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*Cartography*  
*in the European*  
*Enlightenment*

PART 1

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from the borders established by the treaties of 1750 and 1777 (Corrêa-Martins 2011).

ANDRÉ FERRAND DE ALMEIDA

SEE ALSO: Portuguese America

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**Geographical Mapping and Topographical Surveying in the Portuguese East Indies.** In contrast with the late sixteenth and early seventeenth centuries, only a few general nautical charts were produced in the Portuguese East Indies after 1650. André Pereira dos Reis, a native of Goa who served the Portuguese Crown as a soldier and pilot, is the only cartographer known to have attempted a systematic representation of the coasts between the Cape of Good Hope and Timor. His surviving work is gathered in an atlas of ten charts (1654) and in a

codex of eighteen charts and views (1656–60) (Cortesão and Teixeira da Mota 1960–62, 5:27–30).

Apart from these works, there are great numbers of manuscript maps and charts on a larger scale representing particular areas under Portuguese administration or influence, mostly places under pressure from other European nations or regional powers. The production of these maps and charts can often be related to moments of intensified diplomatic and military activity of the state (Estado da Índia), such as the handover of Bombay (Mumbai) to the British (1661–65), the increasing pressure from local powers on Bassein (late 1600s) and the Maratha attacks on major Portuguese possessions in the so-called Northern Province of India (Daman, Bassein, Tana [Thãne], and Chaul, 1720s to 1740s). While some of these maps show extensive stretches of the coastlines and inland territory, others were conceived in order to detail the physical contours of strategic places and illustrate particular sieges. Most seem to have been made in haste and with limited use of high-quality measuring and surveying instruments.

Another relatively coherent corpus of manuscript maps was produced between the mid-1740s and late 1780s mostly in the context of the Portuguese territorial conquests around Goa. A typical set would include three to four sheets of paper displaying richly colored and decorated maps and views and plans of particular fortresses and their surroundings in varying scales and perspectives; many of these plans were also accompanied by textual, often propagandistic narratives of military campaigns.

A few exceptionally large works representing the Goan territories as a whole were painted in oil on canvas during the eighteenth century (fig. 314). Although some of these panoramic maps were made in Portugal, they were clearly based on charts or sketches originally produced in the East Indies.

The increasing detail and accuracy of maps may be related to the reforming activities of the enlightened Portuguese government of Sebastião José de Carvalho e Melo, marquês de Pombal (1750s–70s), which found fertile ground in Goa. An unsigned manuscript geographical map of the Goan territories made in 1784 corresponds to one of the earliest medium-scale surveys executed by a professional body of military engineers and draftsmen explicitly working for the authorities of Lisbon and Goa (fig. 315). These included quite sophisticated representations of the relief, vegetation, paths, hydrographic networks, and urban centers of the conquered territories. The results were further improved in a map prepared in 1801 by the *engenheiro de Sua Magestade* (royal engineer) João António Águia Pinto Sarmento and in a series of large-scale manuscript maps signed in 1812–18 by the engineer Francisco Augusto Monteiro Cabral, as well as



FIG. 314. “MAPA TIPOGRAFICO DAS ILHAS E PROVINCIAS DE GOA E DAS TERRAS DOS SEVS VEZINHOS,” [1760s–70s]. Map of the Goan territories based on an Indo-Portuguese model, ca. 1:79,000, oil on canvas.

Size of the original: 104 × 145 cm. Image courtesy of the Biblioteca Nacional de Portugal, Lisbon (cota INV-10922).

a general chart of the Goan territory printed in 1814 under the supervision of James Garling, a British engineer from Madras (Teixeira da Mota 1979, 35–37, 52–55). Contemporary British and French cartographers usually relied on Portuguese maps for the representation of the Portuguese possessions (e.g., Alexander Dalrymple, 1775 and later).

Comparable attempts to improve the quality of maps during the Enlightenment took place in East Africa, historically a part of the Portuguese Indies (Thomaz 1994, 207–43; Saldanha 2016, 368–72), but this occurred most notably after the separation of this region from the Estado governed by Goa (1752). While earlier charts, maps, and views of Inhambane, the Monomotapa Empire, Sofala, Quelimane, Mozambique and Ibo Islands, and Cape Delgado reveal serious technical limitations, the surveys carried out from the 1750s by the

military engineers António José de Mello and Gregório Taumaturgo de Brito among others greatly increased the available data. During a pioneering though incomplete cross-continental scientific expedition in 1797–99, initiated by the governor of the Portuguese Zambezi region, Francisco José de Lacerda e Almeida generated the first set of accurate astronomic observations made within the African continent, recorded in a series of twenty-three topographical sketch maps covering an area from Tete to Kazembe, which accompanied the manuscript diary of his journey (Rio de Janeiro, Biblioteca Nacional do Brasil, published in 1844–45).

Dispersed and varied samples of maps and cartographic sketches also cover the remaining areas of Portuguese interest in the East Indies, including Meliapor (Mylapore), Laos, Timor, Macao, and maritime South China. Very few maps were printed until the 1820s,



FIG. 315. "CARTA GEOGRAPHICA DOS ESTADOS DE GOA LEVANTADA EM OS ANOS 1776, 1777, E 1778," an unsigned manuscript map of Goan territories, reflecting the military training of the engineers who surveyed the region.

Size of the original: 50 × 70 cm. Image courtesy of Portugal/ Gabinete de Estudos Arqueológicos da Engenharia Militar/ Direção de Infraestruturas do Exército, Lisbon (1233/ I-2A-24A-111).

except for some seventeenth-century items in books (e.g., Ceylon, Ethiopia). Large collections of manuscript maps may be found in repositories in Lisbon (Sociedade de Geografia, Biblioteca Nacional, Arquivo Histórico Ultramarino, Arquivo Histórico Militar, and others), Évora, Porto, Paris, and London. There are at present no comparable collections in Asia or the Americas.

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SEE ALSO: Portuguese East Indies

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**Geographical Mapping in Russia.** Until the early eighteenth century, the main form of mapping in Russia was geographical drawing (*chertëzh*) performed in a distinctively artistic manner, almost always without strict mathematical references and with the inclusion of a great number of place-names and various explanatory notations. About 1,300 such Russian drawings survive, all of them in manuscript except for six printed examples (Kusov 1993). Most are large-scale maps prepared for inventories and recording borders. There are few medium- and small-scale drawings representing large parts or the whole of Russia. Their notations indicate distances between settlements and describe towns and villages, but generally do not show orientation with cardinal points.

The mapping of Siberia was actively pursued after the mid-seventeenth century. Maps covering the whole of Siberia were compiled under Pëtr Ivanovich Godunov (untitled, 1667); by an anonymous author, *Chertëzh vsej Sibiri do Kitayskago tsarstva i do Nikaskago* (ca. 1672); by Nikolay Gavrilovich Spafariy (untitled, 1678); by Semën Ul’yanovich Remezov (untitled, 1698); and others (Goldenberg 2007, 1873–83). The drawing of the whole of Siberia on canvas by Remezov is the largest among them measuring 213 × 277 centimeters with 5,110 geographical names (Goldenberg 2007, 1892).

The “Chertëzhnaya kniga Sibiri,” an atlas compiled in 1701 by Remezov on the order of Peter I, represented a historical turning point in the development of Russian cartography. This atlas included twenty-three drawings representing the whole of Siberia, its *uyezds*, their capitals, and the town of Tobol’sk, as well as a valuable summary of distances from Tobol’sk to other Siberian towns. The maps and atlases by Remezov demonstrate a particular technique of mapmaking in the era of Peter I, based on river networks, the use of the compass, and data on distances by river and land in sazhen’ (1 sazhen’ = 2.134 m) (Goldenberg 2007, 1884–1902).

The compilation of maps of the entire course of a river constituted a form of atlas production that heralded later more geographically oriented works. Instrumental river surveys had been performed in Russia from the late seventeenth century. Up to the 1720s, they were carried out mainly by foreign officers in Russian service. The survey of the Don River, performed by Vice-admiral Cornelis Cruys and Peter I personally in 1699, was used as a basis for the compilation of an atlas of the river consisting of seventeen maps with explanatory text. Published in Amsterdam by Hendrik Doncker in 1703 or 1704, the atlas had titles in both Russian and Dutch: *Prilezhnoye opisaniye reki Donu / Nauw-keurige afbeelding vande rivier Don*. The bilingual approach continued in its dedication to czarévich Aleksey Petrovich in Dutch, a discourse on the Don River and the city of Azov with interesting historical and ethnographic information about the Cossacks, profiles of the Black Sea coasts, a general map of the Don with inscriptions in Dutch, and detailed maps of individual sections of the Don River with geographical names in Dutch and Russian, as well as maps of the Azov and Black seas with notations in Dutch. Many geographical names on the maps are supplemented by explanations; there is also information on a planned canal aimed to connect the Don with the Volga River. The atlas illustrates the transition from the methods of simple drawing to those based on instrumental measurement and observation.

The reforms of Peter I encouraged the adoption of such methods of mapmaking in tune with developments in Western Europe. With the establishment in 1701 of the Moscow mathematical navigation school, Moskovskaya matematiko-navigatskaya shkola, geodesists who initiated the instrumental surveys of the country were trained in Russia. The first maps and atlases based on Western European sources were compiled by Vasiliy Onufriyevich Kipriyanov and printed in his Moscow printing house, Grazhdanskaya tipografiya, founded in 1705 (Bagrow 1975, 135).

Between 1706 and 1717, Kipriyanov issued thirteen educational maps of the world, its continents, and individual countries. Five maps of this set (the world in