringer and Roeck 1999). In addition to the famous *Civitates orbis terrarum* (6 vols., 1572–1618), with its many views and maps of German cities, these city books included works such as Eberhard Kieser's *Thesaurus philo-politicus* (1623–31), which included 830 schematic townscapes accompanied by aphorisms and emblematic scenes. The geographic illustrations in the so-called *Topographia Germaniae* (16 vols., 1642–54), published in Frankfurt am Main by the Swiss engraver Matthäus Merian the Elder with commentaries by Martin Zeiller, represent many of the first planimetric prospects and bird's-eye views of German princely residences with their centers and urban peripheries (fig. 900) (Wüthrich 1966–96, 4:13–19; Schiermeier 2006, 92).

Merian's city maps formed the foundation for the urban cartographic picture of the German states, although his successors preferred a more baroque style. For ex-

FIG. 901. MANUSCRIPT PERSPECTIVE PLAN OF MUNICH. Matthias Paur, "Churfürstl. Haubt- und Residentz Statt München," June 1705, 1:4,000. Paur, as "Churfürstl. Geometer," had undertaken several surveys of parts of Munich and the surrounding areas since 1700. This detailed map, which Paur constructed for the city magistrate, depicts buildings according to an isometric, parallel perspective; this was the first map of the city to be oriented to the east.
Size of the original: 46.0 × 56.5 cm. Image courtesy of the Stadtarchiv, Landeshauptstadt München (PS-C-2978).

ample, his map of Munich, derived from earlier plans by Tobias Volckmer the Younger (1613) and Wenceslaus Hollar, was updated in different versions in many city atlases and even in foreign publications such as Nicolas de Fer's 1703 atlas (Horst 2006, 79–89; Schiermeier 2003, 163).

Urban maps continued to be copied with diverse additions and variations (such as the positions of new buildings and improvements of the fortification or bastions) throughout the seventeenth and eighteenth centuries by miscellaneous German publishing houses. Examples include the townscapes in the atlases by the autodidact Johann Stridbeck the Elder of Augsburg, whose copperplate images in his *Curioses Staats und Kriegs Theatrvm Dermahliger Begebenheiten* (from ca. 1700) were copied in *Force d'Europe* (ca. 1720–27) by Gabriel Bodenehr; the numerous city maps by the famous Nuremberg engraver Johann Baptist Homann and his heirs (Homännische Erben) were often copied in the atlases by his apprentice Matthäus Seutter and later also by his successor Tobias Conrad Lotter.

The increasing use of city plans as tools for the emerging bureaucracies shows a completely different pattern from commercially published works. Forensic manuscript maps of German cities can be found together with tribunal files of legal disputes (*Augenscheinkarten*) starting in the sixteenth century. These little-known litigation maps always show small, specific areas at a large scale and so can serve as excellent sources for cultural history. This kind of urban cartography is always singular and unique (Horst 2009).

The emergence of absolutist states furthered the employment of local surveyors to map their home towns, as when Matthias Paur mapped Munich around 1700 (Schiermeier 2003, 62; Horst 2006, 106–7) (fig. 901). Such scaled, official topographical surveys were often designed by military and civil engineers to demarcate real estate both for tax purposes and after catastrophic floods and fires and also to aid in city management. They often lacked the baroque style of their predecessors. An example would be the first geometrically accurate map of Cologne by the soldier Johann Valentin Reinhardt in 1752 (Dieckhoff et al. 1995, 14–15).

By the end of the eighteenth century, there had developed a third genre of urban maps; in addition to those in collections of city views and manuscript maps for planning and engineering, maps in guidebooks were made for the rapidly developing tourist industry (fig. 902). Such maps included the numbering of houses and divisions of the city into districts, were annotated with multilingual legends, and sometimes even had grid squares for locational indexing. They generally covered the urban area together with the urban periphery. The peripheral areas had, of course, gained importance with the destruction

FIG. 902. A TOURIST MAP OF MUNICH FOR THE ENGLISH-SPEAKING MARKET, 1800. *A Plan of the City of Munich*, from Jakob G. Boetticher, *A Geographical, Historical, and Political Description of the Empire of Germany, Holland, the Netherlands, Switzerland, Prussia, Italy, Sicily, Corsica and Sardinia*, trans. from the German (London: Printed for John Stockdale, 1800), opp. 268.
Size of the original: 16.5 × 22.5 cm. © The British Library Board, London (Cartographic Items Maps C.22.bb.18).

of city walls, the creation of public gardens as inspired by Romanticism (e.g., the map of the English Garden in Munich of 1806/1807; Schiermeier 2003, 76), and the construction of avenues for new traffic systems encompassing the newly assimilated suburbs.

THOMAS HORST

SEE ALSO: German States

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Urban Mapping in Great Britain. As yet, there is no exhaustive study of eighteenth-century town mapping in Britain. There is an introduction (Delano-Smith and Kain 1999, 179–214); a more detailed monograph on British town mapping, from which most of the statistics cited below are drawn, details all the maps cited here in the associated database (Kain and Oliver 2015). The most thorough cartobibliographies are for London (Howgego 1978) and Glasgow (Moore 1996). While this entry considers only those urban maps drawn in plan, significant contemporary interest in representation in views, profiles, and prospects should be noted, as evident in collections such as the British Library's King George III Topographical Collection, which includes all types of urban representation, and by the immense popularity of the prospects published by Samuel Buck and Nathaniel Buck (Hyde 1994). The bird's-eye view, at least for London, no longer appeared in print as a form of urban representation, in contrast to other European capitals.

There is no wholly satisfactory definition of a town or urban area in Britain. Nominal corporate status includes a few anomalies that hardly even exist as settlements but excludes a great many places that had markets and performed local service functions. These "market-towns" include a core that was established before 1500 and would continue after 1900, but the peripheries were either developing or declining, and thus the service role may be difficult to ascertain. In very general terms, eighteenth-century Britain was still largely dominated by rural interests and primary food production, even though by the end of the century the balance had decidedly shifted toward urbanization, commerce, and increasing industrialization.

The definition of "town map" is similarly ambiguous. Coverage of a whole town rather than of districts within it (this latter qualification is important in London) and a minimum scale of 1:25,344 (0.4 miles to an inch) have been adopted for this entry. Urban mapping appeared in two basic ways: printed for publication and manuscript for specialized use. While printed mapping tended to be of corporate towns and manuscript mapping tended to be of market towns, there were numerous exceptions. For the period 1700–1800, printed mapping is known for 165 towns in Britain and manuscript mapping for another 251. This total of 416 is less than half the number of places that at some time in the eighteenth century would probably qualify as a market town. For these 416 towns, 548 printed maps and 516 manuscript maps are recorded, with an inherent greater likely survival of printed as compared to manuscript maps (the figure of 548 includes general maps of London but excludes a large number of district maps). Most of the manuscript mapping belongs to genres discussed elsewhere in this volume: of the 516, 226 are estate maps, 57 are enclosure maps, and 145 are of military origin. Others are of miscellaneous or uncertain purpose; few can be unequivocally classed as administrative, and this is unsurprising as piped water, sewage, and similar infrastructure developed later. While many corporations were considerable landowners, these estates are rarely recorded other than on fragmented estate maps. Military, estate, and enclosure maps are restricted in the location shown and the often skeletal mapping of areas outside the avowed subject area, but such is often the only known mapping of a town. There was a greater tendency for smaller towns to have a single predominant owner (for example, the Dukes of Bedford at Tavistock and Woburn), and thus to be mapped as a coherent whole.

Although there was no stimulus to urban mapping of the sort provided for county mapping by the Society of Arts from 1759, there was a striking parallel increase in output. This is particularly apparent in London; five new titles published in the 1750s were followed by thirty-two between 1761 and 1770 (Howgego 1978, 109–24). There was a similar sharp rise elsewhere in the 1760s, notably in Oxford. In contrast, only one map was produced for Cambridge, and that was to illustrate a guidebook. Developing commercial centers such as Birmingham, Bristol, Glasgow, and Liverpool showed varying patterns of publication; for Glasgow the earliest known map that might be considered urban is a manuscript map from 1765, yet eight new maps were published between 1773 and 1797, perhaps the result of the appointment of James Barry as official surveyor in 1773 or related to economic activity in the city. In Edinburgh a particularly intense output in the 1770s can be correlated with the inception of the New Town in 1767. There are similar variable patterns between pairs of towns and cities elsewhere: fourteen new maps of Liverpool were produced between 1764 and 1799, whereas fifty kilometers away, Manchester had one in 1741, another in 1772, and four in the 1790s. The reason for such differences has yet to be elucidated. Also awaiting clarification is the extent to which these maps were based on new survey versus copying older material. Central to such an investigation would be the time and cost of survey of various degrees of complexity compared to drafting and engraving, and at present no data is available. Even more uncertain is the likely readership.

Overall, London dominated the output of printed mapping in the eighteenth century: 113 new titles were issued between 1700 and 1800, and titles such as *New Pocket Plan* suggest visitors to the city were among the

FIG. 903. *A PLAN OF DERBY*, INSET ON PETER PEREZ BURDETT'S 1:63,360 *SURVEY OF DERBYSHIRE,* 1767. Scale of the plan, 1:5,760. This is a good example of mapping that demonstrates sensitivity to building frontages in streets, but is much more generalized where less publicly accessible. It is a representative example of British town mapping of the period.
Image courtesy of the Biblioteca Nacional, Madrid (410.148).

expected readership. In this, London may have been unusual. Its sheer size made a map far more necessary than for anywhere else in Britain. Leisure use may be discerned in a few other places, notably Bath and Brighton. The sheer size of London made a new survey an expensive undertaking, and the only complete surveys following that of John Ogilby and William Morgan in the 1670s (see fig. 884) were those of John Rocque (1738–46) and Richard Horwood (1792–99), both at 1:2,400, which were only completely replaced after 1860. Reduction from large-scale primary surveys such as these was one source for new publications, but a less troublesome one was to copy another publisher's reduction. How individual maps of London that owed their ultimate parentage to the three primary surveys were derived from various intermediate sources has yet to be elucidated, and the same applies to other places where there were significant numbers of separate publications. The average scale for derivative mapping of London tended to be smaller than elsewhere, possibly because of considerations of fitting the built-up area within a manageable paper size.

The series of new county surveys that appeared after 1750 often included one or more larger-scale insets of towns (fig. 903). These account for the printed maps of about a quarter of British towns in the eighteenth century as a whole and include both county towns that had been mapped by John Speed and others before 1611 and other towns that were covered by published large-scale mapping for the first time. Whereas Speed was consistent in including town maps as insets on his county maps, with a definite administrative-ecclesiastical trend, his successors were not. Thus a number of towns that Speed

mapped were apparently either not remapped at all for publication in the eighteenth century—for example, Ely and Stafford and most county towns in Wales—or else were mapped as adjuncts to larger projects and can be classified as idiosyncrasies—for example, two maps of Lincoln, one by William Stukeley of 1722 for antiquarian purposes in his *Itinerarium curiosum* (1724), and the other by Samuel Buck in 1725 to illustrate his *The South View of the Antient City of Lincoln*. The *Map of Lincoln-Shire* by Andrew Armstrong of 1779 (at one inch to the mile, or 1:63,360) included insets of Boston, which had been the subject of a detailed map by Robert Hall in 1742, and of Grimsby, Louth, and Spalding, which had not previously been the subject of published town mapping. The inclusion of Grimsby and Boston might be justified by their enjoying separate parliamentary representation, but the omission of Lincoln is a striking anomaly in view of the inclusion of Louth. In contrast, Thomas Jefferys's similarly scaled *The County of York* of 1771 included insets of Kingston upon Hull, Leeds, Ripon, Scarborough, Sheffield, and York, which accorded fairly well with relative administrative and commercial status (of these, only the smallest, Ripon, had not previously had a published map). Andrew Armstrong and Mostyn John Armstrong's *Map of the Three Lothians* in the Scottish Lowlands in 1773 had insets of the three county towns: that of Edinburgh was more ceremonial than innovative, in contrast to the depiction of Haddington and Linlithgow. Their *Map of the County of Berwick* of 1771 includes the smallest place to be treated to an inset, Greenlaw—barely even a village—which could be justified only by its role as a county meeting place. While the parallel with Speed is evident, it is open to question how far these insets were a survival of his concept, and how far a revival, perhaps as an element of added value. The usual funding for these county maps came from raising subscriptions, and inclusion of some town plans might be expected to make an appeal to merchants, professional men, and other monied town dwellers whose interest was urban rather than rural. The limited number of towns actually mapped in this manner suggests that this economic explanation may be more likely than a technical one, whereby the greater intricacy of townscapes justified a larger scale in order to depict them with suitable clarity.

Another class of town mapping that was an adjunct to something, rather than a publication in its own right, was illustrations to books. This strand can be traced back into the later sixteenth century. These books were mostly town or county histories, often financed by subscription, and the selection of towns could include some of apparently lesser administrative or commercial importance: for example, Hitchin, a market town mapped in Sir Henry Chauncy's *The Historical Antiquities of Hertfordshire* (1700), and Selby, in James Mountain's *The History of Selby* (1800), a town south of York distinguished only by its abbey church. By far the most extensive urban mapping of this type was in John Hutchins's *The History and Antiquities of the County of Dorset* (1774), which covered Dorchester, the county town, and the other five largest towns. While such maps could be seen as a counterpart to other illustrations of buildings of antiquarian or prestigious interest, they also had an economic aspect; the engraving of such plates could be sponsored by a named individual, thereby serving the interests of both scholarship and self-advertisement. Allied to these were various histories of London, of which the first and best-known was John Stow's *A Survey of London*, first issued in 1598. The 1720, 1754, and 1756 editions, *A Survey of the Cities of London and Westminster,* edited and augmented by John Strype, included maps of the wards of the City of London and also of adjoining parishes, apparently mostly derived from Ogilby and Morgan. This type of mapping, sometimes derived from Rocque, was imitated in a number of other histories of London in the later eighteenth century; it has no parallel outside London.

The work of John Rocque epitomizes three town-mapping aspects: some of his county maps include town insets, he produced an independent survey of London, and he was responsible for several independent town surveys (Bristol [1743]; Exeter [1744], with views of buildings; and Shrewsbury [1746], see fig. 476). His survey of London, executed from 1737 to 1746, is the best known and was published in several forms, including a twenty-four-plate wall map at ca. 1:2,400 that seems to have been designed as much to impress as to inform (see fig. 878), along with several smaller-scale derivatives. Originating from the initiative of George Vertue, engraver and member of the Society of Antiquaries, Rocque's was the first comprehensive survey of the capital since that of Ogilby and Morgan in the 1670s and was supported by the City of London Corporation and the Royal Society, even if it was not necessarily an advance in all respects. The earlier survey had shown tenement divisions, possibly schematically but with a suggestion of verisimilitude that invited close inspection; Rocque's more broad-brush approach mapped frontages but showed no detail behind them. His significant accomplishment was to base his work on a careful triangulation, as witnessed by Royal Society officers Martin Folkes and Peter Davall, who vouched for its exactness (Rocque 1981, v–vi). The resulting plan was designed for display on a wall at least as much as for consultation at a table; it was a decidedly "public" view.

His London mapping apart, Rocque's contribution is more remarkable for quality than for quantity. The same might be said of Thomas Jefferys, at least with respect

FIG. 904. DETAIL FROM MOSTYN JOHN ARMSTRONG, *PLAN OF GREAT YARMOUTH, SURVEY'D BY THE LATE M^R. HENRY SWINDEN*, 1779. Scale, 1:2,376. Building shapes are mapped with considerable care in this example of eighteenth-century British town mapping by a local surveyor, the antiquary Swinden, who performed his survey as part of his research on the Roman town of Gariannum. The inscription states that this printed version is a reduction by Armstrong of Swinden's original manuscript plan of Gariannum, measuring two feet four inches by four feet nine inches (71 × 145 cm). Comparatively few towns were mapped in such detail.
Size of the entire original: 54 × 73 cm; size of detail: ca. 38.5 × 26.0 cm. Image courtesy of the Museo Naval de Madrid (MN 138-28).

to standalone maps; he issued five of towns in the Midlands between 1747 and 1751. As with his later county maps, some of these were surveyed by local men, and it may be that in at least some instances he was acting as engraver and publisher rather than initiator. Elsewhere, local men seem often to have produced only one published town map (fig. 904); perhaps what was hoped to be a profitable speculation proved not to be so. Generally, these maps can be explained as representing corporate towns that were also prosperous commercial and administrative centers: a clear example is Isaac Taylor's Wolverhampton of 1751.

A single map for a place suggests far more strongly direct derivation from a recent survey. An extreme example of a printed map of a noncorporate place is Thorney in the Cambridgeshire fens, a tiny place of forty-six houses of which nonetheless an engraved map at 1:1,440 was produced in 1728. It seems to have been made in connection with a rebuilding scheme by the landowner, Wriothesley Russell, third duke of Bedford, and it thereby straddles both the printed and manuscript and the public and private elements in British town mapping.

RICHARD OLIVER

SEE ALSO: Great Britain

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Urban Mapping in British America. Urban settlements in British America developed as outposts on the far shore of the Atlantic, serving as entrepôts for their respective hinterlands. By the late eighteenth century, the ports of Boston, New York, and Philadelphia had become large provincial towns (by British standards), and smaller urban places had developed in the interior as lower-order service centers in an expanding mercantile network. Most towns in British America developed within the future borders of the United States—although there was little urban development in the British mainland colonies south of Virginia, except for Charleston, South Carolina (founded 1672), and Savannah, Georgia (founded 1733)—and on the islands of the West Indies.

Most interest in urban mapping in British America has been as part of general accounts of the development of particular towns and especially the major ports such as New York (Cohen and Augustyn 1997), Philadelphia (Snyder 1975), and Boston (Reps 1973; Krieger and Cobb 1999), although John Reps (1969, 1972) featured many early maps in his fundamental histories of urbanization in early America. Since British urbanization in America was much less intense than that under the Spanish and the French, little has been written about urban mapping in the British mainland colonies, nor

about those in the West Indies and Canadian Maritime Provinces.

British urban places were too small and organic to warrant mapping for much of the seventeenth century. However, the creation or acquisition of new colonies after 1660, the growth of towns, and eventually political unrest and military conflict after 1765 all prompted the planning, recording, and mapping of towns. The acquisition of Jamaica (1655) and New Netherland (1664) were both memorialized by the preparation of plans of the primary settlements by English officials, whether of Port Royal, which was replaced by Kingston after the 1692 earthquake, or the renamed New York. The development of Pennsylvania included the establishment in 1682 of Philadelphia. The first map of this town, actually a planning and promotional document, was published in London by Thomas Holme in 1683 (fig. 905); the first map to record how the city had actually developed would not be published until 1762 by Nicholas Scull. Philadelphia's urban plan, which served as a model for many other colonial towns, was designed on a regular grid that permitted the easy allocation of and access to property. Similar grid patterns were used elsewhere in Pennsylvania and other British colonies, notably Savannah, in the eighteenth century (Reps 1984).

During the eighteenth century, a number of manuscript plans were created of colonial towns, both for planning new colonial capitals—such as Williamsburg, Virginia (1699); Annapolis, Maryland (1694); and Halifax, Nova Scotia (1749)—and for recording the sale of lots in county records. In the plantation colonies of the mainland, attempts were made through legislation to create towns to serve as tobacco inspection stations, although most remained only paper towns (Reps 1972).

While most urban maps prepared in the colonies circulated in manuscript, the older and larger port cities were memorialized in locally published maps during the eighteenth century. The first such map was John Bon-

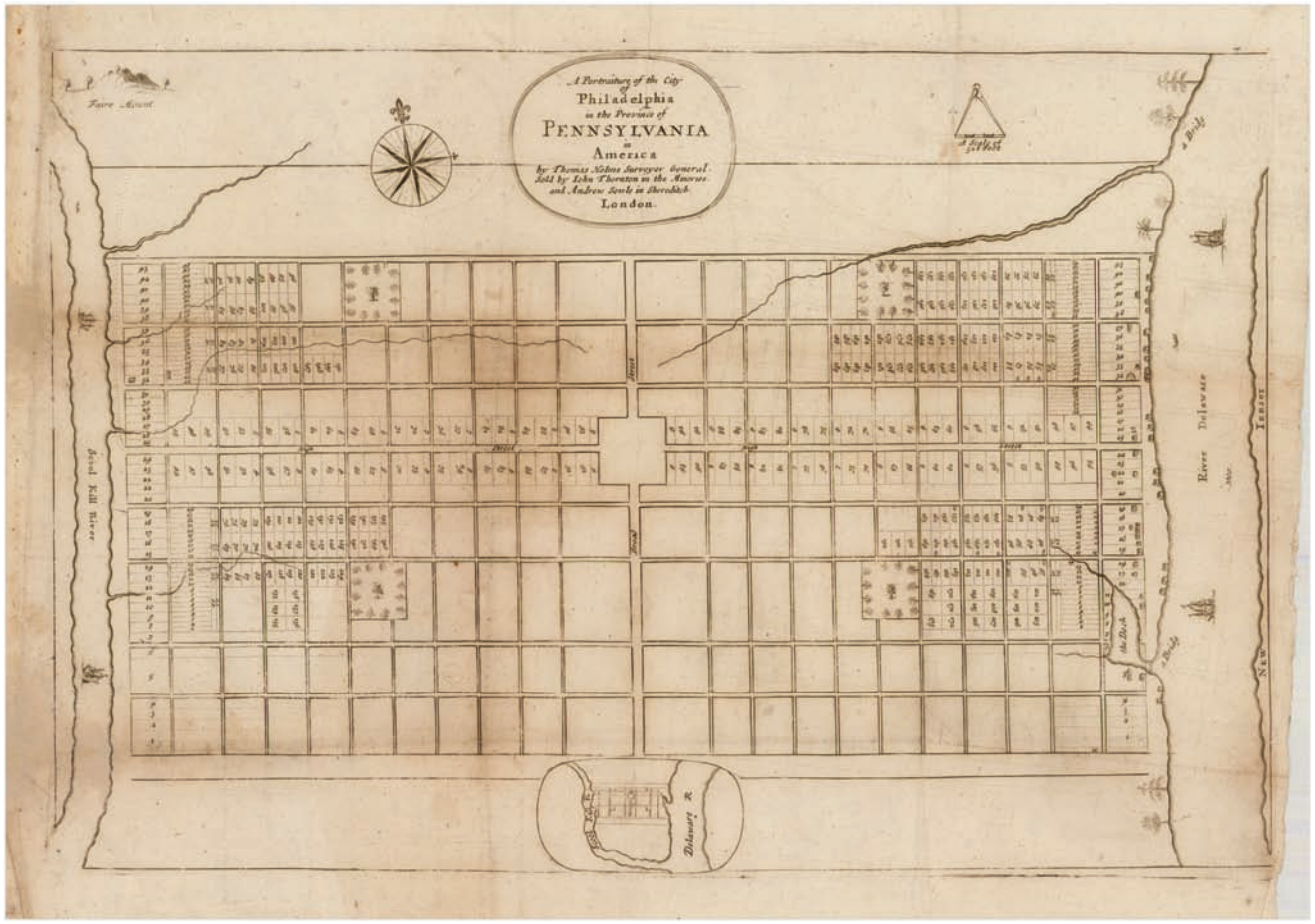

FIG. 905. THOMAS HOLME, *A PORTRAITURE OF THE CITY OF PHILADELPHIA IN THE PROVINCE OF PENNSYLVANIA IN AMERICA*. This map promoted Philadelphia's original grid pattern and was included in *A Letter from William Penn . . . to the Committee of the Free Society of Traders* (London, 1683).
Size of the original: ca. 30 × 44 cm. Image courtesy of Barry Lawrence Antique Maps, La Jolla.

FIG. 906. JOHN BONNER, *THE TOWN OF BOSTON IN NEW ENGLAND*. The first printed map of Boston, which was also the first town map printed in the colonies, was originally published in 1722. Illustrated here is a later, previously unrecorded state most likely issued between 1723 and 1732. Size of the original: 43 × 59 cm. Map reproduction courtesy of the Norman B. Leventhal Map Center at the Boston Public Library (G3764.B6 1723.B66).

ner's map of Boston (1722). Bonner juxtaposed lists of several fires and smallpox epidemics, the last in 1721–22, with lists of the major public buildings, thereby indicating how the port city had flourished despite these vicissitudes (fig. 906). The map was updated and republished at least ten times over the next fifty years (Reps 1973). New York was similarly the focus of laudatory urban maps, beginning with James Lyne's *A Plan of the City of New York* (1731). The earliest map of Charleston showing streets and buildings was published in 1739, while Peter Gordon's bird's-eye view of Savannah was published in 1734.

For Europeans interested in learning about the geography and economy of the British colonies, maps and images of major cities appeared increasingly in European publications during the eighteenth century. Recognizing their importance within the empire, small-scale maps of the major port towns and harbors (Boston, New York, Philadelphia, and Charleston) initially appeared as insets on maps of the eastern half of the continent (such as Henry Popple's map of British America, 1733) or on regional or individual colony maps (such as Cyprian Southack's and John Green's maps of New England or Henry Mouzon's map of North and South Carolina). Generally, these inset maps were reduced and generalized versions of maps that had been produced in the colonies. Political upheaval after 1765 and then overt revolution led to the preparation of numerous urban maps for military planning and for recording sieges and battles. Many of the manuscript plans from this era were published in London. Other European publishers, especially the French cartographers Jacques-Nicolas Bellin and Georges-Louis Le Rouge, also published maps of the major British port cities, often as smaller, generalized renditions of the maps published in London.

RONALD E. GRIM

SEE ALSO: British America

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Urban Mapping in the Italian States. After a long period of political stasis, Italy experienced significant changes during the eighteenth century. The Treaties of Utrecht (1713), Rastatt (1714), and Aix-la-Chapelle (1748) settled many conflicts in Central Europe, using Italy as a territory for compensation. The arrangements codified by these treaties in the various Italian states ratified the decline of Spanish power and the rise of Austrian supremacy on the peninsula. While the redistribution of territory and the shake-up of dynasties increased the gap in economic conditions and systems of government between different regions, especially between north and south, they also gave a positive impetus to local cartography.

Besides these political factors, or possibly as a direct consequence, the real turning point and radical renewal of urban cartography came with the public surveys connected to the introduction of the cadastral system. Ordered by the sovereigns and supervised by special officers, it was considered a necessary step toward progressive reforms. However, the cadastre came into effect only in the Duchy of Milan (1718) and the Duchy of Savoy (1728), while in other states it was introduced a century later. As surveyors who had apprenticed in the northern states circulated throughout Italy, they spread an appreciation for the methods of the urban plan versus the perspective plan, which in Italy had been invented and practiced as the most successful mode of urban representation for two centuries. Plans were acknowledged as products concurrent with contemporary science and as such began to be engraved and marketed.

Despite these significant signs of change, most of the urban plans published in the eighteenth century were not conceived as instruments for public utility or connected with actual urban planning. The survey of Verona had been commissioned by the engineers of the Republic of Venice, but it was published in 1737 on the initiative of the engraver Giuseppe Filosi, who dedicated it to marchese Francesco Scipione Maffei (De Seta 1998, 199–200). Local patrons, wishing to see their name linked to an updated image of their city, remained the best supporters of large-scale maps, as broader public financing was lacking.

Continuing incentive came from the market of tourists and collectors connected with the Grand Tour, for which Italy offered the primary destinations of Venice and Rome. As increasing passion for archaeology and the picturesque made travel to Naples and the south extremely appealing, the production of paintings and maps flourished more than ever. By contrast, even for capitals like Genoa and other cities less appreciated by Grand Tourists, only small and unimportant products were published.

To capture the market, maps of any kind—even measured plans—had to satisfy the demand for visual and aesthetic appeal. The authors were generally not professional surveyors or geographers but rather young architects, scenographers, or draftsmen-engravers. Often designing their first or only work of this type, they took particular care in rendering the interiors of churches and monasteries, archaeological remains, and the patterns of Italian gardens. The engraved maps were enriched with elaborate decorations, including partial views drawn from other contemporary productions.

The appreciation of urban plans started in Milan, not a major center for art, but a rich capital and a very important fortress. Because of its military importance, Milan boasted a long record of accurate surveys from which cadastral operations could easily be carried out. The map of Milan called "Iconografia della città e Castello di Milano," which appeared in 1734 signed by Giovan Battista Riccardi, a technician of the public works office, is largely based on the overall cadastral plan that had just been completed by the surveyor Giovanni Filippini. Though in manuscript, it was designed to be hung on the Senate palace wall and demonstrated a desire to present the image to a wider public through its framed layout incorporating a profile and twenty-eight partial views of monuments and squares. Marc'Antonio Dal Re, a well-known painter of military and political events and collaborator with Filippini, ultimately engraved the *Città di Milano* (1734), based on the same survey. Although the plan is quite rough and lacks any ornamentation, it was the first published urban plan in Italy based on a survey and served as a model for later products.

The activities in Milan were immediately echoed in the contiguous Republic of Venice, where the tradition of surveys predated that of Milan because special officers were appointed to control waters and embankments. In 1729 Ludovico Ughi issued the *Iconografica*, which updated the image of Venice by using the language of the

plan yet without any connections to cadastral or urban embellishment projects (fig. 907).

Ughi's plan, described by its author in the map's legend as a "geometric plan . . . first delineated with the most correct measures, and graduation of angles," is at best an updated revision of previous products, with city blocks still undifferentiated by shading. Ughi was a young engraver and architect who wanted to present himself to the Doge, as the dedication testifies, and at the same time issue a commercial product. The plan is framed by sixteen partial views, most of which are derived from Luca Carlevariis's series *Le fabriche, e vedute di Venetia* (1703).

The most remarkable emissary of Milanese technical prowess acquired from the cadastral surveys was Giovanni Battista Nolli, who moved to Rome in 1736. There, Nolli's surveying skills led him to entirely different goals, reflecting the aims of an enlightened public. A society of scholars and antiquarians entrusted Nolli with drafting a scientifically measured plan of the city in which the ancient topography and remains of the imperial capital could clearly be read. The *Nuova pianta di Roma* (1748; see fig. 609) was initially financed by subscribers, but when the subscription failed, it was completed and marketed as a joint venture by Nolli himself and the Milan banker Girolamo Belloni. At last, though lagging behind other European capitals, Rome presented an image of itself that kept up with the new standards of urban representation. The delay in production was compensated for by the result: the care taken in the surveying and the level of detail awarded Nolli's plan with critical and commercial success.

The Nolli plan served as a model for, or at least stimulated, two other valuable plans published in the second half of the century. The debt to Nolli was explicitly acknowledged in the first plan, the *Pianta di Padova* (1781–84), engraved by Giovanni Volpato and framed with views. Girolamo Zulian, ambassador to Rome from the Republic of Venice, financed the task and commissioned Giovanni Valle, a young topographer who had acquired some experience working with the mapmaker and surveyor Giovanni Antonio Rizzi Zannoni, to execute the survey (fig. 908). The plan of Padua was Valle's first significant work, as he admitted. It is one of the few cases where methods are well documented, confirming how the practice of surveying was carried out at the time. Just as for the Nolli plan, surveyors used the plane table along with compass for angles and the chain for measurement. Measures were first checked on the ground and observations made from fifteen elevated points to fix the trigonometric network.

The second descendent of Nolli's enterprise was the monumental *Mappa topografica della città di Napoli* (1775) in thirty-five sheets (see fig. 880), although its patron, Giovanni Carafa, duca di Noja, did not mention its Nolli forebear. Carafa had embarked on this ambitious project in 1750, but personal and financial problems delayed its execution. Only in 1775, after Carafa's death, was the plan published. A large group of surveyors (led by Antonio Vandi) and engravers contributed to the map, on which rich decoration occupies a third of the whole surface including coats of arms, images of historical heritage, and a spectacular view of the city. Carafa's explanation of his project in the *Lettera ad un amico* (1750) clearly reflects the new cultural climate of the Enlightenment pervading the scholarly circles of the city. An exact "scientific" plan—one based on observation and measurement and subject to verification—was an essential instrument for administrators to develop programs of reform and social improvement.

The second major city of the kingdom, Palermo, was probably challenged by Carafa's plan. Francesco Maria Emanuele e Gaetani, marchese di Villabianca, commissioned Nicolao Anito to survey the city as homage to Ferdinand IV of Bourbon, yet without a distinct social purpose. In 1777 the *Pianta geometrica e novella . . . di Palermo* was engraved by Giuseppe Garofalo, with such flourish that he almost suffocated the plan with exuberant decoration. The new image of the city had a familiar purpose: according to the cartouche, the mere contemplation of and the pleasure derived from the plan would celebrate "the correct extension and the magnificence of Palermo in the eyes of native and foreign people."

The other capitals or secondary major cities of the Italian states similarly updated their images to these new standards. One after another, a continuous publication of plans covered the peninsula in the second half of the century. One of the best examples is the large-scale *Pianta della città di Firenze*, surveyed by Francesco Magnelli, an engineer in the public administration, and engraved in 1783 by Cosimo Zocchi with a complement of six views.

The Dukes of Savoy were satisfied with the prestigious publication of the precadastral seventeenth-century surveys in the two-volume joint venture, the so-called *Theatrum Sabaudiae*, published in Amsterdam by Joan Blaeu's heirs in 1682. The ambitious enterprise had almost exhausted the royal finances, but cities and royal properties, translated into magnificent perspective plans, circulated throughout Europe, creating a prestigious visiting card from the duchy.

Though in decline, perspective plans and views did not disappear in the eighteenth century. They played a strong visual role, still appealing to the tourist market. In 1676 the very successful *Nvova pianta et alzata della città di Roma,* compiled by Giovanni Battista Falda, was issued to celebrate the embellishments of Pope Alexander VII to the city. The title "plan and elevation" highlights

FIG. 907. LUDOVICO UGHI, *ICONOGRAFICA RAPPRESENTATIONE DELLA INCLITA CITTÀ DI VENEZIA*, 1729. Engraving on thirteen sheets from twenty copperplates (eight for the map and twelve for the views and the texts); 1:2,260 (*passi cinquecento veneti da piedi cinque l'uno*). This is the first large surveyed plan of the city, framed by views to satisfy the demand for visual and aesthetic appeal.
Size of the original: 148.5 × 264.2 cm. Image courtesy of the Ahmanson Foundation and National Gallery of Art, Washington, D.C. (Accession No. 2010.66.1).

FIG. 908. *PIANTA DI PADOVA*, GIOVANNI VALLE, GIOVANNI VOLPATO (ENGRAVER), AND RAFFAELLO MORGHEN (ENGRAVER OF THE VIEWS), 1781–84. Copper engraving from twenty plates; 1:220. Size of the original: 177.0 × 204.5 cm. © The Trustees of the British Museum, London (175*.b.19).

the two modes of representation; however, the geometrical aspect is stronger than in the past, and a scale bar is placed at the bottom. Similar features may be found in the last generation of perspective plans such as the *Nuova pianta ed alzato della città di Ferrara* (1747) by Andrea Bolzoni, *Brescia* (1764) by Domenico Carboni, and the *Disegno dell'alma città di Bologna, Ichnoscenografia* (1702) published by Filippo de' Gnudi, in which the author stressed the importance of his "skillful drafting in perspective" of the buildings.

By the last third of the century, the perspective plan no longer completely gripped the public imagination. In Rome in 1765, almost twenty years after the successful appearance of Nolli's urban plan, Giuseppe Vasi thought that the market was still favorable for scenografic views and engraved the *Prospetto del'alma città di Roma visto dal Monte Gianicolo* (see fig. 881), an appropriate conclusion to his views of modern Rome. The *Prospetto* was despised by Luigi Vanvitelli, who wrote: "You can easily buy it, since Vasi has fixed it at a low price in order to sell it, which is proving difficult, because of its bad taste" (quoted in Bevilacqua 2004, 385). In Naples, Paolo Pe-

trini, an engraver and publisher of guidebooks, in 1713 and 1718 issued two wide-angle perspective plans with the same title, *Pianta ed alzata della città di Napoli*, the first for the tourist market and therefore enriched with views, and the second without views but more accurate in identifying places and landmarks.

Yet the maritime cities continued to fix their image with the view. Naples was one of the few in Italy producing maps with long prospects viewed from the sea with hills flattened to render the whole length of the coast, as in the famous *Cavalcata* by Alessandro Baratta (1680). In similar mode is the *Prospetto . . . di Napoli* (1764) by Ignazio Sclopis (fig. 909, overleaf), derived, in its frame, from the *Veduta di Napoli dalla punta di posilipo sino al ponte della maddalena, come si vede dal mare* (1759) engraved by Giuseppe Aloja but offering very accurate details, as might be expected from a military spy (Iaccarino 2006, 149). Venice, immersed in its flat lagoon, also boasted a tradition of long views drafted from different vantage points and then assembled. Two such views delivering topographical information were the anonymous *Origine e principio della città di Venetia* (ca. 1680) and the more original and ambitious *Venezia* (1743) by Giorgio Fossati, enriched by four columns of text incorporating a topographic inventory and long description. Fossati changed the traditional point of view by bringing Giudecca Island to the foreground, consequently altering the urban image made familiar by plans and views of the previous two centuries. As the distortions (probably due to the optical device used) are very pronounced, the information is most accurate for the area in the center of the image, while lateral areas are quite illegible. At the same time, the Venetian pictorial *veduta* and the *capriccio* were fashionable, creating long-lasting clichés of the city in tourists' imagery.

Urban mapping in eighteenth-century Italy marked the success of the geometric plan versus the perspective plan and a widespread renewal of urban iconography to conform to updated standards. However, this process did not imply a general growth toward the conception of urban maps as instruments for public and social utility. Public action was lacking, and learned societies played no important role. Local aristocrats continued to be the best promoters and supporters for private mapping enterprises, which were directed to the tourists' and collectors' markets, boasting aesthetic values and visual appeal.

LUCIA NUTI

SEE ALSO: Italian States; Nolli, Giovanni Battista

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Urban Mapping in the Netherlands. Within the scope of urban mapping in the Netherlands in the Enlightenment, various types of town maps can be distinguished: uniform series of town plans, often published in atlases or other geographical works; separately published town plans, sometimes published as multisheet wall maps (often in perspective view with decorative borders); fortification and siege plans; and large-scale plans of parts of towns that were printed or drawn for various administrative purposes, an often forgotten but important category of urban mapping. These traditions of urban mapping mainly are a continuation of Renaissance urban mapping. Even with the decline of Dutch power after 1650, the cities in the Netherlands remained wealthy and could support significant mapping projects. At the end of the seventeenth century, the councils of the major cities in Holland produced multisheet wall maps of their cities. At the same time, the many wars of the late seventeenth and early eighteenth centuries demanded up-to-date town plans, especially in the genre of military mapping.

Beginning in the late sixteenth century, a number of series of Dutch town plans were printed (Koeman et al. 2007, 1330, 1333–38). Most commercial publishers relied on previously printed work when they could copy it, and the results of any direct surveys were reissued over a long period of time. Apart from plans of Dutch towns in Georg Braun and Frans Hogenberg's *Civitates orbis terrarum*, various town plans were included in the numerous editions of Lodovico Guicciardini's *Descrittione di tutti i Paesi Bassi*, published from 1567 to 1662 (Deys et al. 2001, 104), and Joan Blaeu's two-

FIG. 909. IGNAZIO SCLOPIS, *PROSPETTO GENERALE DELLA CITTÀ DI NAPOLI,* 1764. Copper engraving from three plates. This is one of the most spectacular views of the city, offering very accurate details and the representation of the urban expansion toward Mergellina. See previous entry, p. 1579.
Size of the original: 48.5 × 213.0 cm. © The British Library Board, London (Maps *24045 [17], fols. 1, 2, 3).

volume atlas of Dutch towns in 1649, which benefited from Blaeu's encouragement and financing of direct surveys (Koeman et al. 2007, 1335). The work of urban mapmakers in the latter half of the seventeenth century was marked by the reuse of earlier materials. Johannes Janssonius, Blaeu's biggest competitor in the Amsterdam map market, inherited copperplates from Braun and Hogenberg and copied many of Blaeu's town plans, especially for cities in the Netherlands, in his town atlas of 1657. Around 1700 Frederick de Wit published his town atlas of the Seventeen Provinces, reworking plates from the town atlases of Blaeu and Janssonius for most of the plans (Van der Krogt 2010, 491). In the eighteenth century, some of De Wit's plates were used in Pieter van der Aa's *Galerie agreable du monde*, published in Leiden in 1728.

Other lesser-known town atlases published in the Netherlands were generally compiled from town plans previously published in books. For instance, Jacob van Biesen published an atlas with plans of towns in Gelderland and Zutphen in 1672 that were based on town plans he published earlier in *XIV. Boeken van de Geldersse geschiedenissen* (1653). Jan de Lat reused the copperplates of the inset plans in the decorative border of Nicolaas ten Have's wall map of Overijssel for his own town plans of the province in small atlas format. After 1780 the Compagnie van Boekverkopers in Amsterdam published a European town atlas with plans previously published by Isaak Tirion (Van der Krogt 2010, 545, 551, 554). Pieter Mortier, George Gallet, Carel Allard, Pieter van der Aa, and Jacob Peeters published copies of Nicolas de Fer's *Les forces de l'Europe* between 1696 and 1726 (Van der Krogt 2010, 588). In addition, a number of books with town views were published in the Netherlands, for instance the *Beschryvinge van de heerlyckheydt van Frieslandt* (1664) by Christiaan Schotanus à Sterringa with plans of eleven Frisian towns. In general, these relatively small-scale town plans (atlas folio size or smaller) were copied from earlier plans. The towns were mainly represented in bird's-eye view with the buildings displayed in perspective. These maps were produced for a more general, but still highly educated, audience.

A relatively new and still little-studied genre of urban mapping was initiated by the more influential and wealthy city councils, which commissioned the best surveyors and engravers to produce multisheet wall maps of their cities. Sometimes these surveyors were employees of the city, or at least well known in the region. The production of these multisheet town plans was time consuming and costly because they were based on new surveys. In most circumstances, the year indicated on the map reflects the geographical situation of the city at the moment when the surveying was completed; time-consuming engraving and printing could delay publication for some years after the map's ostensible date. The publication of multisheet town plans in the Low Coun-

tries in the late sixteenth and early seventeenth centuries pushed the production of city wall maps to its peak in Holland by the second half of the seventeenth century (Koeman et al. 2007, 1356) (table 6).

The baroque compositions are similar in style to other Dutch wall maps of the period. Comparable to the wall maps of *waterschappen* (water management boards), they were displayed in town halls to show the power and wealth of the city. These wall maps combined plans with urban views as well as images of the most important buildings. The city administrators did not primarily intend these wall maps to be functional works, but a means to express the beauty of their hometown and the affluence of its surroundings—all matters of local pride. During the Dutch Golden Age the character of the maps changed from a defensive or administrative objective toward a more decorative one (Ratsma 2007, 194). The addition of decorative borders with title, coats of arms, town view, and vignettes of buildings became common practice only after 1650. Yet while these great town plans clearly had a decorative function, the individual sheets of the town plans could also be used for administrative and management purposes. For example, the plan of Leiden (1670–74) by surveyor Johannes II Dou and engraver Christiaan Hagen functioned for all kinds of town management purposes. Many copies have survived on which different administrative subdivisions of the city are indicated with colors and numbers. Even in 1807, this seventeenth-century town plan was reprinted from the original copperplates and used to indicate the area destroyed by the explosion of a gunpowder ship in the city center (De Vries 1997, 54). For more than a century this map was the most detailed and accurate plan of Leiden.

Cornelis Elandts was the first of the so-called "geometrical artists" who appeared during the end of the seventeenth century and turned town plans into works of art. His town plan of The Hague (*Plattegrond van s'Gravenhage*, 1667; 1681) is the first multisheet local map of this style to appear in the province of Holland (Ratsma 2007, 61–71, 125, 194). More town plans were published of Amsterdam than of any other city, with no fewer than sixty-seven different plans known, printed (or drawn) before 1670, with at least another sixty-nine surviving from between 1670 and 1795. The planned expansion of the city under architect Daniel Stalpaert led to a boom in map production around 1662, including two multisheet town plans, based on Stalpaert's design for urban expansion (Hameleers 2013, 7–9, 157–60). Different ways of compiling the sheets of these wall maps were possible, evidenced by the accompanying printed mounting scheme for the map of Delft (1678), known as the "Kaart figuratief" (ordered by the city, supervised by Dirck Evertsz. van Bleyswijck and published by Pieter Smith), which described two alternatives (Houtzager et al. 1997, 8–9). The publication of the wall

Table 6. Development over time of large multisheet urban wall maps in the Netherlands

City	Surveyor	Engraver	Printer/ Publisher	Year of publication	Approximate scale	Number of map sheets*	Dimensions of the map (cm)*
Amsterdam	Cornelis Anthonisz.	Cornelis Anthonisz. (woodcut)	—	1544	1:1,700	12	111 × 113
Bruges	Marcus Gheeraerts	[Marcus Gheeraerts?]	—	1562	1:2,350	10	177 × 100
Antwerp	Virgilius Bononiensis		Egidius Coppens van Diest	1565	1:1,500	20	120 × 265
Amsterdam	Pieter Bast	Pieter Bast	Pieter Bast	1597	1:2,400	4	94 × 82
Amsterdam	Balthasar Florisz. van Berckenrode	Balthasar Florisz. van Berckenrode	Philips Molenvliet	1625	1:1,950	9	139 × 165
Rotterdam	Balthasar Florisz. van Berckenrode	Balthasar Florisz. van Berckenrode	Evert Symonsz. van Hamersveldt	1626	1:2,400	4	73 × 82
Groningen	Egbert Haubois	Jan Lubberts Langeweerd	Nathanael Roman	1637	1:2,300	4	82 × 104
Brussels	Martin de Tailly & Nicolaas van der Horst	Abraham Santvoort	—	1640	1:3,000	6	103 × 125
Ghent	Vaast du Plouich	Henricus Hondius	Antonius Sanderus	1641	1:3,333	8	104 × 123
Amsterdam	Daniel Stalpaert	Julius Mülhüsser	—	1663	1:3,100	6	145 × 169
The Hague	Cornelis Elandts	Anthony van Zijlvelt	Nicolaas I Visscher	1667	1:3,750	12	123 × 133
Amsterdam	[after Daniel Stalpaert]		[Pieter Mortier]	1676, or earlier	1:3,750	4	102 × 120
Leiden	Johannes II Dou	Christiaan Hagen	—	1670–74	1:1,625	4	94 × 118
Delft	Jacob Spoors	Johannes de Ram	Pieter Smith	1678	1:1,200	4	82 × 125
Haarlem	[Pieter Wils]	Romeyn de Hooghe	[Bernardus Cleynhens]	1688–89	1:1,300	4	108 × 118
Rotterdam	Johannes de Vou	Romeyn de Hooghe	—	1694	1:1,850	6	110 × 122

* For valid comparison, only the number and size of map sheets covering urban areas were counted and measured, excluding the surrounding topographical prints and decorations.

map of Rotterdam in 1694 can be seen as the superlative example of multisheet town plans while it simultaneously marks the end of this genre (fig. 910). This town plan was slightly larger than those published in the years before (Ratsma 2008, 61–63, 101–2); due to differences in the total number of sheets, compilation, mounting, and the occasional addition of coats of arms, some copies were even larger. This plan of Rotterdam, by Romeyn de Hooghe and Johannes de Vou, was the last big city wall map made, although some were reprinted or republished in the eighteenth century. A comparison between the maps engraved by De Hooghe such as Haarlem and Rotterdam and those of The Hague, Delft, and Leiden by other engravers shows De Hooghe's superior engraving skills (Hameleers 2008, 190–93).

The third principal genre of Dutch urban mapping was the fortification plan. By the conclusion of the Eighty Years' War with the Treaty of Münster (1648), military engineers and surveyors had already benefited from experiences with Italian and Spanish engineers in designing and mapping fortifications (Koeman and Van Egmond 2007, 1280–90). Fortification plans served as designs for new architectural installations as well as for the management, inspection, maintenance, and defense of towns. Generally speaking, fortification mapping in the Netherlands was characterized by a lack of uniformity, probably because there was no standardized Dutch training for the corps of engineers (Scholten 1989, 149–50). Drawing or copying of fortification plans could have been part of the apprentice-style training of military engineers. Under the inspector general of fortifications Menno van Coehoorn, known as the "Dutch Vauban," systematic large series of fortification plans were commissioned. In contrast to earlier fortification plans, the representation was not limited to the fortification walls but also mapped the topography both in and around the fortified towns and fortresses. In general, the addition of topographical features increased over time, as did the application of a uniform scale and the consistent use of the color scheme of Sébastien Le Prestre, maréchal de Vauban, of yellow for projected work, red for existing walls and buildings, gray or black for embankments, blue or dull green for water, and green for vegetation (Scholten 1989, 150).

Assistant controller general Jan Philip Prevost produced plans of the fortified towns in Holland from

FIG. 910. *ROTTERDAM MET AL SYN GEBOUWEN*, 1694. This very large-scale, six-sheet plan of Rotterdam, surveyed by Johannes de Vou and engraved by Romeyn de Hooghe, illustrates the use of a complex border of views of eminent buildings, the large coats of arms of the city and its officials, and the variable outer borders incorporating the coats of arms of other local worthies. A view of the city forms the lower border. Size of the original: 206 × 238 cm. Image courtesy of the Museum Rotterdam (inv. nr. 85085).

FIG. 911. J. A. D'HERLIN AND H. E. VAN BARNSTÄDT, "PLAN VAN DE STAD SLUIS IN VLAANDEREN EN ONDERHOORIGE FORTEN," 1754. Manuscript. An example of a fortification plan of the town of Sluis, with emphasis on the external fortification walls, leaving the interior of the town as generic built space.
Size of the original: 167 × 178 cm. Image courtesy of the Universiteitsbibliotheek Leiden (COLLBN 053-07).

1724–27 and the series of Generality Lands from 1734 to 1737. Because of their comprehensiveness, uniformity, and detail in the mapping of fortified towns and their surroundings, these series of fortification plans are considered milestones in Dutch urban mapping, unequalled during the time of the Dutch Republic (Scholten 1989, 49–53). The majority of the fortification plans were concerned with fortifications of the southern frontier, such as the cities of Maastricht and Bergen op Zoom and smaller fortified towns such as Sas van Gent and Sluis (fig. 911). The War of the Austrian Succession (1740–48) saw the publication of many fortification plans (Danckaert 2007, 524), in some ways repeating the success of the earlier Dutch publication of de Fer's *Les forces de l'Europe*, which were largely dedicated to Vauban's fortifications in the Southern Netherlands (Van der Krogt 2010, 588). Although these fortification plans were made for military purposes, their publication shows that they found their way to the commercial market.

Finally, from the sixteenth century onward, urban governments also commissioned surveyors to make

large-scale plans of parts of cities for various administrative and civil engineering purposes. Due to population growth and urban expansion, this practice of large-scale urban mapping increased during the seventeenth century. The eighteenth century also saw a development of larger-scale mapping of distinct parts of towns and cities for administrative purposes. The *burgerwijkkaarten* (district maps) of Amsterdam (Hameleers 2015, 57–85) typify this development (fig. 912). In other towns, maps of districts or neighborhoods, usually made for land tax purposes, remained in manuscript. In many towns including Amsterdam, large-scale cadastral plans were published in relation to urban expansion led by city officials. These allocation maps were used for the sale of plots of land and tax administration for newly built-up areas. Finally, civil engineering projects like road and bridge widening, canal maintenance, building projects, and drainage demanded large-scale maps to accompany and guide these projects; they too remained in manuscript and were usually kept in city archives.

MARTIJN STORMS

SEE ALSO: Netherlands, Republic of the United

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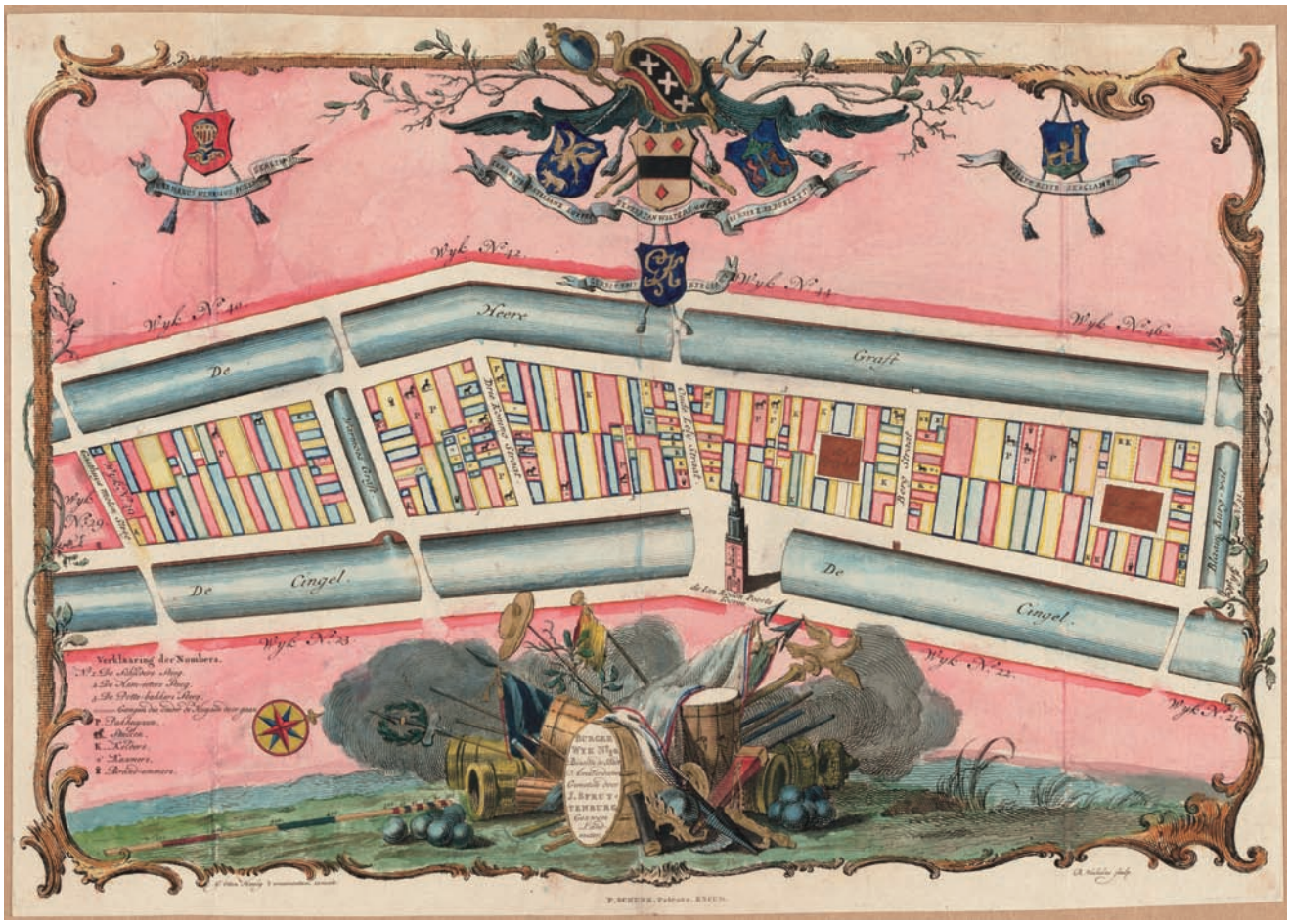

FIG. 912. JAN SPRUYTENBURG, *BURGER WYK NO 30 BINNEN DE STADT AMSTERDAM,* CA. 1784. This district map of a section of Amsterdam typifies the large-scale administrative maps produced in the second half of the eighteenth century. Image courtesy of the Stadsarchief Amsterdam (Collectie Atlas Kok, 10095/546).

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Urban Mapping in the Ottoman Empire. A defining aspect of Ottoman urban cartography through the early modern era was its varied and composite nature, developing through multiple connections to various modes of spatial representation in earlier and contemporary Islamic and European worlds (Karamustafa 1992). The seventeenth and eighteenth centuries present strands of continuity, alongside the emergence of novel modes and uses of urban mapping. Several related phenomena undergird the changes: the growing responsiveness of a closely knit cosmopolitan intellectual environment to contemporary European forms and systems of knowledge, with a burgeoning focus on geography as one of its dimensions; and particularly in the eighteenth century, the increasingly central military and administrative reform agendas of the court, which introduced a set of European actors and practices to the production and consumption of urban cartography in Ottoman lands (Kafadar 2006; Hagen 2003; Küçük 2012; Pedley 2012).

Through the course of the sixteenth century, historical and geographical works (illustrated histories and conquest narratives, pilgrimage itineraries, copies of Pīrī Reʾīs's portolan atlas "Kitāb-ı baḥriyye") had been the main manuscript contexts of city views, while individual siege plans were part and parcel of military organization and communication. Illustrated histories of the dynasty and conquest narratives were discontinued from the early decades of the seventeenth century onward; urban cartography continued to be produced within military

FIG. 913. VIEW OF THE CITY OF BAGHDAD, MANUSCRIPT ATLAS, LATE SEVENTEENTH CENTURY. Size of the original: 28.8 × 45.0 cm. Image courtesy of Topkapı Sarayı Müzesi Kütüphanesi, Istanbul (B 339, fols. 4v-5r).

FIG. 914. PROPERTY REGISTER, MANUSCRIPT, 1814. Bostancıbaşı register of property along the Golden Horn and the Bosporus, Istanbul. The register starts with the Shore Kiosk and office of the royal gardeners (Bostāniyān Ocağı) located on the Golden Horn outside the Topkapı Palace walls, and proceeds westward. Landings, mosques, and royal properties are inscribed in red ink.
Size of each page: ca. 24.0 × 16.5 cm. Image courtesy of the Library of Rare Works, İstanbul Üniversitesi Kütüphanesi (TY 8830, fols. 2r–3v).

and geographic frameworks. City views appeared in novel contexts beyond the collections of the elite, such as the image of Baghdad featuring the city's main religious landmarks and references to its defense system, included in a privately owned and eclectically composed atlas of global and regional maps (fig. 913). Manuscripts of newly popular literary works such as "Ḫamse-i ʿAtāʾī" (London, British Library, Or. 13882, 68v–69r) and illustrated ambassadorial accounts also featured bird's-eye views of cities and their suburbs (Anonymous 1810). City views and landscape paintings, often modeled after images in manuscript painting or European views circulating in print, adorned interiors of elite residences and, less frequently, public structures in Istanbul and in the empire's Anatolian, Balkan, and Arab provinces (Bağcı et al. 2010; Weber 2002).

Water distribution system maps with depictions of urban and extra-urban landmarks, structured as linear itineraries and held in rolls, present a trend of continuity with the sixteenth century (Karamustafa 1992, 215–19). Urban property surveys and descriptions and measurement of urban property prepared in the context of legal transactions continued to be produced exclusively in textual form, with recourse to the elaborate system of verbal spatial description that Ottoman surveyors and men of law, the *ʿulemā*, had articulated from the fifteenth century onward. An eighteenth-century addition to the textual mode of mapping was the creation of a new form of property register, particularly for Istanbul's increasingly popular coastal areas along the Golden Horn and Bosporus, that listed public and private property along the shorelines within a grid, each unit featuring one piece of property, adjacent units indicating the neighboring plots and when private, their owners (fig. 914) (Kayra and Üyepazarcı 1992, 4–6).

The terms for urban mapping in this period were

ḫarīṭa (earlier used mostly for naval charts), *resim*, and *şekl*. In the later eighteenth century, the widening use of surveying and mapping for architectural projects led to the use of the term *ḫarīṭa* also for small-scale urban land surveys conducted by the imperial architectural office, Ḫāṣṣa miʿmārlar ocağı, for construction and restoration projects, while the term also denoted military maps of towns and fortresses. The term *ḫarīṭa-i musaṭṭaḥa* (flat, or leveled map) was used for the earliest extant measured and scaled plan of Istanbul dating to 1812–13 (see below).

"Kitāb-ı baḥriyye" manuscripts, copies of the Ottoman portolan atlas inspired by the Renaissance *isolarii* and combining aspects of this genre with a visual and textual narrative of coastal seaways, constituted a locus for urban cartography. Its two original versions were completed in 1520–21 and 1525–26, and the majority of its nearly forty extant manuscripts date to the seventeenth and the early eighteenth centuries. Among these, a significant number are luxury manuscripts destined for libraries of elite collectors rather than for galleys of Mediterranean sailors (Soucek 1992; Tolias 2007, 269–70; Loupis 2004). City views punctuating the representation of the coastlines demonstrate the refinement and continued elaboration of the bird's-eye view into the early decades of the 1700s. The elaborate urban portraits of Istanbul and Cairo in later "Kitāb-ı baḥriyye" manuscripts capture the remarkable expanse, density, and complexity of these early modern capitals through their representation of a tightly packed, largely undifferentiated intramural fabric punctuated by monuments, which contrasts with the specificity of the depiction of extramural areas of development and the minute toponymy of landmarks and district names (see, for example, fig. 915). Particular sources of inspiration for the urban imagery of the "Kitāb-ı baḥriyye" may in part be traced to Italian maritime and urban mapping in print and manuscript. The "baḥriyye" imagery of this period nevertheless is a largely unified body of work, with a pronounced focus on the representation of major urban centers and on densely settled stretches along the Mediterranean coastlines.

FIG. 915. PĪRĪ REʾĪS, VIEW OF ISTANBUL AND THE BOSPORUS, FROM THE "KİTĀB-I BAḤRİYYE," MANUSCRIPT, 1726. The maintenance of a single viewpoint in the representation of the walled city and the Asian suburbs, the perspective rendering of particular spaces, and conventions in the portrayal of extramural areas and roads underscores eighteenth-century developments in Ottoman urban representation in connection with contemporary and earlier European practices and the integration of aspects of the printed image into the manuscript drawing. The work is oriented to the southwest.
Size of the original: 34 × 24 cm. Image courtesy of the Walters Art Museum, Baltimore (W 658, fol. 370b).

The establishment of a state-sponsored printing press in the early eighteenth century and the increasing circulation of European printed material in Ottoman domains impacted the production of urban cartography directly and also tangentially. The reception of and responses to Western European cartography in Ottoman urban representation can be traced in maps and views of Istanbul, which were in continuous reproduction and revision in Ottoman and European publications throughout this period. The Istanbul map appended to the printed version of *Kitāb-i Cihānnümā*—the only urban image in the book and within the larger corpus of the press that had a pronounced focus on geography—featured north orientation, provided a largely accurate rendering of the coastlines, used conventions of portolan charts to register toponymy, and completely emptied the represented space of all graphic and pictorial devices (Kātib Çelebi 1732). In stark contrast, a "Kitāb-ı baḥriyye" manuscript from a few years earlier (fig. 915) presents one of the densest urban images in the series of Istanbul maps, with its tightly geometricized rendering of the aerial view (Orbay 2001, 256–62). The monochrome drawing is in sharp contrast to the bold use of color and gold in all the other maps of the book, as a nod to the aesthetics

of print. The rendering of nonurban areas betrays the draftsman's familiarity with mapping conventions for arable land in early modern northern Italian and German cartography, another connection to the culture of print (Lindgren 2007).

From the late seventeenth century into the early decades of the nineteenth, a new type of cartographic image of Istanbul gained ground. Juxtaposing the orthogonal plan of the walled city and the three boroughs with the bird's-eye views of the settlements along the complete course of the Bosporus, such maps, whether produced through European or Ottoman agency, partook in a trend that became visible in European urban cartography through the 1600s: the fusion of the bird's-eye view and the orthogonal plan (Ballon and Friedman 2007). While cartographers adjusted to a new notion of accuracy centered on the representation of the street layout, the street map of Istanbul and its landmarks remained a partly rhetorical gesture throughout the period of this study. Although they exhibited differing degrees of technological advance and cartographic accuracy, neither Ottoman nor European cartographers of the period created a completely truthful rendering of the city's intricate street network. Maps of this group attest to the complex web of connections and interrelationships between Ottoman and European patrons, intermediaries, technicians, draftsmen, and users—some inhabiting multiple worlds—that characterized Ottoman cultural and intellectual production of the seventeenth and eighteenth centuries. Among them are a late-seventeenth century printed map with a legend in Ottoman Turkish (Kayra 1990, 76); a 1734 map appended to the Ottoman history of the Moldavian prince Dimitrie Cantemir, a resident of Istanbul for more than twenty years, published in several European languages (Kayra 1990, 84–85); and a map with Armenian legends, printed in 1791 in the Monastery of San Lazzaro in Venice (Katırcıoğlu 2000, 110–11), attesting to the agency of non-Muslim Ottoman communities with connections to Western European cultural centers in the dissemination of contemporary European conventions within Ottoman cartographic practice.

The Ottoman agenda of military and administrative reform, particularly from the later decades of the eighteenth century onward, expanded the production, availability, and uses of urban mapping in the Ottoman domains. Formal education in geometry, surveying techniques, and mapmaking were central to the program of schools of military engineering established as part of the reform agenda, earlier efforts culminating in the foundation of the Hendeseḫāne in 1775, which in 1795 split into the Mühendisḫāne-i Baḥrī-i hümāyūn (naval engineering school) and the Mühendisḫāne-i Berrī-i hümāyūn (army engineering school). European agents, in this period mostly French and Swedish officials and instructors, introduced contemporary surveying techniques and instruments to the newly established institutions (Beydilli 1995; Mehmed Esʿad 1986, 10–25; Pedley 2012). From the 1730s onward, maps and plans of cities and forts created for military purposes began to reveal the new techniques of measurement and drawing, and soon featured scales and consistent orientation (fig. 916) (Uzunçarşılı 1956, figs. 6–10; Finkel and Ostapchuk 2005). By the turn of the nineteenth century, the inspectorate of waterways and the Ḫāṣṣa miʿmārlar ocağı, both functioning as part of the court's administrative hierarchy, were attached to the Mühendisḫāne. The appointment of new architects to the corps was supervised by the head of the Mühendisḫāne alongside the chief architect, and some architects received education there. The connection between the Mühendisḫāne and the Ḫāṣṣa miʿmārlar ocağı, traditionally responsible for supervising construction activity in the Ottoman domains, led to the quick dissemination of current surveying and charting techniques into the realm of architecture and urban administration. While the earliest surviving architectural drawings in the Ottoman domains date from the later fifteenth century, a quantitative increase in their use and regular recourse of city authorities to drawings (*resim* and *ḫarīṭa*) is evinced by archival sources and a number of extant drawings (Istanbul, Başbakanlık Osmanlı Arşivi, HAT/9783c. [anonymous plan for restoration of a bathhouse, 1794], and C.ADL 18/1078 [anonymous plan for restoration of a mansion, 1799]; Ünsal 1963).

Manuscript maps dating to the 1810s provide perspectives on Ottoman urban cartography at the close of the period surveyed here. A map of Istanbul and the Bosporus dated 17 November 1813 expands on the then-established form of the city's cartographic image, with a street plan of the walled city and representation of extramural settlements through signage denoting property divisions. It attends to the topography of the extramural areas, the farmlands, the dams and conduits that were part of the city's water distribution system, the main roads, and some of the defenses on the Bosporus (fig. 917; and see fig. 847). Oriented to the north, it does not feature a scale. Except for the main monuments and arteries, the street layout and the landmark locations of the walled city are approximate; gridlike boundary lines in extramural areas indicate settled areas rather than actual property divisions. Only the city's defenses, architecture of the water distribution system, and a number of extramural mosques are rendered in elevation or axonometric view, a legacy of early modern conventions in urban cartography. The precise toponymy identifying public structures, palaces, embassies, commercial nodes, districts, urban gardens, and

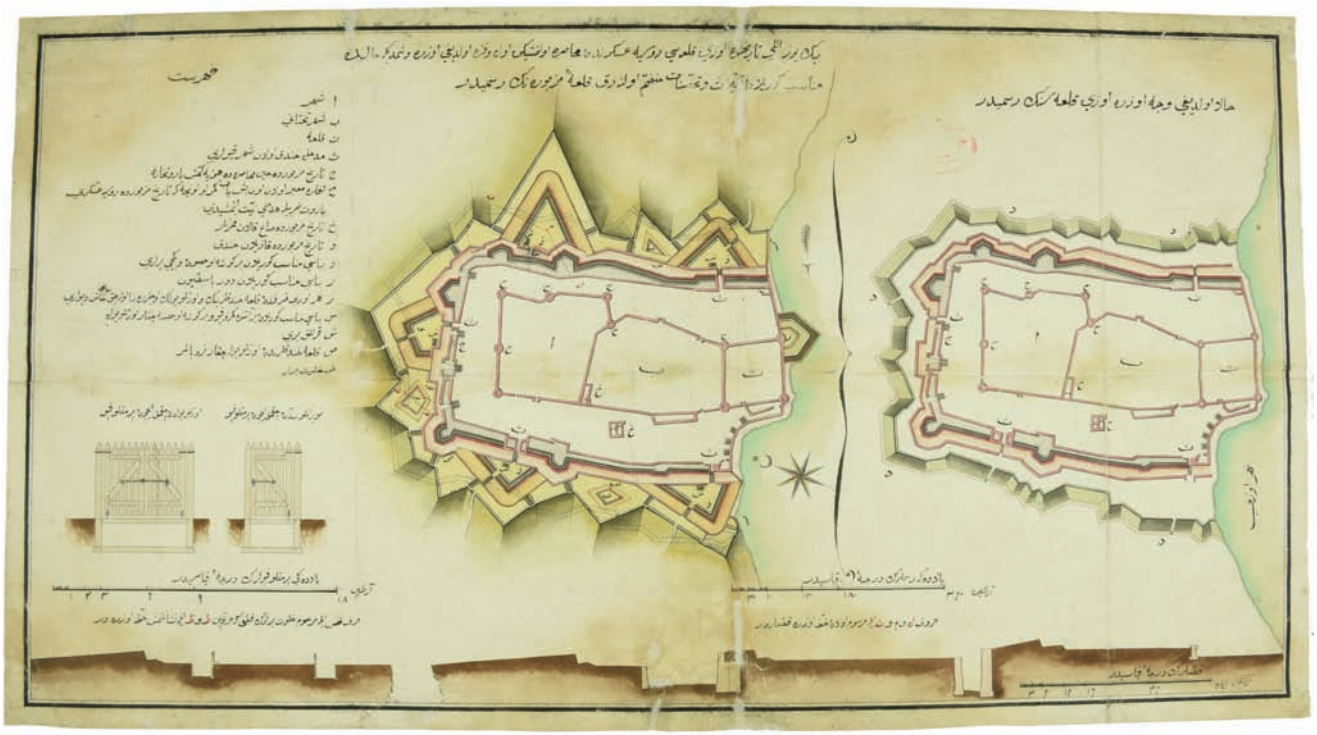

FIG. 916. ANONYMOUS MANUSCRIPT PLANS OF ÖZI FORTRESS, 1737. Actual and projected plans of the Özi fortress (Ochakiv on the Dnieper), related to a printed plan of the castle and annotated "Özi fortress as it was besieged by Russian troops in 1150 [1737–38]." The plan attests to shifts in architectural drawing within the context of military planning and construction.
Image courtesy of the Başbakanlık Osmanlı Arşivi, Istanbul (Plan ve proje, 857).

FIG. 917. DETAIL OF ISTANBUL, GALATA, AND BEŞIKTAŞ FROM MANUSCRIPT MAP OF THE CITY AND THE BOSPORUS BY KONSTANTIN KAMINAR, FORMER DRAGOMAN OF MOREA. Watercolor on paper, dated 23 Zilkaʿde 1228/17 November 1813; the full map is illustrated as figure 847. This large-scale version of Istanbul and Bosporus maps that became widespread in Ottoman and European mapping of Istanbul presents a street layout of the walled peninsula, arteries and landmarks of Galata, and topography of the surrounding land. It is distinguished from earlier Ottoman and European examples by its highly detailed toponymy and its attention to arable lands and water resources. Kaminar is the author of several regional maps in the same collection.
Size of the entrie original: 98 × 210 cm; size of detail: ca. 25.5 × 53.5 cm. Image courtesy of Topkapı Sarayı Müzesi Kütüphanesi, Istanbul (H. 1858).

extra-urban farmlands and vineyards betrays a cognizance of the larger city. Its inscription (which proudly claims the beauty of the map) identifies the cartographer as Konstantin Kaminar, formerly dragoman of Morea, and notes that detailed sections would be provided upon request. Two maps from ca. 1813 depicting the extramural and urban sections of the Bāyezīd II water distribution system illustrate the expanding use of cartographic knowledge in aspects of urban administration. Unlike earlier linear itineraries mapping waterway systems, the intramural section of one of them (see fig. 846) is an orthogonal plan of the northern sections of the peninsula, the earliest such work that utilizes a systematic geometric scale, according to the architect's cubit (zira'-i mi'mārī) and to ells (kulāç), to represent the street network and property divisions (Çeçen 1997, 24–56). Inscriptions identify the maker as Ḳule Ḳapılı Seyyid Ḥasan the engineer (*mühendis*), member of the corps of bombardiers ('Ulūfeli ḫumbaracı ocağı, established in 1734–35 and revived in the 1790s), and indicate the use of a plane table (*plançete* or *planchette*) in their production. Containing detailed graphic information and legends for particular loci and streets beyond the reaches of the water distribution system in question, the plan may be a fragment of a larger endeavor to map the city. These maps from ca. 1813 are products of the set of institutions and networks of interrelationship that characterized Ottoman cartographic production at the turn of the nineteenth century. They represent the web of connections between the Ottoman and European worlds, between works in print and manuscript, and between military and civil practices that characterized the production and use of cartography at this juncture.

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Urban Mapping in Poland. Detailed urban surveys were carried out in Poland as early as the thirteenth century in conjunction with the location acts (*akty lokacyjne*), which legally incorporated each city, although no maps survive. The foundation of new towns, starting in the fifteenth century, led to further surveys and a few plans do survive, while several Polish cities were included in Georg Braun and Frans Hogenberg's *Civitates orbis terrarum* (1572–1618) (Bartoszewicz and Bartoszewicz 2006, 22). Urban mapping flourished after 1648: the variety of urban plans is evident from several catalogs (Jammers and Klemp 2000; Bartoszewicz and Bartoszewicz 2006; Ehrensvärd 2008). Broadly speaking, this ac-

FIG. 918. AN EXAMPLE OF THE EARLY STYLE OF POLISH URBAN MAPS. Planimetric, no scale but proportional, no compass points, impressionistic topographical rendering. Michał Nagrodzki, manuscript map of Bolimów, 1745, 1:2,500. Size of the original: 38.2 × 47.8 cm. Image courtesy of the Archiwum Główne Akt Dawnych Collection, Warsaw (Archiwum Radziwiłłów z Nieborowa, Akta majątkowe I gospodarce starsze 108).

tivity falls into two categories: military engineering and civil administration; some of the resultant maps would eventually be published elsewhere in Europe.

The military mapping of towns in Poland began in earnest during the Thirty Years' War (1618–48). The leading Polish figure was the Rhenish engineer Fryderyk Getkant, who dedicated a collection of fortification maps dating from 1634–39, called "Topographica practica," to King Władysław IV (Ehrensvärd 2008, VI, 15, nos. 102–16). A further invasion by Sweden (1655–60) was the occasion of more urban surveys by Erik Dahlbergh, many of whose maps and views were later published in Samuel Pufendorf's *De rebus a Carolo Gustavo Sveciæ rege gestis commentariorum libri septem* (1696); Dahlbergh also copied existing Polish maps, as with the plan of Gdańsk (Ehrensvärd 2008, VII, esp. no. 35). Poland's ongoing wars with Russia, Prussia, and Austria—culminating in the third partition in 1795—inevitably produced a great number of fortification plans by Poles such as Krzysztof Eygird and by foreigners, such as Johann Georg Max von Fürstenhoff and Peter Willer (Alexandrowicz 1989, 210–36). Finally, with each partition, military engineers of the victorious armies undertook general surveys of the newly annexed cities, producing such works as the anonymous map of Toruń at 1:5,700 (1793) and G. von Rauch's 1796 plan of Warsaw at 1:14,000 (Jammers and Klemp 2000, 423, 445 [nos. 3364, 3483]).

The almost continuous warfare did not discourage Polish officials from seeking to regularize the administration of cities and towns. The post-1650 era saw a large increase in the number of urban maps in the royal map collections, especially that of Stanisław August Poniatowski. The maps were used as inventories and strategic military documents and also for urban planning. Probably the first Polish plan for an urbanization project—an unrealized new suburb of Warsaw—was prepared in 1699 by the architect Tilman van Gameren (Tylman z Gameren) (Bartoszewicz and Bartoszewicz 2006, 23, 31). Urban maps became very popular in Poland as a useful tool for urban reconstruction and for evidence in legal actions. The result was the creation of many large-scale plans of urban property. These urban cadastral plans fall largely into two phases—one in the later seventeenth century, the other in the second half of the eighteenth century (Bartoszewicz and Bartoszewicz 2006, 23–24)—and reveal a range of stylistic traditions (figs. 918 and 919). Also in the later eighteenth century, urban surveys were promoted in a few Polish cities by local initiatives. In Gdańsk, for example, the main motivator for mapping projects was the mayor, J. E. Schmidt, who authored two plans in 1780 and 1792. The publication of plans of Toruń (1769), Zamość (1774), and Kraków (1785) was commissioned by the rector of the Akademia Krakowska, Hugo Kołłątaj (Odlanicki-Poczobutt and Traczewska-Białek 1977, 9–18; Tomczak 1973, 175–98).

The state's policy of reconstructing and modernizing towns led to the establishment by the Polish parliament of paving commissions, Komisje Brukowe, which were responsible for carrying out urban planning and technical works, including detailed surveys. The first of the Komisje Brukowe was created in Warsaw in 1659, where detailed surveys were carried out in 1685, 1693, and 1700, with maps being prepared, for example, by Van Gameren (Bartoszewicz and Bartoszewicz 2006, 23–24). Similar works were also carried out in private towns (i.e., those owned by nobles) such as Kiejdany, mapped

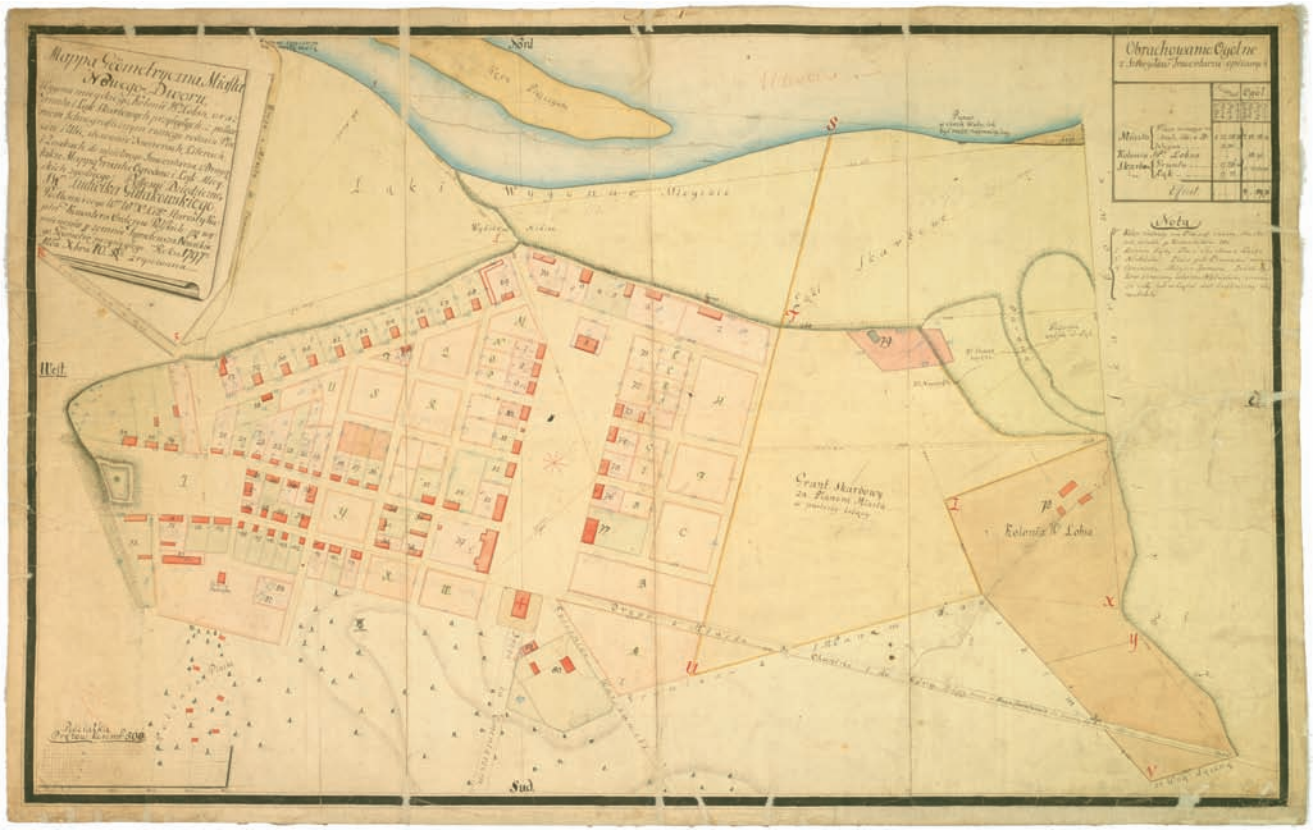

FIG. 919. AN EXAMPLE OF THE LATE STYLE OF POLISH URBAN MAPS. The scale, cardinal points, numbered plots, and a statistical summary at top right are features of later eighteenth-century style. Tymoteusz Nowicki, "Mappa geömetrycina, miasta Nowego-Dworu" (Nowy Dwór and Lobs Colony), manuscript, 1797, 1:16,230. Size of the original: 61.2 × 97.0 cm. Image courtesy of the Archiwum Główne Akt Dawnych Collection, Warsaw (Zb. Kart 341-8).

FIG. 920. PRINTED MAP OF WARSAW, 1762. Gotlob Jacob Marstaller, *Plan de la ville de Varsovie dedie a S. M. Avgvste III* (Warsaw, 1762). Marstaller reduced Pierre Ricaud de Tirregaille's eighteen-sheet manuscript map to four engraved sheets at ca. 1:6,500. The plan is one of the few maps to have been published in Poland in the eighteenth century; special features and the surrounding architectural views were labeled in both Polish and French.
Size of the original: 106 × 137 cm. © The British Library Board, London (Cartographic Items Maps K.Top.110.67.8 TAB.END).

in 1653 by Józef Naronowicz-Naroński (Alexandrowicz 1967, 253–67), and Kraków, mapped in 1733–34 (Odlanicki-Poczobutt et al. 1981). One of results of the works of the next Komisja Brukowa (1740–65), presided over by Count Franciszek Bieliński, was the preparation of an eighteen-sheet map of Warsaw at 1:1,000 by Pierre Ricaud de Tirregaille, a French engineer in Polish service; unfortunately the original manuscript went missing during the 1944 Warsaw Uprising. It was, however, published in Warsaw in 1762 at a reduced scale in four sheets (Jammers and Klemp 2000, 441 [no. 3464]) (fig. 920). A further impulse for the development of urban surveying was the establishment after 1765 of the Komisje Boni Ordinis to regulate the social and architectural organization of royal cities. To coordinate and carry out their work, these commissions contracted with only certified surveyors; the result was the formation of the association of architects and geometers, Związek Architektów i Geometrów, to manage the certification process. The next survey of Warsaw was carried out from 1770 to 1772, resulting in a twelve-sheet plan by Antoni Hiż and Hieronim Jędrzejowski (Warsaw, Gabinet Rycin Biblioteki Uniwersytetu Warszawskiego). The growing desire for information resulted in the local publication of other urban plans, such as that of Warsaw by Piotr Hennequin (1779), Kraków by Józef Kromer (1783) (Jammers and Klemp 2000, 442, 202 [nos. 3472, 1693]; Krassowski and Majewska 1980), and that of Lublin by Jan Nepomucen Łęcki (1783) (Przesmycka and Przesmycki 2010, 105–12).

The 1790s saw the decline of organized civil mapping of towns by the Polish state. First, there was a decline in institutional effectiveness. Political turmoil led parliament in 1791 to subsume both the Brukowe and Boni Ordinis commissions into the combined Komisja Policji Obojga Narodów (police commission of the two nations). This new commission was, however, dissolved in 1793 by a new government, and the older system was reinstated. The loss of Polish independence in the third partition (1795) shifted responsibility for control of the cities to the occupying powers. Their principal interest was in the establishment of cadastral regulation plans (*plany regulacyjne*) of confiscated royal, private, and clergy estates at scales between 1:2,500 and 1:5,000.

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Urban Mapping in Portugal. Urban cartography produced in Portugal has not yet been the object of specific study and its sources remain dispersed. A significant number of maps were produced in the second half of the eighteenth century, reflecting the reformist politics in effect throughout the Portuguese territory. These urban maps and plans could bear several designations: *planta*, *planta geometrica*, *planta topographica*, *planta ichnografica*, *carta topographica*, *mappa topographico*, *plano*, *projecto*, *prospecto*, *perspecto*, *prospectiva*, *perspectiva*, *vista*, *demonstração*, *elevação em prospectiva*, *elevação e faxada*, or *perfil da cidade*.

Three aspects in general characterized urban map production: the persistent influence of military cartography, the particular circumstances concerning the imperial capital of Lisbon, and the dependence of cartographic practice on urban projects. Increased military influence stemmed from the Portuguese Restoration War (1640–68) as well as the renewal of the network of urban fortifications along the borders that required upkeep for decades and implemented knowledge of geometry and its techniques.

The need to rebuild Lisbon following the earthquake of 1755 provided Sebastião José de Carvalho e Melo, marquês de Pombal, with a specific opportunity to intervene in urban space with enlightened political ideas. The Casa do Risco das Obras Públicas, responsible for the design of public works and led by military engineer Manuel da Maia, commanded other official engineers and architects and produced a rich corpus of cartographic materials, including surveys, blueprints, and architectural designs of various scales. Its working methods were consolidated into an urbanistic school with national influence (Rossa and Tostões 2008).

A similar organization, the Junta das Obras Públicas, was instituted in Porto in 1762 with the objective of modernizing the urban network, though within the political and economic purview of the Companhia Geral da Agricultura das Vinhas do Alto Douro. The Junta brought together military engineers and civil architects who operated through the nineteenth century. The most significant groups of documents were the cartographic representations of principal cities, namely Lisbon and later Porto as well as Coimbra, with design plans related to the Coimbra university reforms of 1772. These institutions continued to depend on military techniques and administration, even though municipal administrations may also have been involved. They described themselves as *casas de riscar* (houses of design), developing a cartography based on urban and even architectural projects. Such works included small and large renovations, new construction, street-widening projects, leveling of plazas or ports, and urban expansion plans. The most radical cases involved the rebuilding of the Baixa (town center) of Lisbon and the foundation of new cities, such as Vila Real de Santo António (1774), whose creation was related to the fishing reforms in Algarve.

The experience and scientific culture of military engineering dominated land surveying operations and helped to spread skills related to trigonometric triangulation, but on the urban scale, mapmaking was linked to engineering and architecture and served technical and political purposes exclusively. As a result, published urban maps were rare, increasing only after 1780. The

FIG. 921. GONÇALO LUÍS DA SILVA BRANDÃO, "PLANTA DE VIANNA, BARRA E CASTELLO, FEITA EM 1756, E ACRECENTADA NA CERCA DO CONVENTO DOS CRUZIOS EM 1758." Manuscript plan in "Topographia da fronteyra, praças e seus contornos, raya seca, costa e fortes da provincia de Entre Douro e Minho," 1758.
Image courtesy of the Biblioteca Pública Municipal do Porto (MS. 1909).

ambiguity between mapping an existing urban reality and representing proposed urban projects oscillated between cartography's various graphic forms and architectural planimetry, as expressed in a variety of names for these maps: topographical maps (or *planta do terreno*); general city maps or detailed sector maps, which seldom corresponded to a cadastral register; surveys of seacoasts for port infrastructure projects; plans for aligning and leveling roads; and prospects or elevations for roads and buildings.

General examples of military influence may be found in two manuscript collections: the designs of the "Vezita às praças do Alentejo" by Miguel Luís Jacob, 1755 (Lisbon, Direcção de Infra-Estruturas–Gabinete de Estudos Arqueológicos de Engenharia Militar, 1390/1400-3-40; Dias 2008, 108), and the "Topographia da fronteyra" by Gonçalo Luís da Silva Brandão, 1758 (Brandão 1994) (fig. 921). It is difficult, however, to note singular examples that support other trends in urban mapping. Several works were developed in the process of rebuilding

(*facing page*)
FIG. 922. AN UNREALIZED PROPOSAL FOR REBUILDING PART OF LISBON AFTER THE 1755 EARTHQUAKE. Filipe Rodrigues de Oliveira, Manuel Álvares Calheiros, Gualter da Fonseca, Lourenço José Botelho, and Tomás Rodrigues da Costa, directed by Manuel da Maia, "Planta que comprehende os Terrenos das partes contiguas de Lisboa desde o Largo do Convento do Rato," 6 April 1756. This manuscript plan, with a measured scale in palmos, covers a devastated portion of Lisbon between the Largo do Rato and Alcântara. It employs an unusual color scheme, with grey for the built up areas, reserving red for important buildings.
Size of the original: 114 × 65 cm. Image courtesy of the Museu da Cidade, Lisbon (MC Des. 982).


Planta
Que comprehende os Terrenos das partes contiguas de Lisboa desde o Largo do Convento do Rato, Rua da nova Colonia de S. Bento,
Poço dos negros, Rua direita da Esperança, Quartel de Alcantara, até topar na nova Ribeira, que continuando por ella até encontrar a direcção do Arco do Carvalhaõ; e dahi hu proseguindo pello muro, e Casas de ponto a S. João dos bem casados, beira de Agoa livre de Bellas
Largo do Rato, até fenecer por ponto da Orta do Conde de Soure, e parte do Nascente da Rua da nova Colonia de S. Bento:
a qual mandou delinear o Mestre de Campo General, e Engenheiro Mór do Reyno Manoel da Maya em virtude de huma
ordem de S. Maj.de nelle dirigida, e communicada ao Ill.mo, e Ex.mo Duque Regedor das Justiças em 6 de Abril de 1756.

Lisbon: the "Livro das plantas das freguesias de Lisboa" by José Monteiro de Carvalho, 1770 (Arquivo Nacional Torre do Tombo, no. 153); the urban design proposals for the reconstruction of the Baixa by Eugénio dos Santos and others, 1756–58 (Câmara Municipal de Lisboa–Museu da Cidade, Des. 975–980; Rossa e Tostões 2008); and the designs for the planned expansion of the city's surrounding lands by Manuel da Maia, Carlos Mardel, and others, 1756–59 (Lisbon, Museu Nacional de Arte Antiga, Inv. 1647–1648; Câmara Municipal de Lisboa–Museu da Cidade, Des. 981–982; Rossa 1998; Rossa and Tostões 2008) (fig. 922).

The typological diversity of urban maps required different scales: measurements appear in braças (200, 150, 100, 80) or palmos (2,000, 1,000, 100, 50), depending on the size of the space represented and the purpose of the map. There is a considerable degree of uniformity in the graphic codification, reflecting the influence of the academic manuals written by Manoel de Azevedo Fortes (*Tratado do modo o mais facil, e o mais exacto de fazer as cartas geograficas,* 1722; *O engenheiro portuguez*, 1728–29) and António José Moreira (*Regras de desenho para a delineaçaõ das plantas, perfis e perspectivas pertencentes à architectura militar, e civil*, 1793). In addition to simplifying the borders and titles, a nearly constant color code was maintained; red represents existing buildings, in contrast to yellow for projected works. Sometimes these differences were emphasized by a continuous line or a dashed line, whereas a dotted line was used for ruins. Less standardized aspects appeared in the representation of gardens, and the representation of relief made use of three-dimensional simulation. Naturally other noncartographic representations of urban space, whether drawn or written, persisted. The creation of *vistas* (perspective views), the traditional pictorial technique of urban iconography, continued to be popular, appearing in various media (wood, paper, and tile). Similarly, the secondary representation of urban drawings on regional maps was not abandoned. At whatever scale or for whatever purpose, the city remained a point of reference in any representation of land cartography.

MARGARIDA TAVARES DA CONCEIÇÃO

SEE ALSO: Portugal

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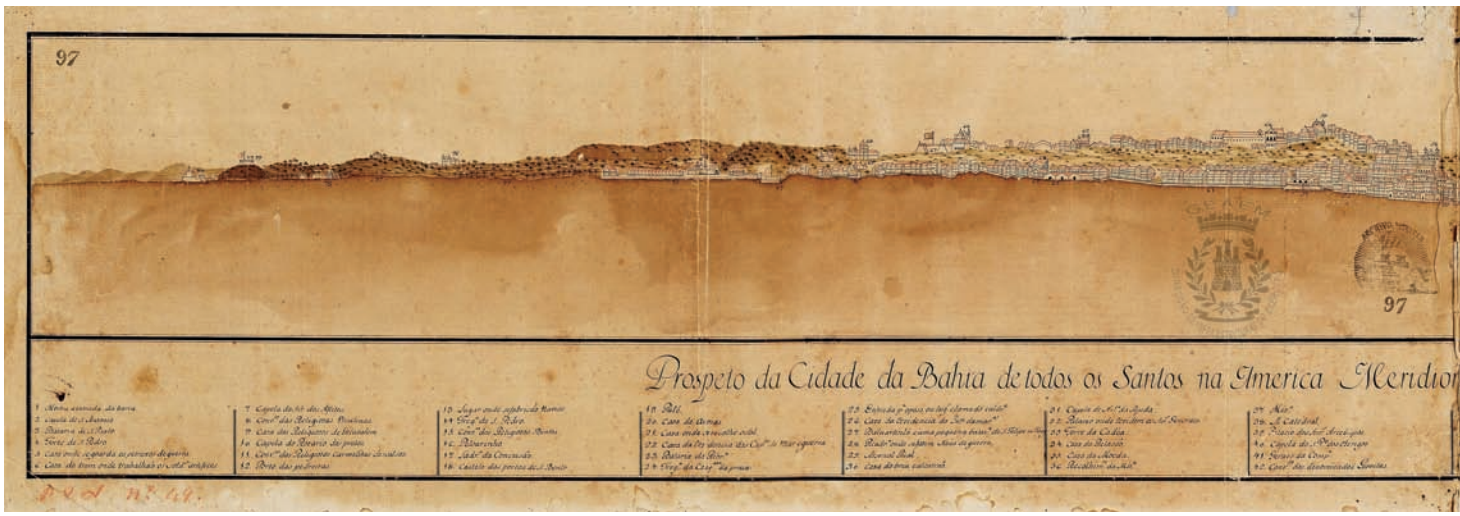
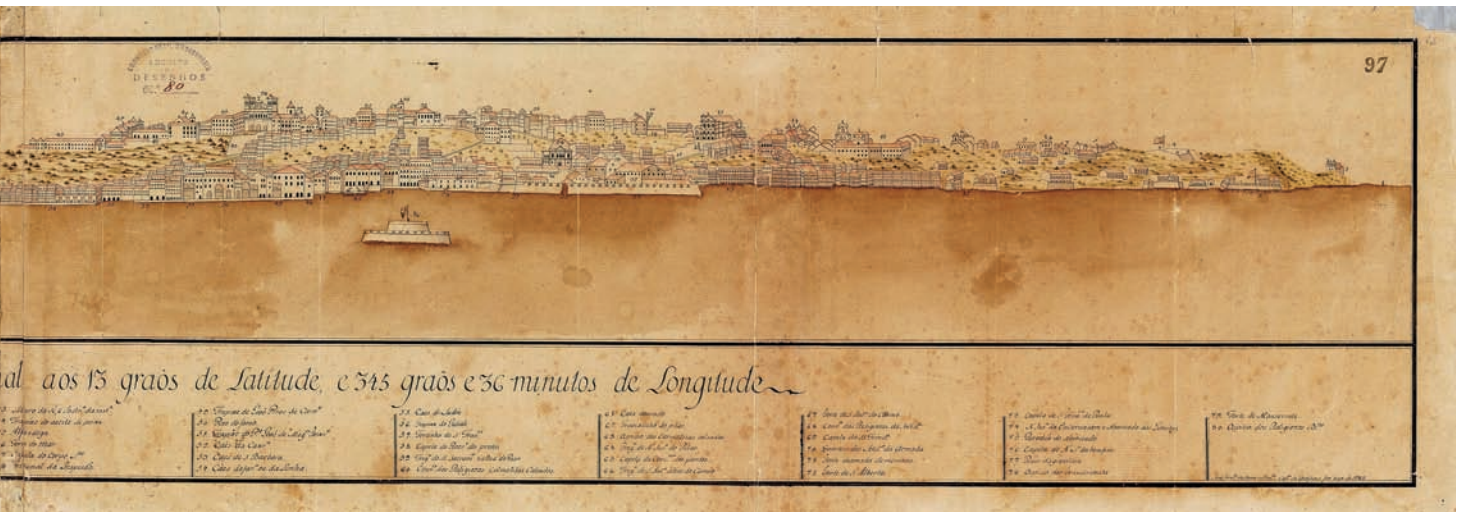


FIG. 923. JOÃO FRANCISCO DE SOUZA E ALMEIDA, "PROSPETO DA CIDADE DA BAHIA DE TODOS OS SANTOS NA AMERICA MERIDIONAL AOS 13 GRAÔS DE LATITUDE, E 345 GRAÔS E 36 MINUTOS DE LONGITUDE," 1782. A panoramic manuscript view of the city of Salvador, drawn from the point of view of the Bahia de Todos os Santos, showing the principal civil, military, and religious buildings.
Size of the original: 25 × 140 cm. Image courtesy of Portugal/Gabinete de Estudos Arqueológicos da Engenharia Militar/Direção de Infraestruturas do Exército (4562-1A-10A-53).

Urban Mapping in Portuguese Africa. See Topographical Surveying: Topographical Surveying and Urban Mapping in Portuguese Africa

Urban Mapping in Portuguese America. Urban maps in eighteenth-century Portuguese America were specifically topographic maps at medium scale—in plan, elevation, and perspective—that focused on cities and served primarily administrative and military purposes. In spite of their aesthetic qualities, they were treated as state documents and prepared by professionals trained by and working for the state. The Conselho Ultramarino and Conselho de Guerra ordered and supervised these mapping activities. As such, urban maps were treated as secret documents and maintained in manuscript form, sketched in China ink and watercolor, until the end of the eighteenth century. Even though such plans existed in the sixteenth and seventeenth centuries, they changed radically in the eighteenth century in both quality and quantity as cities increasingly defined and defended the boundaries between Portugal's overseas conquests and other European overseas territories. When Brazil became the principal colony of the Portuguese Empire, its cities served strategically to defend the coast and the inland frontiers as negotiated with Spain in the Treaties of Madrid (1750) and San Ildefonso (1777). Therefore, cities merited town planning as well as architectural and military projects. Many proto-urban settlements in the inland territory were created from projects idealized by military engineers. Other older urban centers required topographic surveys to reinforce their systems of attack and defense; these efforts produced maps, elevations, and perspectives, detailing military conditions and proposing new ramparts, trenches, and fortresses. The panoramic view of the city of Salvador—"Prospeto da cidade da Bahia" (fig. 923)—drawn in 1782 by João Francisco de Souza e Almeida, *ajudante de engenheiro na praça da Bahia,* is a copy of the perspective view designed by the military engineer José António Caldas in 1756 (Reis Filho 2000, 316–19). All projects for cities and new construction were sent to the Conselho Ultramarino in Lisbon to be approved by the *engenheiro-mor* (principal engineer) of the kingdom. Urban maps mediated all these operations, making them increasingly important tools for decision making and reflections of the investment made in training capable professionals who could master such cartographic techniques.

The best sources for understanding the production process of urban maps are two treatises written by the *engenheiro-mor* of Portugal, Manoel de Azevedo Fortes: *Tratado do modo mais facil, e o mais exacto de fazer as cartas geograficas* (1722) and *O engenheiro portuguez* (1728–29). Published during the reign of João V (1706–50), they were written to educate national engineers with a common method, to define Portugal's overseas territories, and to establish its own political and ecclesiastical boundaries. His *Tratado do modo mais facil* focused on geographic maps, teaching the easiest and most exact method of surveying large areas and transferring that data to paper. It included appendices that discussed instruments and techniques for surveying perspective



townscapes. The *Engenheiro portuguez* concentrated on medium-scale topographic maps, instructing how to measure distance and accessible surfaces by using practical geometry and trigonometry. It also described the instruments and techniques used for surveying terrain, drawing elevations and perspectives of cities or buildings, transferring plans to a larger or smaller scale, and representing in aerial perspective the landscape around the city. Azevedo Fortes further highlighted the conventions, codes, and techniques of representation and of coloring maps (composition of pigments, techniques of watercolors, and the design, use, and role of colored symbols) (Bueno 2004, 226–27).

Adopted by the military academies, these two works unified the practice of cartographic representation in Portugal by introducing international rules and principles as discussed in similar French treatises, such as Jacques Ozanam's *Methode de lever les plans et les cartes de terre et de mer* (1693) and Nicolas Buchotte's *Les regles du dessein et du lavis* (1721/1722) (Bueno 2011, 102–27).

Urban maps of Portuguese America were created using instruments and techniques to measure lengths and plane surfaces, determine the volume and dimensions of a solid, and triangulate and measure space. These included the *prancheta circular moderna* (an ancestor of the theodolite), chains, ropes, and landmarks. To create perspective townscapes, engineers used the Dürer grid or the camera obscura (Bueno 2011, 124–25).

The reforms proposed by Azevedo Fortes for teaching mapmaking at the military academies had a positive effect; drawings multiplied and showed considerable technical refinement. Attractive cartouches framing titles and legends mirrored the aesthetic taste of the period (from Baroque to Rococo); the cartouche was one of the few elements on a map in which the engineer was free to escape from the increasingly codified rules of spatial representation that required increasing mathematical discipline.

BEATRIZ PICCOLOTTO SIQUEIRA BUENO

SEE ALSO: Portuguese America

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Urban Mapping in the Portuguese East Indies. The Portuguese tradition of mapping the empire's towns and fortresses in the East Indies on the eve of the Enlightenment is well illustrated by the "Livro das plantas de todas as fortalezas, cidades e povoações do Estado da Índia Oriental" from 1635. This work includes fifty-two views and plans drawn or collected by Pedro Barreto de Resende, the secretary of the viceroy of India, together with texts by the chronicler António Bocarro. The work responded to orders issued by Filipe III of Portugal (Felipe IV of Spain) after five decades of Spanish rule in the context of the Iberian Union (1580–1640), at a time when Gaspar de Guzmán, count-duke of Olivares, sponsored a number of mapping projects on the Iberian possessions in Europe and other continents. Due to the strategic value of these materials, their publication was forbidden by law, thus reducing their circulation. Resende further improved and enlarged this work with a volume entitled the "Livro do Estado da Índia Oriental" (ca. 1636). The latest known version of this "Livro" is dated 1646 (London, British Library, Sloane MS 197), yet the seventy plans of eastern cities and fortresses included in a manuscript atlas by the royal architect João Nunes Tinoco in 1663 are still little more than reproductions of Resende's pictures (Lisbon, Biblioteca da Ajuda, MS 46–XIII–10). Simplified versions of the work compiled by Resende can be found in the influential *Asia portvguesa* of Manuel de Faria e Sousa (1666–75) (Garcia 2007, 405–15; 2009, 25–40; Oliveira 2009, 26–28; 2017, 42).

The roots of these works go back to sixteenth-century urban iconography, namely the views in the "Lendas da Índia" produced ca. 1550–63 by the chronicler Gaspar Correia in India under the viceroy João de Castro (Lisbon, Arquivo Nacional Torre do Tombo) (Alegria et al. 2007, 1017–19), who had himself prepared maritime rutters containing harbor views and plans. Two atlases made by the Luso-Malaysian cartographer Manuel Godinho de Erédia in 1610–ca. 1620 also contained harbor views and plans (Alegria et al. 2007, 1022–24; Oliveira 2017, 43–44).

Despite the difficulties of circulation imposed on these materials, they served as a basis for many plans and views of Portuguese cities in the East Indies produced in Europe, such as those by Arnoldus Montanus (*Ambassades mémorables*, 1680), Allain Manesson-Mallet (*Description de l'univers*, 1683), Pieter van der Aa (*La galerie agreable du monde*, 1690–1700), Alphonsus Lasor a Varea (*Universus terrarum orbis scriptorum calamo delineatus*, 1713), Joseph-François Lafitau (*Histoire des découvertes et conquestes des portugais*, 1733), and Antoine François Prévost (*Histoire générale des voyages*, 1746–70).

A number of new and more accurate representations of Portuguese cities—namely those captured by the Dutch, such as Mangalore, Cannanore, Cranganore, Cochin, Quilon, Jaffna, Colombo, Galle, and Malacca—also appeared in Northern European contexts. The two most important surviving possessions of the Portuguese in Asia, Goa and Macao, are thus represented in Dutch,

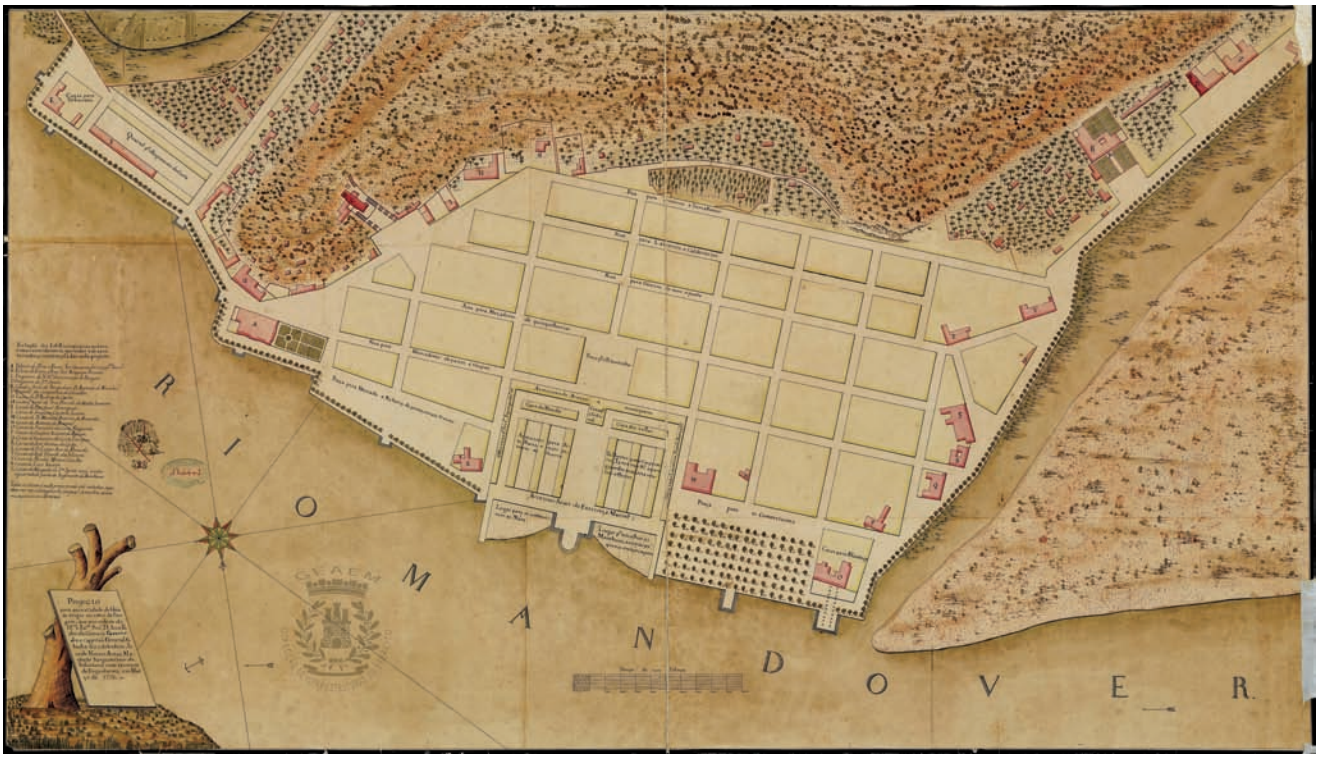

FIG. 924. PROJECT FOR THE NEW CITY OF GOA TO BE BUILT IN PANGIM. "Projecto para a nova cidade de Gôa se erigir no sittio de Pangim," 1776, by José de Morais Antas Machado; manuscript with watercolor. Size of the original: 67 × 118 cm. Image courtesy of Portugal/Gabinete de Estudos Arqueológicos da Engenharia Militar/Direção de Infraestruturas do Exército, Lisbon (1236-2A-24A-111).

English, and French manuscripts and printed cartography: e.g., the manuscript work of Joannes Vingboons (ca. 1665, The Hague, Nationaal Archief, VELH 619; Zandvliet 2007, 1441–42) and Jacques-Nicolas Bellin, *Le Petit atlas maritime* (1764). The two mapping traditions—Portuguese and non-Portuguese—ran mostly parallel to each other during the eighteenth century. In the case of Macao, Portuguese plans influenced Chinese and Macanese cartography as witnessed in manuscript versions in Beijing, Zhongguo diyi lishi dang'an guan 中国第一历史档案館 (First historical archives of China), ca. 1678–1808, and in printed versions in Ruan Yuan 阮元, *Guangdong tongzhi* 廣東通志 (Comprehensive gazetteer of Guangdong), 1822, and Liang Tingnan 梁廷枏, *Yuehai guan zhi* 粵海關志 (An account of the Guangdong customs), ca. 1840.

As is the case with topographical mapping, a number of manuscript maps made by the Portuguese in the East Indies during the first half of the eighteenth century represent fortresses, some of which are urban in character, that were besieged by local powers including Mombasa (ca. 1727), Bassein and Tana (1739), Alorna (1746), and São Tomé de Meliapor (ca. 1749) (Teixeira da Mota 1979, 10–21). New and substantially more rigorous representations appeared in the second half of the century under the influence of the "enlightened" government of Sebastião José de Carvalho e Melo, marquês de Pombal (1750–77), and as a consequence of the institutional and technical innovations introduced during those years, for example in Mozambique (plans of the island and town by Gregório Taumaturgo de Brito, ca. 1754, and various plans by Carlos José dos Reis e Gama, 1786–1802), in Diu (plan by João António Águia Pinto Sarmento, 1783), in Daman (plans by José de Morais Antas Machado and Pedro Paulo Rodrigues da Fonseca, 1774–78, and two other anonymous plans from the late 1700s), in Goa (water color map of the island by Faustino António Gomes da Silva, 1812–48), and in Macao (hydrographic and topographic plan by Joaquim Bento da Fonseca, 1808) (Teixeira da Mota 1979, 34–35, 40, 68–69; Graça 1986, 30).

In the wake of the great earthquake of Lisbon (1755) Pombal's government invested heavily in urban planning. Plans were also made in India to rebuild the capital of the Estado in Goa or relocate it to either Mormugão (plans lost) or Pangim (1776) (fig. 924). The ambitious designs made by the military engineers Machado and Sarmento in 1774–77 follow the techniques and con-

ventions of the Lisbon plans made in the 1750s (Rossa 1997, 44–47, 93–111).

FRANCISCO ROQUE DE OLIVEIRA
AND ZOLTÁN BIEDERMANN

SEE ALSO: Portuguese East Indies

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Urban Mapping in Russia. The earliest surviving urban maps in Russia include plans and drawings of Russian fortresses. Dating to the early seventeenth century, plans of fortress towns on the frontier were considered essential to the construction of defensive lines. In the 1630s, for example, when the Voennaya kollegiya planned the Tula defensive line, it asked for drawings attached to reports about the projected fortifications. The Tula defensive line drawings have not survived, but it is clear from the documents that the final plan represented the fortifications in great detail (Kuzin 1955, 141–42). It is unknown whether these were measured scaled plans or topographic drawings.

In the 1720s, Peter I's European geodesists turned their attention to towns and cities. Abandoning traditional bird's-eye views and drawings, they produced plans based on instrument surveys made to scale with more or less standard symbols. On the whole, eighteenth-century plans of Russian towns, fortresses, and villages, both manuscript and printed, can be divided into four groups: plans showing the actual geographical situation, an urban ensemble of parts and whole; plans showing proposals of how ensembles might develop, often detailing buildings; plans showing proposed designs approved by the emperor; and report plans showing urban development or redevelopment in progress. Two or more of these plans often were combined (Postnikov 1996, 41).

The vast majority of Russian fortress and town plans made during the century were commissioned by state entities with different needs such as the governing senate, Pravitel'stvuyushchiy senat; the war collegium, Voennaya kollegiya; and the main chancellery of artillery and fortification, Kantselyariya glavnoy artillerii i fortifikatsii. During the early instrumental surveys of the 1720s–40s, state geodesists drew up plans of the towns and cities in the areas they were mapping. In 1733, for example, Moisey Dmitriyevich Smetyev and Aleksey Zhikhmanov presented the senate with a 1:42,000 plan of the town of Kashin showing churches and distinguished homes (Goldenberg and Postnikov 1990, 46). Although the majority of plans remained in manuscript, a handful were published by the Akademiya nauk, for example, a 1737 two-sheet plan of St. Petersburg at ca. 1:12,600, annotated in Russian and German (Postnikov 1996, 49, fig. 26), and a 1741 plan of Moscow engraved in copper (fig. 925). The Russian printing facilities at the time were poor and concentrated mainly in the Morskaya akademiya and Akademiya nauk, which published charts for the navy and small-scale maps and atlases. The only private publishing house specializing in educational and translated foreign maps and atlases belonged to Vasiliy Onufrievich Kipriyanov. Town plans remained mainly manuscript documents for use in governmental offices. The sale of printed plans was very small.

Under Catherine II, governmental urban mapping was enforced in an effort to establish measured and scaled urban plans of all the towns of the Russian Empire. Catherine II's general land survey, General'noye mezhevaniye, which began in 1765, made urban surveys a crucial part of the state's largest and most comprehensive cartographic project to date. The *uyezd* and *guberniya*

FIG. 925. *PLAN IMPERATORSKAGO STOLICHNAGO GORODA MOSKVY* (PETROPOLI, 1741). Surveyed in 1739 by a team led by Ivan Fedorovich Michurin, ca. 1:25,000, with relief shown by hachures and landform drawings. This impression was included in a copy of the Akademiya nauk's *Atlas Rossiyskoy* (1745). Hand colored. Size of the original: 50 × 54 cm. Image courtesy of the Geography and Map Division, Library of Congress, Washington, D.C. (G7064.M7 1739 .M5 Vault).

atlases compiled under the General'noye mezhevaniye usually began with plans of administrative capitals (fig. 926).

After 1775, when surveyors were installed in every *uyezd* and *guberniya*, urban plans were regularly updated. The Russian government later used an array of this local material when it published Russian town plans in the *Polnoye soborniye zakonov' Rossiyskoy imperii* (1838).

ALEXEY V. POSTNIKOV

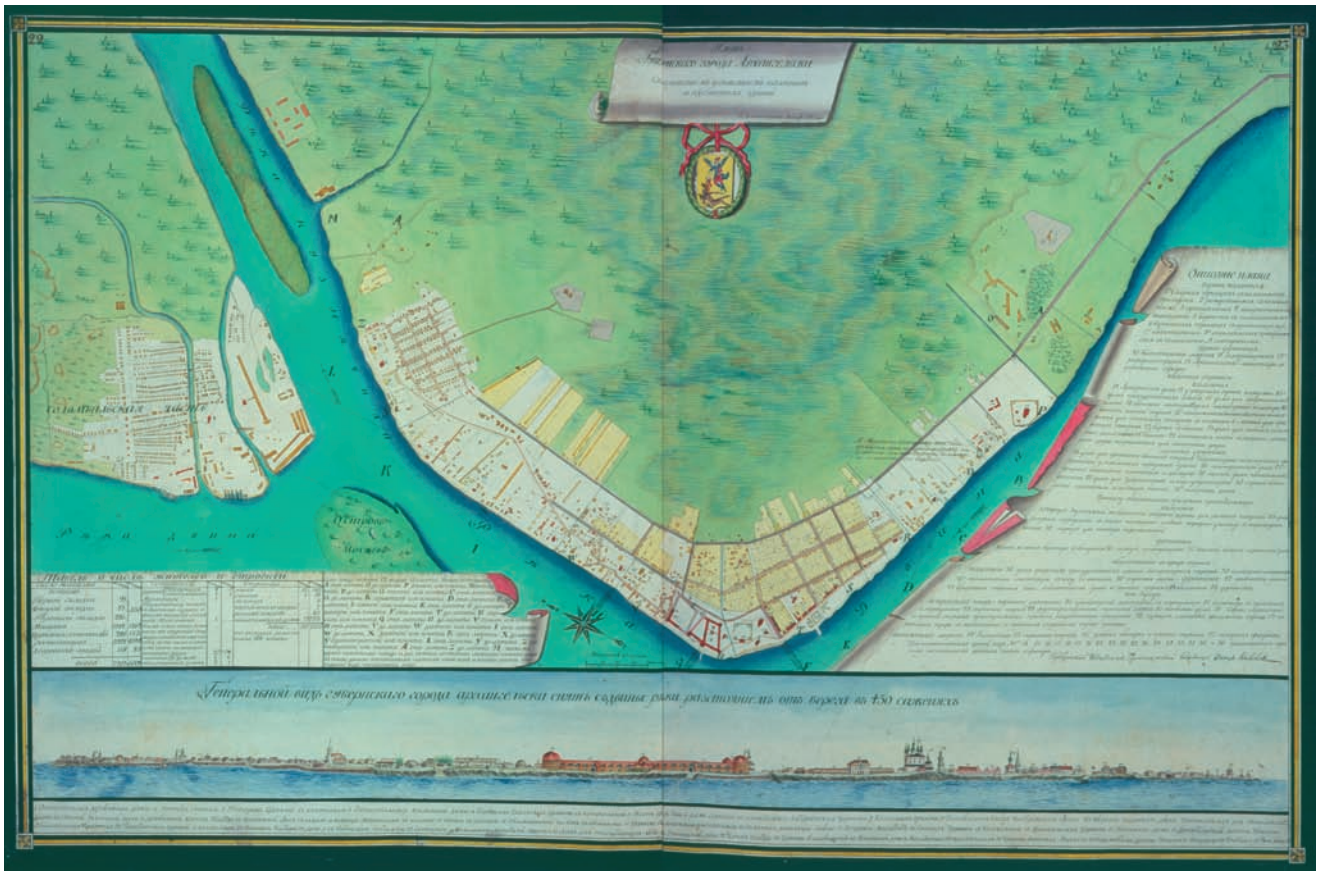

FIG. 926. PLAN OF A LOCAL CAPITAL FROM A REGIONAL ATLAS. Arkhangelsk (1792), from the manuscript atlas of Arkhangelsk *guberniya*, 1794. The manuscript is accompanied by a panoramic view of the town from the river. Size of the original: 64 × 99 cm. Image courtesy of the Rossiyskiy gosudarstvennyy voyenno-istoricheskiy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

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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 maritimas* (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

these services, sometimes in a simple descriptive manner. Examples include a plan of the Indian parish of San José (1768) within the city of Mexico (Archivo General de Indias, Seville [AGI], Mapas y planos [MP], México, 247) and another plan of Santiago de Cuba (1751) (AGI, MP, Santo Domingo, 284) featuring paved and unpaved roads; plans of Quito (1734) (AGI, MP, Panamá, 134) and La Plata (Charcas or Chuquisaca) (1779) (AGI, MP, Buenos Aires, 244), the latter by painter Ildefonso Luján, showing the presence of canal works for water drainage; and a view of Querétaro based on the manuscript "Diario del viaje . . . a la América septentrional" (1763–67) by Francisco Ajofrín (Real Academia de la Historia, Madrid). The views of Valladolid de Michoacán (Morelia, 1751) (Archivo General de la Nación, México, plano 831) and Antequera de Oaxaca (Oaxaca de Juárez, 1771) (AGI, MP, México, 543) provide rather schematic drawings of the characteristic aqueducts built in New Spain, while other plans of cities explicitly illustrate such infrastructure: a plan of Mexico City (1754) (AGI, MP, México, 545) marks the distribution of water pipes near Santa Fe; several plans of Guadalajara (1732, 1741, and 1745) (AGI, MP, México, 127, 138, and 153) depict projects for supplying water; one of Havana (1773) (AGI, MP, Santo Domingo, 379) by Ramón Ignacio Yoldi shows both extant water storage structures and fountains and those that were to be constructed; and plans of Trujillo (Peru) (1760) (fig. 929) and Santiago de Chile (1800) (AGI, MP, Perú y Chile, 141) and their environs showing the canals La Mochica and San Carlos, respectively, that would supply the cities with drinking water.

Another important objective of the government was the beautification of the urban landscape. This became manifest through the construction of landmark buildings, such as palaces, military posts, libraries, and theaters; the improvement of public space through the modification and reordering of the city layout; the adornment of streets and plazas with monuments and fountains; and the development of green areas such as promenades and botanical gardens. These are shown, for example, in views of the main plaza of Mexico City, remodeled by order of the viceroy, Juan Vicente de Güemes, 2.º conde de Revillagigedo (1793) (AGI, MP, México, 446), the promenade of Santiago de Cuba (1792) (AGI, MP, Santo Domingo, 568), and the fountains of the Plaza Mayor and the Calle Ancha of Santo Domingo, Córdoba, Argentina (1792) (AGI, MP, Buenos Aires, 181 and 182).

Public order and the organization of city space were promoted by government officials, the *intendentes* in particular, by dividing urban space into precincts or quarters (*cuarteles*) for the purpose of civic guards; these precincts were further subdivided into neighborhoods (*barrios*) supervised by a mayor under a comprehensive municipal code compiled in the corresponding *Ordenanzas*. Illustrating these divisions of urban space are the plans of Mexico City of 1750 and 1782 (AGI, MP, México, 178 and 387), and others for Valladolid de Michoacán (Morelia), San Luis Potosí, Puebla de los Ángeles, and Santiago de Querétaro (AGI, MP, México, 455, 456, 457, and 603), produced by order of the viceroy, Miguel de la Grúa Talamanca, marqués de Branciforte, between 1792–96.

Enlightenment urbanism was expressed not only in the modernization of existing settlements. The policy of territorial expansion created a new impulse toward reinforcing and defending frontiers and expanding the boundaries of provinces through the colonization and repopulation of marginal areas. This energy bore fruit in Alta California (Upper California); the Provincias Internas (Inner Provinces of New Spain); Nuevo Santander (Tamaulipas); Florida; western Louisiana; the islands of Cuba and Santo Domingo; Venezuela; the provinces of Tucumán, Chaco, and Patagonia; the New Kingdom of Granada; and Chile. The corresponding urban mapping may be seen, for example, in plans of Villa de Reinosa (1751) (AGI, MP, México, 184), founded by José de Escandón in Nuevo Santander; San Ramón de la Nueva Orán (1795) (AGI, MP, Buenos Aires, 191), founded by *intendente* Ramón García de León Pizarro in Chaco; and the city of Osorno in Chile (1793–1804) (AGI, MP, Perú y Chile, 131, 138, 155, and 156), reestablished by governor Ambrosio O'Higgins. In each case, variations to the classic urban layout model were introduced.

Some cities required refoundations, such as Concepción (Chile) and Guatemala City, which were destroyed by major earthquakes in 1751 and 1773, respectively. Two foundational plans of 1752 (fig. 930) and 1765 (AGI, MP, Perú y Chile, 49) show the new location of Concepción in the Mocha Valley, following a classical layout but with the size of the city's blocks considerably reduced. On the other hand, Nueva Guatemala was erected in the Ermita Valley following extensive surveying and topographic studies to guarantee the supply of fresh water to the new city. Two plans, dated 1776 and 1787 (AGI, MP, Guatemala, 220 and 265), allow us to see changes in the project within the main axis and collateral city blocks due to the numerous subdivisions of property.

Settlement plans are not the only sources for studying colonial urbanism. From the sixteenth century on, military mapping in Spanish America included a considerable number of plans of cities related to fortification


DESCRICION DEL VALLE DEL CHIMO,
y planispherica de la Ciudad de Truxillo del Perú.
Advertencias.
La Ciudad tiene 1634 v.s castellanas de longitud y de latitud 1354 ½, y servirá la mensura para las distancias desde el principio de las Murallas.
Las letras, que estan en el centro de la Ciudad significan.
El signo ✠ La Cathedral.
La C. el Convento de S.to Domingo.
La D. el Collegio de la Compañia.
La E. Capilla de la Carcel.
La F. Parroquia de S.ta Sebastian.
La G. Hospital de Hombres.
La H. Hospital de Mugeres.
La Y. Tambo, ó Pandilla.
La K. Convento de S.ta Agustin.
La M. el Conv.to de la Merced.
La V. Capilla de S.ta Lorenzo.
La O. Collegio seminario.
La P. Parroquia de S.ta Ana.
La Q. Monast.o de Monjas clarisas.
La R. Capilla de S.ta Rosa.
La S. El Estanco para el agua.
La T. Monast.o de Carmelitas.
La N. Convento de S.ta Fran.co
Año 1760.
Trapiche de Galindo.
Trapiche de S.to Domingo.
Hazienda de S.n Agustin.
Tierras de Conache.
Camino real que va a los Valles de Lambayeque y Piura.
Pueblo de Manseche.
Salitrales.
Pueblo de Guaman.
Pueblo de Moche.
Camino real para Lima.
Garita.
Puerto y Pueblo de Guanchaco.
9 brasas.
D. D. Michael Feijoo, Civitatis truxillensis Prator faciebat, ac delinibat.

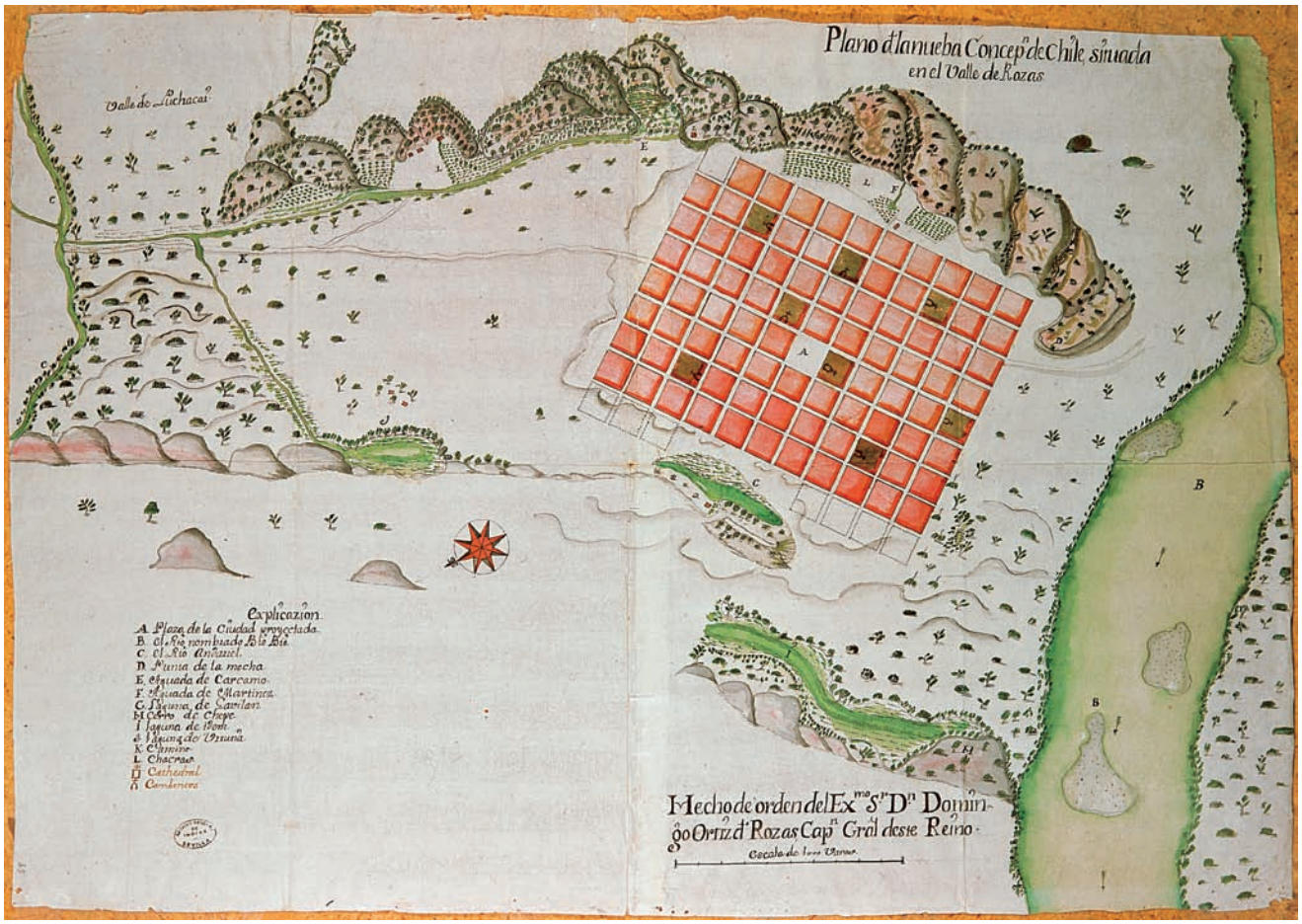

FIG. 930. "PLANO DE LA NUEBA CONCEPN DE CHILE, SITUADA EN EL VALLE DE ROZAS," 1752. Made by order of the captain general of Chile, Domingo Ortiz de Rozas, this "new" city is constructed as a quadrangle, with a central plaza; the sizes of city blocks are more reduced than in a classical model. Ca. 1:7,600, manuscript, colored.
Size of the original: 41 × 59 cm. Image courtesy of España, Ministerio de Cultura y Deporte, Archivo General de Indias, Seville (MP, Perú y Chile, 35).

projects. In the eighteenth century, especially after the British seizure of Havana and Manila in 1762, all lines of defense were reinforced, mainly in port towns servicing galleons and vessels of the commercial fleet. Cities such as Havana (fig. 931), Veracruz, Omoa, Cartagena de Indias, as well as those outside the Caribbean route, such as Montevideo, 1771 and 1781 (AGI, MP, Buenos Aires, 99 and 140) and Lima, 1740 (AGI, MP, Perú y Chile, 22), received considerable cartographic attention by well-trained military engineers. These plans allow us to follow the evolution of the fortifications as well as that of adjacent urban areas.

Cadastral and property cartography and topographic maps and plans that shed light on public works and economic activities (such as mining) may also provide sources of urban information. The mining settle-

(*facing page*)
FIG. 929. "DESCRICION DEL VALLE DEL CHIMO Y PLANISPHERICA DE LA CIUDAD DE TRUXILLO DEL PERÚ," 1760, BY MIGUEL FEIJÓO DE SOSA. The valley of Chimú with the plan of the city of Trujillo showing the infrastructure of the region by depicting the irrigation channels for water provision and the roads. Ca. 1:16,000, manuscript, sepia ink.
Size of the original: 44 × 34 cm. Image courtesy of España, Ministerio de Cultura y Deporte, Archivo General de Indias, Seville (MP, Perú y Chile, 39).

ments, born more spontaneously, became towns of irregular plan, as may be seen in the plan of Guanajuato (fig. 932).

MARÍA ANTONIA COLOMAR ALBÁJAR

SEE ALSO: Spanish America

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FIG. 931. PLAN OF THE CITY AND BAY OF HAVANA, CUBA, 1733. This map demonstrates military urban mapping, with its interest in fortifications; the estates, houses, roads, quarries, mountains, lagoons, ditches, and streams that surround the plaza are also represented. It was created by order of the governor, Dionisio Martínez de la Vega, 16 May 1733. Ca.1:4,959, manuscript, sepia ink with shading. Size of the original: 104 × 108 cm. Image courtesy of España, Ministerio de Cultura y Deporte, Archivo General de Indias, Seville (MP, Santo Domingo, 176).

FIG. 932. "GVANAJVATO: LA NOBLE CIUDAD DE GUANAXUATO, VISTA DESDE LO ALTO DEL SERRO DE S[N] MIGUEL." This manuscript plan, with its hills and mines, shows the irregular layout of a mining city. No date or scale, though the town's latitude and longitude are given (bottom right). Size of the original: 30.8 × 39.4 cm. Image courtesy of España, Ministerio de Cultura y Deporte, Archivo General de Indias, Seville (MP, México, 601).

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Urban Mapping in Sweden-Finland. In the seventeenth century, when Sweden was a great power, the extent of Swedish town planning was unparalleled in Europe (this entry is based on the much larger study by Ahlberg 2005). Only in the plans of the colonial towns of the Americas and of the Far East is there any production on the same scale. Throughout the areas under Swedish control there were plans for 100 new constructions, both foundations for new towns and relocations of old towns; about 170 extensive plans for changes in existing towns; and some 160 urban fortifications. Some were as far away as Gustavsburg (1632), opposite Mainz in

Germany, and Christinehamn (Wilmington) (1654) in the New Sweden colony in North America. The major rise in activity began in the early seventeenth century during the reign of Gustavus Adolphus (1611–32). It was then that principles were laid down, the path staked out, and work begun. The peak years came in the 1640s and 1650s. Then followed a fall in activity, interrupted by a small rise in the 1680s. It was not until the second half of the eighteenth century that a slow increase began again.

Early gridiron plans, where the streets pass through the whole town area in both directions, appeared in the 1580s. The first right-angled grid is a plan by the Dutchman Petter Nicolaus de Kemp in 1608 for the foundation of Göteborg. The city was built in an attempt to attract Dutch immigrants and was of utmost military and commercial importance. Situated on Sweden's then short stretch of western coast, Göteborg gave direct access to the North Sea. This explains the sophisticated semicircular plan in a symmetrical design, with a protected harbor and surrounding fortifications. A Dutch influence can also be seen in a number of town plans with canals, above all the rebuilding of Jönköping after 1613 and the relocation of Göteborg after 1619. From the mid-1620s, new plans as a rule became right-angled grids. Generally, a rectangular shape of the town was desired along with as much symmetry and uniformity as possible. After the mid-1650s the layouts show a new monumentality as part of the European baroque, such as Landskrona (1659 and later) (fig. 933) and Karlskrona (1683).

The largest group of plans consists of "simple, regular gridiron plans" for mainly smaller towns. There are also many "pragmatic gridiron plans," which are much more varied and adjusted to the individual prerequisites of the town and used in both small towns and the largest cities. A third group of "elaborate gridiron plans" are closer to the ideal city plans and models in the European town planning of the time (Ahlberg 2005, 377). Most are symmetrical, axial plans and regular polygons, but some are also more complex layouts where the parts balance without being completely symmetrical. The great majority of these were fortified. The maps also show some fifteen radial layouts. One that is preserved is of Hamina (Fredrikshamn) in Finland (1723).

Ever since the sixteenth century, the Crown had tried to make the burgers build in masonry. Still, almost all town construction was wood. In a map for Nyen (1644), the Swedish predecessor of Saint Petersburg, a particular area was dedicated to wooden buildings for the common people. A planned social distribution can also be seen in gradually smaller plots toward the outskirts of the town in some maps. Towns frequently burned down and, from the mid-eighteenth century, the planners tried to avoid this by removing buildings along rivers in order to provide better access to the water, widening a few streets, and planting rows of trees to stop the spread of fire.

It had been previously assumed that in the seventeenth century the land surveyors did most of the town planning in nonfortified towns, which formed the great majority of settlements in Sweden and Finland. The first instruction (1628) for Lantmäteriet (national land survey) indicates this, and in the eighteenth century it also proved the case. However, it has been shown (Ahlberg 2005) that fortification officers or others with a close connection to the Fortifikationen (fortifications administration) drew up almost 70 percent of the town plans. The most productive planners belonged to this group. Only some 20 percent of the town planning originated from the land surveyors. The remainder was carried out by a couple of leading architects or derived from the mining authority.

Urban maps demonstrated a variety of uses: as surveys for sieges; as plans for preparing quick reinforcements after capture; as spy maps; for theoretical projects; as outline plans for new foundations and town plan changes, as proposal sketches (see fig. 935), and finally as approved plans; to show alternatives and consecutive revisions; and as reports on work performed. There were particularly magnificent specimens for presentation or propaganda and what are obviously showpieces for seeking employment. The mapping thus reflected the political situation, the fortunes of war, planning ideals, and the views of the monarchs and the political elite. Urban mapping was seen as a fundamental tool in developing the administration, the economy, and remote parts of the kingdom, particularly concentrating on the north coasts of Sweden and Finland and in the mining districts of central Sweden.

NILS AHLBERG

SEE ALSO: Sweden-Finland

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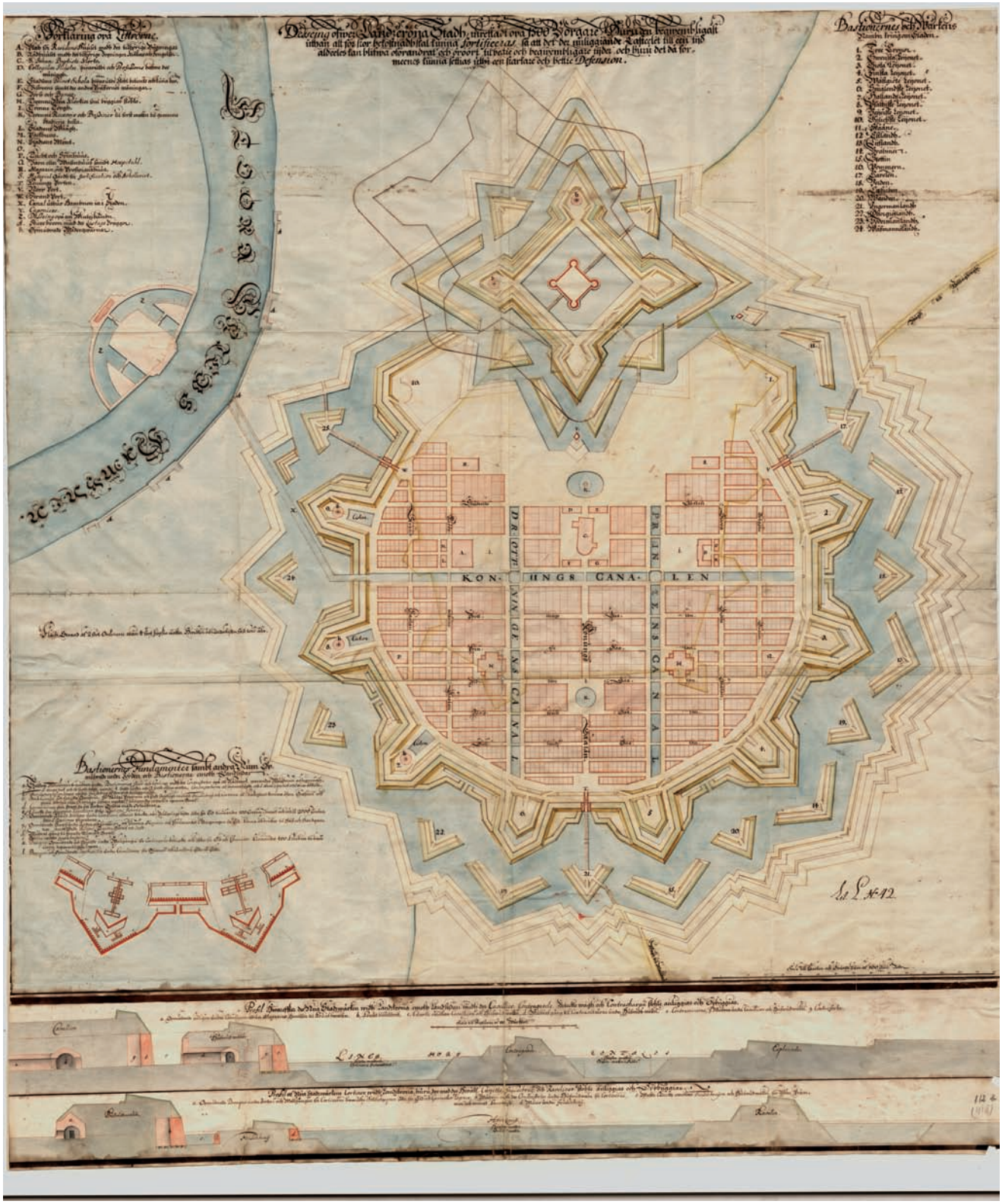

FIG. 933. THE PLAN FOR LANDSKRONA, 1680. The "Desseing öfwer Landzcrona Stadh, inrettadt opå 1500 Borgare" is one of the many magnificent fortification plans by Quartermaster General Erik Dahlbergh. Manuscript, 1:2,500. Size of the original: 96.5 × 83.5 cm. Image courtesy of Krigsarkivet, Stockholm (SE/KrA/0424/084/112b).

Urban Mapping in Switzerland. Between 1650 and 1800, Geneva, Basel, Bern, and Zurich were Switzerland's most important cities. By the late eighteenth century, Geneva's population had grown to a little more than 20,000; those of the other cities, to about 10,000 to 15,000 each. These numerical proportions are consistent from the Renaissance. Because of their size, these cities were mapped with some frequency, both in view and in plan. The motivations for mapping were three: a desire by local authorities and commercial entities to depict these cities for the general public, to provide basic information for the construction of fortifications for military defense, and to obtain precise records of property ownership.

City surveys initiated locally in the sixteenth and early seventeenth centuries continued to be used well into the eighteenth century, often only slightly altered. The best examples of the commercial re-use of earlier surveyed material may be found in the *Topographia Heluetiæ, Rhætiæ et Valesiæ* (1642) of Basel-born Matthäus Merian. The collection included bird's-eye views and twelve *veduta* plans of the most important cities and a single ground plan of Geneva (Weber 2013). Seven of the *veduta* plans were based on earlier Renaissance models (Basel, Bern, Freiburg, Lausanne, Lucerne, St. Gallen, and Zurich), and all twelve were copied later by other publishers, for example by Johann Stridbeck the Elder and the Younger and their successors Gabriel Bodenehr and Georg Christoph Kilian. Stridbeck the Younger published the *vedutas* reduced and simplified in his *Theatrum der vornehmsten Stædte und Örther in der Schweitz* (22 sheets, ca. 1700). Bodenehr published this work in 1717 at the earliest with the same title and content but with his publishing address. The 1792 *veduta* plan of Lucerne (*Elevation der Stadt Luzern*) by Franz Xaver Schumacher demonstrates the continued role for the perspective view in the later eighteenth century by basing the view of the city on the geometrically surveyed ground plan provided as an inset at reduced scale (Manetsch 2013, 402–3).

Military concerns are present in Merian's *Topographia*: his plan of Geneva—derived from Christophe Tassin's *Plans et profilz des principales villes de la province de Dauphiné* (1634)—shows most of the important buildings in cavalier perspective, useful for military architecture and fortification plans. Merian took his view of Lenzburg from the ground plan surveyed in 1624 by the engineer Joseph Plepp, who later inserted a fortification project (Huggel 2013, 374–75). Surveyed ground plans served as the foundation for fortification projects in other cities as well, such as Bern, Geneva, Solothurn, and Zurich. One of the earliest ground plans of Zurich (*Grundriß der Statt Zürrich, und deroselb. Fortification,* ca. 1:9,500) was drawn by Johann Heinrich Vogel and published in 1696; it primarily depicts the fortifications. An alternative method of providing defensive information for the planning of urban fortifications was the creation of wooden relief models, as recommended by Daniel Specklin in his *Architectvra von Vestungen* (1589). In 1627, Hans Ulrich Bachofen crafted a wooden relief model of Zurich and its surroundings (ca. 1:3,000), which was painted by Hans Conrad Gyger, as a preliminary study for a refortification of the city (Wyder-Leemann and Wyder-Leemann 1994).

Property mapping within the city served as the basis for taxation. Such cadastral plans, which were not true to scale, were initially drawn in French-speaking Switzerland from 1665 to 1680 for Lausanne by Pierre Rebeur and his son Jean-Philippe (see fig. 50) (Sardet 2013, 367). Between 1689 and 1697 Jacques Deharsu produced a similar plan for Geneva. The detailed manuscript cadastral plans of Lausanne were drawn by Antoine-Michel Gignilliat from 1721 to 1723 (184 sheets; Chavannes-près-Renens, Archives cantonales vaudoises, Gb 132/e 1-3). In Geneva, the young architect Jean-Michel Billon worked under the direction of military engineer Jacques-Barthélemy Micheli du Crest to survey the city at a very large scale, completed in 1726 and known as the "Plan Billon" (Billon 1986–87). It served the municipality as a cadastral register (fig. 934).

In German-speaking Switzerland, large-scale ground plans did not come into existence until the second half of the eighteenth century. From 1757 to 1765 engineer and surveyor Johann Jakob Brenner worked for the city of Bern to create a series of plans on a scale of 1:200. His work was followed in 1797–99 by Johann Rudolf Müller, whose important collections of plans of Bern were gathered in two atlases containing overall survey maps and seventeen detailed plans (Grosjean 1960, 15–17 [no. 69], 30–33 [no. 338]). In Zurich the engineer Johannes Müller, secretary to the city council responsible for safety, generated from 1788 to 1793 a manuscript plan ("Grund-Riss der Stadt Zurich," twenty sheets, 1:928) that named the houses and homeowners, accompanied by a booklet that provided professions and the value of the properties for fire insurance purposes (Mathis 1979, pl. 29, 31–32, 104–5).

The management of the urban fabric also encouraged measured plans of the city, particularly in connection with water supply lines. In 1765, Franz Joseph Scherer drew plans of the water supply network of Lucerne (e.g., "Plan oder Grund-Riss der Wasserleitung oder Dücklen durch welche dass Brunnen-Wasser in die löbliche Stadt Lucern her geführt und geleitet wird"); this work also provided one of the earliest geometrically surveyed

FIG. 934. "PLAN BILLON" OF GENEVA, 1726, SECTION 13–14. One of thirty-four manuscript sheets at a scale of 1:240 accompanied by a general plan at 1:800. These cadastral plans were commissioned by the government of the Republic of Geneva and surveyed by Jean-Michel Billon. Walls of structures are drawn in red and built property in yellow, with measurements noted on the plan. A numeric register of property also accompanied the plan.
Size of original: 64.6 × 72.0 cm. Image courtesy of the Archives d'Etat de Genève (CH AEG Cadastre A 2, plan 13–14).

plans of Lucerne at a scale that allowed the differentiation of individual houses. Precisely surveyed city plans were also created after major fires, such as that in Frauenfeld in 1771 (David Herrliberger, *Plan der Stadt Frauenfeld*, 1771) (Güntert 2013, 298–99).

Commercial maps of the city for the general public continued to follow in the tradition of Merian. Pierre Guillaume Martel conducted and presented to the city council a survey of Geneva and its environs in 1727, which he later had engraved and published in London, where he lived, in 1743 (*A Plan of Geneva with the Adjacent Parts*) (Clouzot 1938, 84–85); it served as the basis for C. B. Glot's *Plan de la ville de Genève, corrigé sur les lieux*, published in Geneva in 1777 (ca. 1:6,000). In 1786, Christian von Mechel published the *Grundriss der Stadt Basel = Plan de la ville de Basle*;

it featured the ground plans of individual houses and an index of street names (ca. 1:5,000) modeled after a manuscript plan by Samuel Ryhiner of 1784. In 1790, the *Grundriss von Bern*, based on Brenner's surveys, was published by Carl Ahasver von Sinner (ca. 1:3,000). Johannes Müller's map of Zurich was reduced in size by the engineer David Breitinger the Younger in 1813–14 and was published as the *Plan der Stadt Zürich* (ca. 1:3,250) in 1817, after Breitinger's death (Mathis 1979, 108, 151).

HANS-PETER HÖHENER

SEE ALSO: Switzerland

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Urban Planning and Cartography. Enlightenment town planning maps reveal the aspirations of rulers, artists, reformers, commercial speculators, and military planners to set the town as an ordered and urbane contrast to one or more "others": the uncivilized or, in colonial or expanding countries, unsettled countryside; the unplanned, spontaneously developed town now deemed deficient in regularity or poorly provided with infrastructure of one sort or another; the decaying town whose raison d'être had vanished; or the wastes of a town damaged by fire, natural disaster, war, or depopulation. Planning maps—which portrayed aesthetically pleasing towns, or ones with effective sanitary infrastructure or transport thoroughfares—encapsulated visions of urban harmony achieved through the exercise of reason and imposition of order. The word "regular" as applied to Enlightenment street patterns and building lines stemmed from the Latin *regere*, to rule. At the same time, the maps silently acknowledged dystopian fears of lack of regulation, misrule, or misery in the form of disease, disorder, destruction, and destitution. Diseases of crisis, such as cholera, were most deadly in densely packed town populations; disorder wrought by urban rioters was harder to control than that of more dispersed rural dwellers; destruction caused by fire and war in towns had particular impact because buildings were tightly packed and often important to civil, military, and religious authorities; and destitution was the fate that commonly met speculators whose projects for new towns failed. The regularity of Enlightenment town plans was aesthetically pleasing and simultaneously helped ward off disease (by segregating the diseased poor from the rich, who hoped to avoid their miasmas, and helping fresh air to flow and thus dispel or dilute miasmas), disorder (august avenues allowed the rapid deployment of troops to quash local insurrection while geometrically pleasing fortifications repelled outsiders), destruction (urbane squares acted as fire breaks and the building regulations that often went with them proscribed the use of flammable materials or overhanging storeys to minimize fire spread), and destitution on the part of the speculator by showing the august future to be had if his plan were adopted.

Enlightenment town planning maps extended earlier trends, at least in the west: increasing distaste for loosely aligned streets and buildings made the use of surveyors and scale mapping virtually universal; views in plan increasingly dominated; and maps of town building projects increasingly became commodities in their own right. Individual speculators joined the state, colonial institutions, and monopolistic incorporated companies in devising and mapping town building projects, giving a new twist to the idea of "mapping for money" (Zandvliet 1998). Privately produced town maps might be superficially indistinguishable from official ones, but in them Enlightenment ideals served primarily the capitalist, not the ruler. The following detailed examples tease out the complex mix of motives behind the easily recognizable features of regular Enlightenment town plans.

MAPS IN TOWN PLANNING Enlightenment rulers and monopolistic companies frequently used planned towns as means to control and remodel the local people and economy, though Enlightenment ideals rarely reached far below the surface of the plan. Outside Europe this policy and the role of maps in it is perhaps best exemplified by the Verenigde Oost-Indische Compagnie (VOC) and West-Indische Compagnie (WIC), whose activities extended over four continents and included the use of surveys and maps to plan new towns and to remodel those captured from the Portuguese. Surveyors often reached positions of authority in the companies, and maps were important tools of policy in many areas including town planning (Zandvliet 1998).

In Europe, fine examples of towns planned with maps are found in Sweden-Finland and Sweden's Baltic provinces. In Sweden's *Stormaktstid* (age of greatness) monarchs used towns to secure the realm's expanding borders; improve its administration; develop, control, and tax its economy; and display the rulers' sense that the nation was fulfilling its destiny as the gothic utopia. Between 1521 and 1721, with the peak of activity in 1640–60, more than three hundred projects established, rebuilt, regulated, expanded, fortified, and moved towns—a scale of town planning matched only in Latin America and the Far East (Ahlberg 2005). Particular attention was paid to strategically important towns such as Sweden's toehold on the west coast at Göteborg (founded 1608, moved 1619–21, expanded and regulated 1647–66 and 1719) or the naval town of Karlskrona (founded 1680, acquired final shape 1683); but also to mining towns such as Falun (founded 1641, moved and regulated 1624); metalworking towns such as Eskilstuna (founded 1658 as Karl Gustavsstad), and towns on the Gulf of Bothnia, such as Umeå (founded 1588, moved 1622), left high and dry as the landmass continued its post–Ice Age rise relative to the sea. Many towns had their streets regulated, often after fire caused by accident or enemy action. The earliest projects had only loosely controlled street plans, but from the reign of Gustavus Adolphus (r. 1611–32), in conscious imitation of foreign cities and using newly consolidated national surveying institutions, town planning was effected using a drawing (*schamplun, skamplun*) or map. The resultant layouts became regular, normally in a grid pattern where rugged terrain and fortification design permitted. Some town planning maps were drawn by surveyors from the civil Lantmäteriet, but most were by military surveyors from Fortifikationskår (led from 1676 to 1703 by Erik Dahlbergh, author of *Suecia antiqua et hodierna,* 1716). Numerous planning maps and fifteen scale models survive (notably in Krigsarkivet, Stockholm) (Ahlberg 2005) (fig. 935). The Swedish maps and their military provenance show the national strategic purpose behind the urban projects, the strong, early, and pervasive Swedish mapping tradition, and the influence of outsiders, for example the Dutch planners of Göteborg with its canals, and more generally of military architecture on town planning.

In the Enlightenment, private speculators joined rulers and monopolistic state companies in town planning and town plan mapping. In the United States, where Enlightenment ideals found a ready audience, individual capitalism flourished, and the population was increasing, many towns were planned and the attractive printed map was a key medium for attracting settlers and capitalists (Reps 1965). Superficially similar in their regularity, some projects were merely commercial, while others shared Enlightenment values. William Bullock, naturalist, antiquary, showman, and speculator, commissioned architect and landscape gardener John Buonarotti Papworth to plan and map Hygeia, a new town to be constructed on Bullock's land in Kentucky, close to Cincinnati. The plan shows cultural buildings, areas for agriculture and horticulture, houses for various classes of people, and a spacious house for Bullock, who encouraged people with capital and of modest means to join him. Papworth's plan shows the international reach of Enlightenment ideas: he was the self-styled "Architect to the King of Wirtemburg" (Württemberg), adopted an Italian middle name, had worked on Bullock's Egyptian Hall in London, and had built in Cheltenham in the Greek style, while his Hygeia plan translated to the United States "most of the building types and plan forms developed in England during the preceding hundred years or so" (Reps 1965, 355, 358, fig. 211). Like many similar schemes, Hygeia failed, but it reveals the Enlightenment as a mixture of rationality, commercial speculation, and showmanship. Showing order in its plan, promoting bodily well-being in its name (Hygeia was a Greek goddess of health) and human well-being in its amenities, and revering ancient learning (through travel writer Francis [Fanny] Trollope, Hygeia influenced the American Egyptian revival), the plan shows Bullock's and Papworth's regard for ancient civilizations and for rational order in the service of health and aesthetic fulfilment for persons of all classes; but it also shows how Enlightenment ideas spread by irrational showmanship and self-advertisement (in which Bullock and Papworth excelled). Papworth's interest in horticulture and gardening shows picturesque influence on late Enlightenment towns (Baigent 2013).

MAPS IN TOWN REMODELING AND RECONSTRUCTION The efficacy of a new town in making ideology concrete was well established by the time of the Enlight-

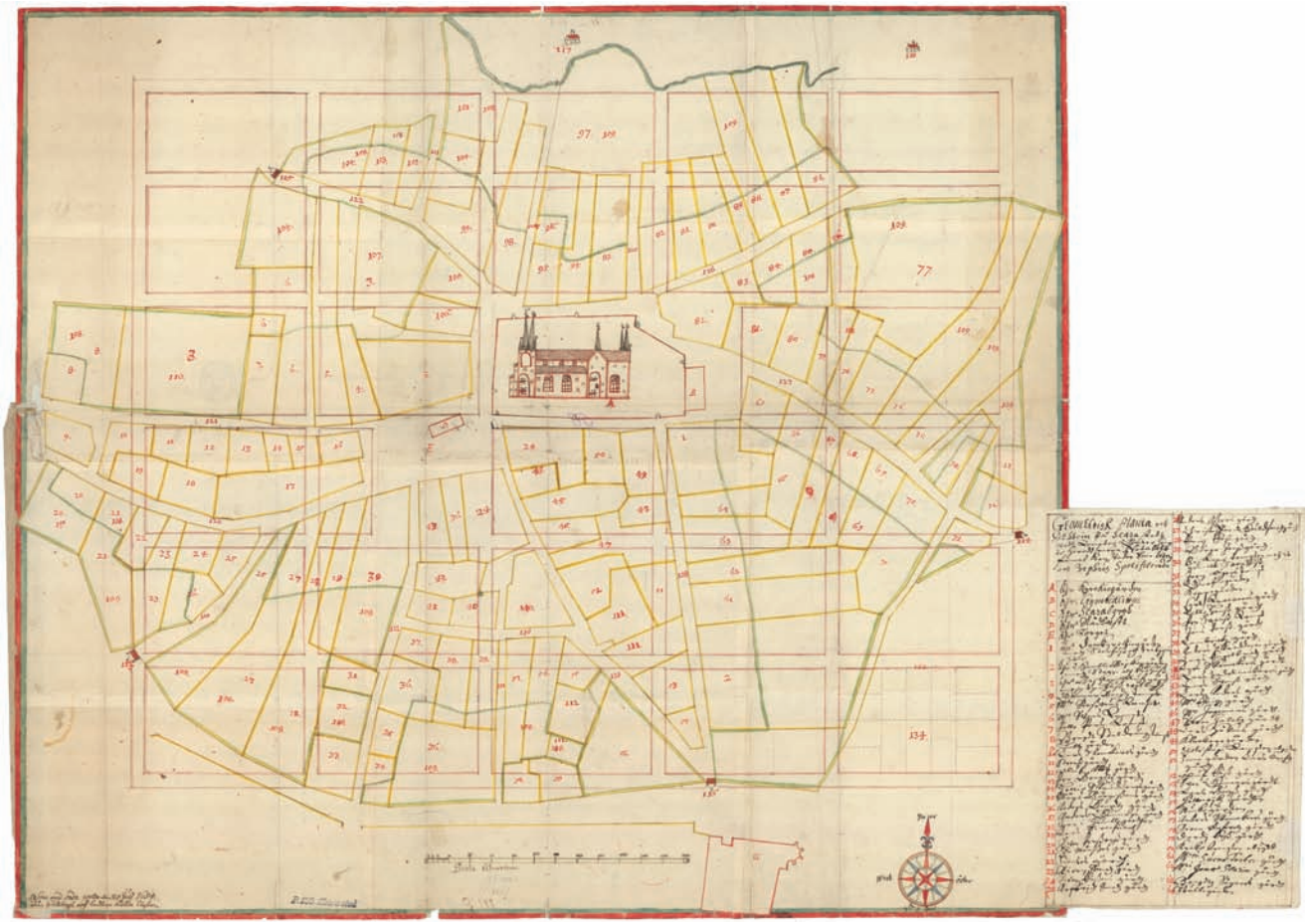

FIG. 935. SKARA, SWEDEN, BY KETTIL CLASSON FELTERUS, 1654. The new proposed urban layout is superimposed on the old one, developed since the city's foundation in the eleventh century, or possibly even earlier. The superimposition, workmanlike style, and manuscript presentation are typical, although unusually the town has no defensive works (hence the map was drawn by civil, not military, surveyors) and the reordering project was not prompted by fire. Size of the original map: ca. 73.0 × 84.5 cm; size of legend: ca. 33 × 21 cm. © Lantmäteriet, Gävle (P180-1:2).

enment. The printed town planning map, which had a much wider reach than the town itself, greatly enhanced the effect. Edinburgh's New Town shows Enlightenment principles and cartographic processes harnessed to political aims particularly well. After the political union of Scotland and England in 1707 and the defeat of Jacobite uprisings in 1715 and 1745 against the Hanoverian monarchs of Britain, Scotland became "North Britain" and Edinburgh, its capital, became the "Athens of the North," and an important site of Scotland's Enlightenment. City provost George Drummond, a confirmed unionist and Hanoverian, persuaded Edinburgh's council to hold a competition in 1766–67 for an expansion of the city, as part of his Enlightenment reforms, which extended to public health (through the building of an infirmary and improved drainage), education (through expansions to the university), and transport (through the building of a new bridge). Maps were involved at every stage of planning the New Town. John Laurie surveyed and mapped the ground in preparation for the competition, and maps were submitted to the competition judges. The winner, James Craig, produced various plans: from an original (perhaps based on the flag of the union of England and Scotland as shown in a 1766 engraved map by Laurie), to a 1767 grid version on which work was begun, to later plans that included features such as circuses. He presented a large manuscript map (London, British Library, K.Top.49.65) to George III in December 1767 for approval of street names (which recalled the royal family) and dedication ("to his sacred majesty"). Craig published engraved versions of his plans as ventures in their own right (fig. 936).

The competition process and resultant plans exemplified progress through reason—qualities that unionists also found in the new political settlement (Meade 1971).

Washington, D.C., and the maps planning it similarly proclaim the ideology of the new United States. The 1791 plan by Pierre Charles L'Enfant was perhaps influenced by the sun-ray plan of Karlsruhe, built in the early eighteenth century to display the power and enlightenment of Karl Wilhelm III, margrave of Baden-Durlach, who attracted settlers by granting them privileges (his 1715 *Privilegienbrief* combined opportunism with enlightenment). L'Enfant's Washington plan (in some versions anonymous or credited to surveyor Andrew Ellicott) epitomized the enlightenment of the new republic: its street naming system adhered to logical principles and declared the adjacent states part of the union; the siting of its public buildings mirrored the U.S. constitutional separation of powers; its name glorified the revolutionary hero; and its Mall allowed the authorities to memorialize events and people deemed appropriate for displaying the nation's history (Reps 1965, 242–56, fig. 148; Stephenson 1993).

When Enlightenment towns were visited by destruction, they were often replanned with the aid of maps. Destruction extended to that caused by natural disaster—for example, the Lisbon earthquake of 1755 that was followed by map-guided rebuilding (França 1965)

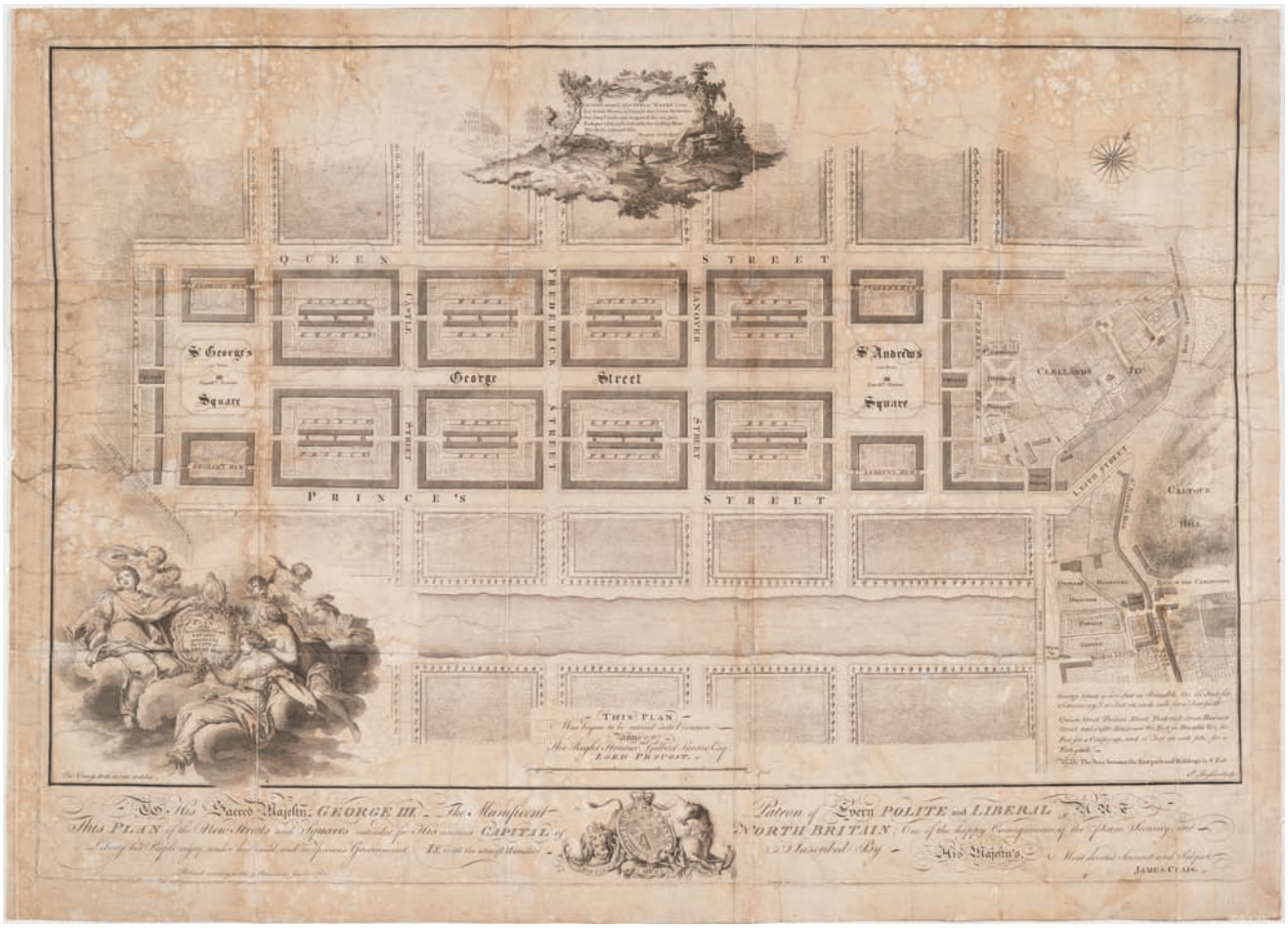

FIG. 936. EDINBURGH'S NEW TOWN, BY JAMES CRAIG. *Plan of the New Streets and Squares Intended for the City of Edinburgh,* engraved by P. Begbie ([Edinburgh], 1768). The printed version of Craig's prize-winning plan for Edinburgh's New Town. In addition to showing a typical Enlightenment street layout, the map promotes unionist ideology in its dedication to George III, street names that recall the Hanoverian royal family, and inclusion of verses that glorify Britain, of which Scotland was now part. The publication of the plan was a speculative venture, not to guide the building process but to meet rising middle-class demand for maps.
Size of the original: ca. 45.5 × 65.0 cm. Image courtesy of the National Library of Scotland, Edinburgh (EMS.s.647).

(see fig. 922)—but fire, caused by accident or enemy action, was more common and threatened towns particularly because dense building allowed fires to spread easily and because creating firebreaks, the main control measure, was itself destructive. Many towns recovered their physical size and population slowly. The rebuilding process and town planning maps themselves often occasioned conflict. The Great Fire of London in 1666 caused startling damage to England's commercial, cultural, and political capital. England's intellectual life and economy were lively and subject to weak political control, and authority in London was divided among the City of London, the monarch Charles II, and an independent national parliament. The fire was followed by a map showing the damaged area reduced by John Leake from six larger-scale "platts," plans for a remodeled city by John Evelyn, Robert Hooke, Christopher Wren, Valentine Knight (all extant), and one by City surveyor Peter Mills (now lost). Knight's curious irregular plan landed him in prison for recommending that the king profit from levies on shipping using the planned central canal. Hooke's plan was adopted by the City, and their maps secured Wren, Hooke, and Mills places as royal commissioners or city surveyors to oversee rebuilding. However, national and city authorities had neither the money to buy out the thousands of landowners nor the political power to commandeer their plots. The idea of a general plan was abandoned and instead various building acts regulated building styles, lines, and materials, while Enlightenment ideas influenced taste enough for property owners to adopt more regular styles (Reddaway 1940; Millea 2003, 52–55, nos. 27–28).

Rennes was also the scene of conflict after a fire in 1720 destroyed many of the town's half-timbered buildings. Louis XV despatched military engineer Isaac Robelin to replan the city, which he did with help of a manuscript plan of 1718 by local architect and engineer François-André Forestier (Paris, Bibliothèque nationale de France, Cartes et plans, GE C-1431). Robelin's plan for a complete rebuilding of the town on Enlightenment principles proved too radical for the citizenry, and the king sent Jacques Gabriel (who became the king's personal architect after 1734), whose plan involved no additional destruction. Using Forestier's survey as their base map, Robelin and Gabriel produced larger-scale plans for particular building projects. Forestier reduced their work for an engraved *plan directeur* of 1726 showing the proposed new district. Later, revised versions of this 1726 plan were also published. The plan shows typical Enlightenment features of wide, regular streets, although the insistence of some local people that the intercession of the Virgin Mary had saved their quarter and the deterioration of conditions in the old quarter, which became flooded with workers constructing the new town, showed the limitations of Enlightenment rhetoric (Nières 1972, 61–76).

While European Enlightenment town planning ideas moved round the globe on imperial coattails, town planning outside the Western tradition survived and provides

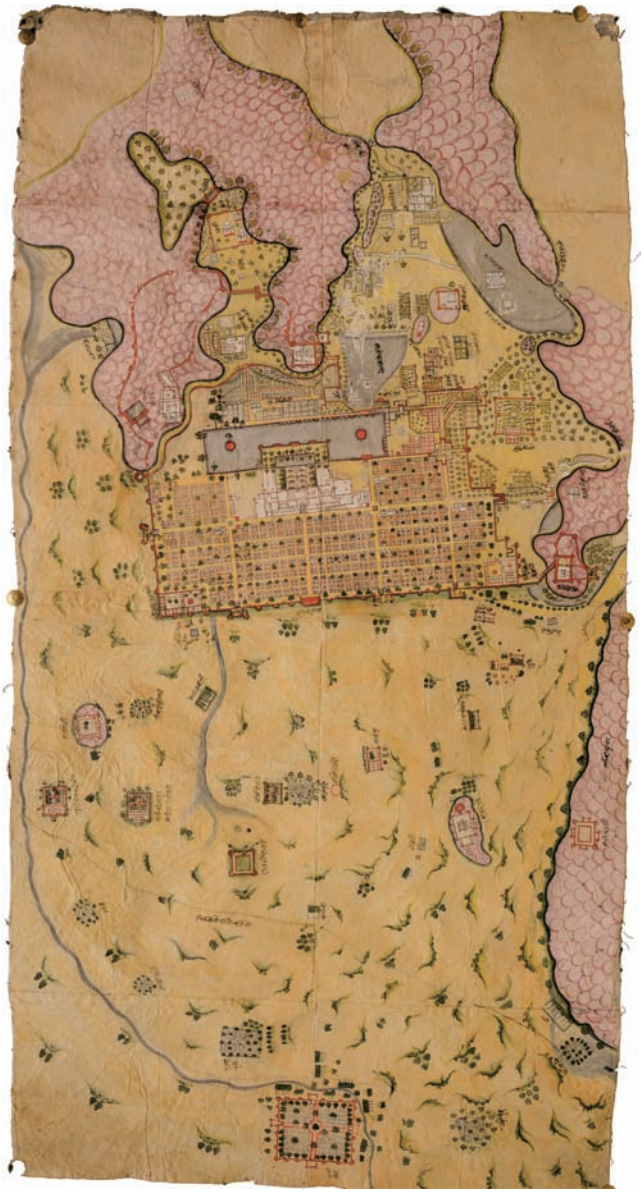

FIG. 937. JAIPUR, AUTHOR UNKNOWN, EIGHTEENTH CENTURY. Map of the planned city and its environs as far as the small gridded city of Sanganer, sixteen kilometers to the south. In Jaipur, the palace and the main wards are clearly delineated. Paint on paper.
Size of the original: 127 × 64 cm. Image courtesy of the Maharaja Sawai Man Singh II Museum, Jaipur (cat LS 16).

a contrasting view of the role of town planning maps. A celebrated example is Jaipur, in northwest India, planned in 1727 as his new capital by Maharaja Sawai Jai Singh II (r. 1699–1743), after whom it was named. Jaipur was to redefine the capital city, not merely relocate it, as part of Jai Singh's plan to assert his independence from the Mughals and his modernity. Jaipur was on a plain and open to traffic, unlike traditional city forts. Although he had contact with Western scientific ideas (Schwartzberg 1987, 361–67), and although Jaipur's grid design, multistory buildings, spacious layout, improved water supply, and dedication to the ruler are superficially similar to those of many European Enlightenment planned cities, Jaipur, like Madurai and Srirangam, follows the *vastu shastra*s, canonical treatises on architecture, design, and planning. Jaipur's grid plan is a *mandala* whose geometry and orientation situate the city and its inhabitants in a sacred landscape and a divine order. The designers remain unknown—suggestions of Jai Singh, Vidyadhar Bhattacharya (who was in charge of construction), and European surveyors all being unsupported. Although conceptual drawings, progress reports, and maps of the completed city survive (Jaipur, library of the Maharaja Sawai Man Singh II Museum) (fig. 937), none is to scale, since, unlike in the West, what was important was the correspondence between the mental construct and the experience on the ground, not between the mental construct and a plan (Gole 1989; Sachdev and Tillotson 2002).

TOWN PLAN AS ICON As the above examples show, town plans were not only handy guides for the builders. They could be political and promotional documents and commodities. In addition, the town plan became the icon and epitome of the town as the bearer of Enlightenment ideals. A portrait of Craig by David Allan (ca. 1781; Edinburgh, Scottish National Portrait Gallery) shows him not with Edinburgh's New Town in the background, but with a plan of it on his lap. The plan (showing unrealized circuses) epitomized his aspiration for the town better than did the town itself. L'Enfant's map of Washington rapidly became an object of veneration. An Italian engraving of St. Petersburg—which was founded in 1703 as the new imperial capital of Russia and built, after an initial phase of unplanned expansion around the fortress, according to ordered Enlightenment plans by Swiss-Italian architect Domenico Trezzini and French architect and garden designer Jean-Baptiste Alexandre Le Blond (Kahn-Rossi and Franciolli 1994; Medvedkova 2007, 199–201)—shows its founder, Peter I, inspecting not the building works but the plan of the town (fig. 938) (Millea 2003, 18–20, no. 12).

Town planning maps are always distanced from reality, representing desiderata, not actuality. The gap between map and reality is in some cases small (though, since the building process was often slow and fitful, being highly susceptible to economic downturns or changes of ruler, today's viewers often see a close correspondence between map and reality, where contemporaries saw chaotic building sites). The gap between map and reality might, however, be a gulf, partly because plan views of towns almost always hide relief, which in reality can mar the regularity of geometric forms, as in the steeply sloping city of Bath (Baigent 2011), and sometimes because mapped projects failed in whole or part—where schemes failed in part, the planner's aim of regularity and harmony might be damagingly compromised. Failure might be due to vested interests of property owners or political factions, or from lack of settlers, money, power, or determination. Where money was abundant and the ruler absolute and determined, the gap between map and reality could be closed; Swedish prisoners of war and Russian conscripts built St. Petersburg despite its swampy site. In other circumstances, planning maps might represent mere dreams (Baigent 2004), but always ones that reveal ideas and ideology.

ELIZABETH BAIGENT

SEE ALSO: Administrative Cartography; Cities and Cartography; Urban Map; Urban Mapping

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FIG. 938. ST. PETERSBURG, PRINTED BY ANTONIO ZATTA AND SONS OF VENICE AFTER A DESIGN BY ARTIST PIETRO ANTONIO NOVELLI. *Il Czar Pietro il grande fonda la città di Pietroburgo nell'Ingria/Le Czar Pierre le grand fonde la ville de Peterbourg dans l'Ingrie . . . le printemps de l'an 1703*. Peter I used a plan to direct building works of his new capital city. The image circulated independently of the building works as the icon of the new Enlightenment and Western orientation of Russia under Peter I.
Size of the original: 38 × 43 cm. © Ashmolean Museum, University of Oxford (Talbot 425).

Sachdev, Vibhuti, and G. H. R. Tillotson. 2002. *Building Jaipur: The Making of an Indian City.* London: Reaktion.
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Utrecht, Treaty of (1713). The Treaty of Utrecht, signed by Britain and France, was one of several between various powers collectively known as the Pacification of Utrecht, which ended the War of the Spanish Succession. In Europe itself, recognition of Philip of Anjou as king of Spain (Felipe V) by Great Britain, the United Provinces, and lesser states and of Anne Stuart as Queen of Great Britain by France were cornerstones of the new balance of power. Anglo-French negotiations, which began se-

cretly in London in 1711 before the peace conference officially had begun (29 January 1712), were drawn out by intractable disputes at Utrecht over territories in North America—the drainage basins of Hudson Bay and Labrador, the Nova Scotian or Acadian peninsula, sovereignty over the Five Nations of the Iroquois in the hinterland of Canada and New York, and, in particular, possession of and access to the Newfoundland fishery. These issues were also the subject of direct negotiations between Westminster and Versailles that circumvented the interminable discussions of plenipotentiaries (Miquelon 2001, 660–61; Veenendaal 1995, 455).

Maps were used in the Utrecht negotiations. Jérôme Phélypeaux, comte de Pontchartrain, the French naval minister (1699–1715), sent unspecified, probably manuscript, maps of North America to Utrecht. It is quite possible that he included the maps by Jean Baptiste Louis Franquelin. Nicolas Desmarets, the French controller general (1708–15), purchased a map from Guillaume Delisle in 1711 and in October 1712 asked Delisle to copy a map of North America; both maps were undoubtedly related to the negotiations (Dawson 2000, 58–60). The French plenipotentiaries described negotiating about the fishery with "map in hand" (Miquelon 2001, 675). But records of the Utrecht discussions betray little grasp of or interest in the New World beyond its islands, its Atlantic coastline, and waterways. The Mississippi Valley, so recently of burning interest to the French and central to Franquelin's maps, appears not to have been discussed.

The only map used in negotiations of which we have extended reference is an unidentified one of North America tendered by the British negotiators late in 1712, almost a year after the Utrecht negotiations had begun.

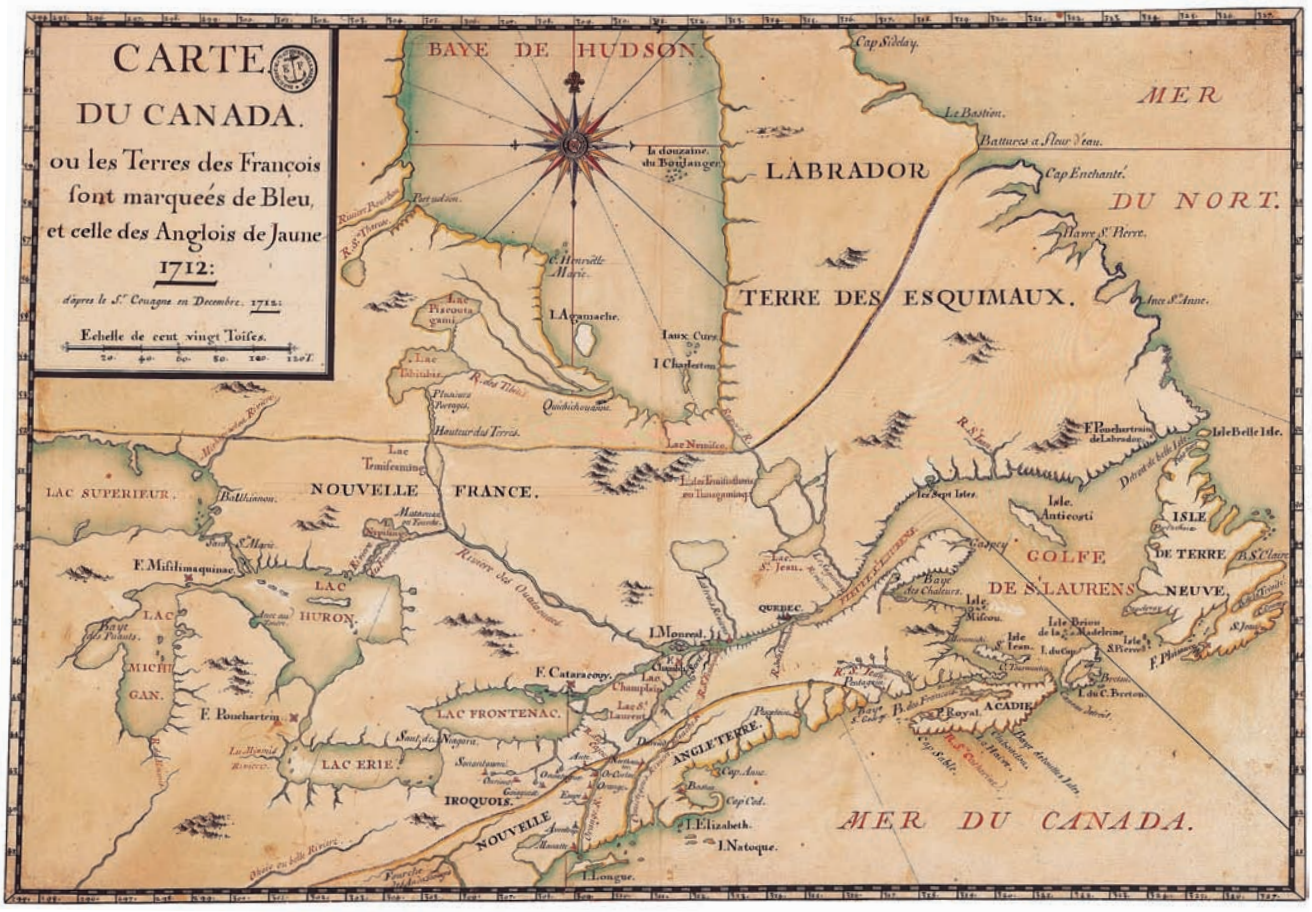

FIG. 939. JEAN-BAPTISTE DE COUAGNE, "CARTE DU CANADA OU LES TERRES DES FRANÇOIS SONT MARQUÉES DE BLEU ET CELLE DES ANGLOIS DE JAUNE 1712." Drawn on a base map by Couagne, the political boundaries on this secret French state map of December 1712 show French persistence in their claim (shown in blue, as per the title, now faded) to the territories of the Five Nations of the Iroquois, but acquiescence in most other British demands (yellow). Size of the original: 43 × 63 cm. © Service historique de la Défense, Vincennes (MV/71/67-13).

Among contemporary (1710) English printed maps, those of John Senex and Herman Moll, the latter with its engraving of the Newfoundland fishery, mirrored the most contentious issue discussed at Utrecht and would have been the obvious choices, but there is no guarantee the map was a printed one. On their proferred map, the British had drawn in a boundary line separating New France, or Canada, from the Hudson Bay and Labrador territories that they claimed for themselves. A boundary between Canada and Acadia was also marked. Louis XIV himself viewed the map at Versailles and returned it with a slightly variant boundary drawn in. Pontchartrain added a list of possible points through which the boundary should pass to guide negotiations and to make up for any bias in the foreign map. The king ordered that the map with an agreed-upon boundary be kept as a reference, but negotiators never agreed on a boundary. A French functionary, Monsieur Le Dran, writing in 1724, was unable to locate the map with competing boundary proposals, and it has not been found since (Miquelon 2001, 666–69; Le Dran 1724, 190).

A new map of Canada and its near neighbors was drawn for Pontchartrain in 1711 by Jean-Baptiste de Couagne and redrawn with political boundaries in 1712 (fig. 939), while the Utrecht negotiations continued (Miquelon 2005, 67–71). No evidence states that this map was shared with negotiators at Utrecht, but it captures the minister's idea of a lesser destiny for Canada than that envisioned by Franquelin's grandly expansionist maps of the previous decade. Couagne's map reflects in advance of the treaty French acquiescence in almost all British demands. Yet a boundary line south of Lake Ontario incorporates the lands of the Five Nations into the Canadian hinterland. The French persisted in this claim, while the treaty's fifteenth article, not without fateful ambiguity, consigned the Five Nations to British sovereignty (Davenport 1934, 213; Miquelon 2010, 483–86, for the treaty clause).

DALE MIQUELON

SEE ALSO: British America; New France

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