

# 41 • Spanish Colonial Cartography, 1450–1700

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In all of history, very few powers have so rapidly acquired as much apparently uncharted territory as the Spaniards did in the first half of the sixteenth century. This acquisition posed huge administrative, military, and political problems, among which was the problem of how the area might be mapped. The early sixteenth-century Spain of the Catholic Monarchs, Ferdinand II and Isabella I, initially responded to this problem by establishing at Seville a great cartographic center whose activities are described in chapter 40 in this volume by Alison Sandman. However, as time went by, other mapping groups emerged, and it is their work that will be described in this chapter. After considering the nature of these groups, we will discuss their activities in the main areas of Spain's overseas possessions.

These areas will be defined by the same geographical regions as those used by the map catalogers of the Archivo General de Indias (AGI) in Seville. This immense collection, originally brought together in the eighteenth century from a variety of earlier collections, is the richest depository for Spain's early colonial cartography.<sup>1</sup> The main headings are nine in number, covering the following areas: Santo Domingo, Florida/Louisiana, Mexico, Guatemala, Panama, Venezuela, Peru/Chile, Buenos Aires, and the Philippines. The maps of the area of Santo Domingo, covering essentially the Caribbean Sea and its islands, number a few over one hundred for the period before 1700.<sup>2</sup> These maps include delineations of whole islands, but also many plans of great cities such as Havana and Santo Domingo, drawn by the military engineers. Plans of this kind may also be found scattered through depositories in Spain and other countries.<sup>3</sup>

The maps of Florida/Louisiana number only about 60 for our period, as might be expected for a region that as yet was of little interest to Spain's rulers.<sup>4</sup> Mexico is another matter, for this was one of the richest and best-mapped of early regions. Not only are there the 135 or so maps in the AGI, but there are many maps in other repositories such as the archives of Valladolid, as well as in the Archivo General de la Nación in Mexico City.<sup>5</sup> Moreover, the Jesuits were very active in this area, particularly in the more remote provinces, and there was a lively indigenous mapping tradition.<sup>6</sup>

The maps of Guatemala are relatively few,<sup>7</sup> but those of Panama are numerous, no doubt because the isthmus was

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Abbreviations used in this chapter include: AGI for Archivo General de Indias, Seville.

1. Between 1900 and 1921, Pedro Torres Lanzas produced a series of catalogs for the AGI. These have been reprinted under different titles and, along with other map catalogs, are now being replaced by a computerized general list. See Pedro Torres Lanzas, *Catálogo de mapas y planos de México*, 2 vols. (reprinted [Madrid]: Ministerio de Cultura, Dirección General de Bellas Artes y Archivos, 1985); idem, *Catálogo de mapas y planos: Guatemala (Guatemala, San Salvador, Honduras, Nicaragua y Costa Rica)* (reprinted [Spain]: Ministerio de Cultura, Dirección General de Bellas Artes y Archivos, 1985); idem, *Catálogo de mapas y planos: Audiencias de Panamá, Santa Fe y Quito* (reprinted [Spain]: Ministerio de Cultura, Dirección General de Bellas Artes y Archivos, 1985); idem, *Catálogo de mapas y planos: Virreinato del Perú (Perú y Chile)* (reprinted [Spain]: Ministerio de Cultura, Dirección General de Bellas Artes y Archivos, 1985); and Pedro Torres Lanzas and José Torre Revello, *Catálogo de mapas y planos: Buenos Aires*, 2 vols. (reprinted [Madrid]: Ministerio de Cultura, Dirección General de Bellas Artes y Archivos, 1988). See also Archivo General de Simancas, *Mapas, planos y dibujos*, 2 vols., by Concepción Álvarez Terán and María del Carmen Fernández Gómez (Valladolid: El Archivo; [Madrid]: Ministerio de Cultura, Dirección General de Bellas Artes, Archivos y Bibliotecas, 1980–90), and Pilar León Tello, *Mapas, planos y dibujos de la Sección de Estado del Archivo Histórico Nacional*, 2d ed. (Madrid: Ministerio de Cultura, Dirección General del Patrimonio Artístico, Archivos y Museos, 1979).

2. Julio González, *Catálogo de mapas y planos de Santo Domingo* (Madrid: Dirección General de Archivos y Bibliotecas, 1973).

3. Many are listed and reproduced in the invaluable catalog by Julio González, *Planos de ciudades iberoamericanas y filipinas existentes en el Archivo de Indias*, 2 vols. ([Madrid]: Instituto de Estudios de Administración Local, 1951).

4. Julio González, *Catálogo de mapas y planos de la Florida y la Luisiana* (Madrid: Dirección General del Patrimonio Artístico, Archivos y Museos, 1979).

5. Torres Lanzas, *Catálogo de mapas y planos de México*. See Archivo General de la Nación, *Catálogo de ilustraciones*, 14 vols. (Mexico City: Centro de Información Gráfica del Archivo General de la Nación, 1979–82), which, with its many reproductions, gives a remarkable conspectus of the holdings.

6. See Ernest J. Burrus, *La obra cartográfica de la Provincia Mexicana de la Compañía de Jesús (1567–1967)* (Madrid: Ediciones José Porrúa Turanzas, 1967), and Barbara E. Mundy, "Mesoamerican Cartography," in *HC* 2.3:183–256.

7. Torres Lanzas, *Catálogo de mapas y planos: Guatemala*.

the central communications point between Spain's possessions in the Atlantic and those in the Pacific. In South America, there are three divisions: Venezuela, Peru/Chile, and Buenos Aires.<sup>8</sup> These three areas were not yet central to Spain's ambitions in the New World, and the number of maps consequently ranges up and down from fifty or so. However, they did contain great cities such as Cartagena and Lima, which attracted military cartographers, and in their more remote reaches the Jesuits were often active.<sup>9</sup> Finally, there are the Philippines, an even more remote region, for which fewer than twenty maps have survived.<sup>10</sup>

It might seem from this enumeration that a good many maps have survived, and that is indeed the case, even if they are much scattered. But it is also the case that a huge number have perished, both in archival accidents and in mishaps that occurred even before they reached the archives. We are thus in the situation of attempting to describe a phenomenon without having any clear idea of its original extent, and this must always be borne in mind when trying to make generalizations. However, students of Spanish colonial cartography have a remarkable advantage in terms of the number of excellent collections of map facsimiles that have been published over the past one hundred years.<sup>11</sup>

#### THE VARIOUS GROUPS OF CARTOGRAPHERS WORKING ON MAPS OF SPAIN'S OVERSEAS TERRITORIES

Sandman has described the activities of the navigation school at the Casa de la Contratación as far as nautical cartography is concerned, explaining how the pattern map was generated and the nature of the institutional arrangements. As time went by, leading members of the school began to produce land cartography of the overseas territories. The first of these was Alonso de Santa Cruz, whose title was "cosmógrafo de hacer cartas y fabricar instrumentos para la navegación." Born about 1505 in Seville, Santa Cruz accompanied Sebastian Cabot on his expedition of 1526–30, then settled back in Seville, where he was named royal cosmographer in 1536.<sup>12</sup>

Santa Cruz eventually published a number of works on discovery and exploration.<sup>13</sup> From a cartographic point of view, his two most remarkable works were a map of the world, set out in gores so as to be made into a globe (1542), and the world atlas known as the "Islario" that exists in several copies.<sup>14</sup> The "Islario" consists essentially of nine general maps and a few over one hundred detailed maps, many of which are of islands, for here Santa Cruz was following an ancient tradition of island atlasmaking. Of its four parts, the fourth concerns Spanish possessions in the New World, including maps like the one of Cuba (fig. 41.1). This delineation is characteristic of Santa Cruz's style in its inclusion of a scale and figures of lati-

tude and longitude, but clearly resembles portolan chart-making in the way it shows coastlines. Santa Cruz based his work on a large collection of manuscript cartographic material, which at his death in 1572 included about one hundred maps of different parts of the world. This collection was passed on to his successor, Juan López de Velasco, and can be traced to the library of the Escorial in 1635; it no doubt perished there in the fire of 1671.

The maps of the "Islario" do not show very much detail about internal regions of the New World. This began to be corrected with the publication in 1562 of the map of America by Diego Gutiérrez. He was also *cosmógrafo* at the navigation school, where he succeeded his father, Diego Gutiérrez, in 1554, serving on until at least 1569. Although the map survives now in only two copies, at the Library of Congress and at the BL, it was once widely dis-

8. Julio González, comp., *Catálogo de mapas y planos de Venezuela* (Madrid: Dirección General de Archivos y Bibliotecas, 1968); Torres Lanzas, *Catálogo de mapas y planos: Virreinato del Perú*; and Torres Lanzas and Torre Revello, *Catálogo de mapas y planos: Buenos Aires*.

9. See Guillermo Fúrlong Cárdiff, *Cartografía jesuítica del Río de la Plata* (Buenos Aires: Talleres S. A. Casa Jacobo Peuser, 1936), and idem, *Cartografía histórica argentina: Mapas, planos y diseños que se conservan en el Archivo General de la Nación* (Buenos Aires: Ministerio del Interior, 1963 [1964]).

10. Archivo General de Indias, *Catálogo de los documentos relativos a las islas Filipinas existentes en el Archivo de Indias de Sevilla* (Barcelona: [Imprenta de la Viuda de Luis Tasso, Arco del Teatro], 1925–).

11. See, for example, Eduardo Acevedo Latorre, comp., *Atlas de mapas antiguos de Colombia: Siglos XVI a XIX* (Bogotá: Litografía Arco, [1971?]); Julio F. Guillén y Tato, *Monumenta cartográfica indiana* (Madrid, 1942–); Egon Klemp, ed. and comp., *America in Maps: Dating from 1500 to 1856*, trans. Margaret Stone and Jeffrey C. Stone (New York: Holmes and Meier, 1976); François-Auguste de Montéquin, "Maps and Plans of Cities and Towns in Colonial New Spain, the Floridas, and Louisiana: Selected Documents from the Archivo General de Indias of Sevilla," 2 vols. (Ph.D. diss., University of New Mexico, 1974); J. H. Parry and Robert G. Keith, eds., *New Iberian World: A Documentary History of the Discovery and Settlement of Latin America to the Early 17th Century*, 5 vols. (New York: Times Books, 1984); Edward Luther Stevenson, *Maps Illustrating Early Discovery and Exploration in America, 1502–1530, Reproduced by Photography from the Original Manuscripts* (New Brunswick, N.J., 1906); Francisco Vindel, *Mapas de América en los libros españoles de los siglos XVI al XVIII (1503–1798)* (Madrid: [Talleres Tipográficos de Góngora], 1955); and idem, *Mapas de América y Filipinas en los libros españoles de los siglos XVI al XVIII: Apéndice a los de América. Adición de los de Filipinas* (Madrid: [Talleres Tipográficos de Góngora], 1959).

12. On Santa Cruz, see Mariano Cuesta Domingo, *Alonso de Santa Cruz y su obra cosmográfica*, 2 vols. (Madrid: Consejo Superior de Investigaciones Científicas, Instituto "Gonzalo Fernández de Oviedo," 1983–84), and Alonso de Santa Cruz, *Map of the World, 1542*, explanations by E. W. Dahlgren (Stockholm: Royal Printing Office, P. A. Norstedt and Söner, 1892).

13. Listed in Cuesta Domingo, *Alonso de Santa Cruz*, 1:61–62.

14. The world map is well reproduced in Santa Cruz, *Map of the World*. Copies of the "Islario" are enumerated in Cuesta Domingo, *Alonso de Santa Cruz*, 1:113–15. On dating the "Islario," see p. 1120, note 157, in this volume.

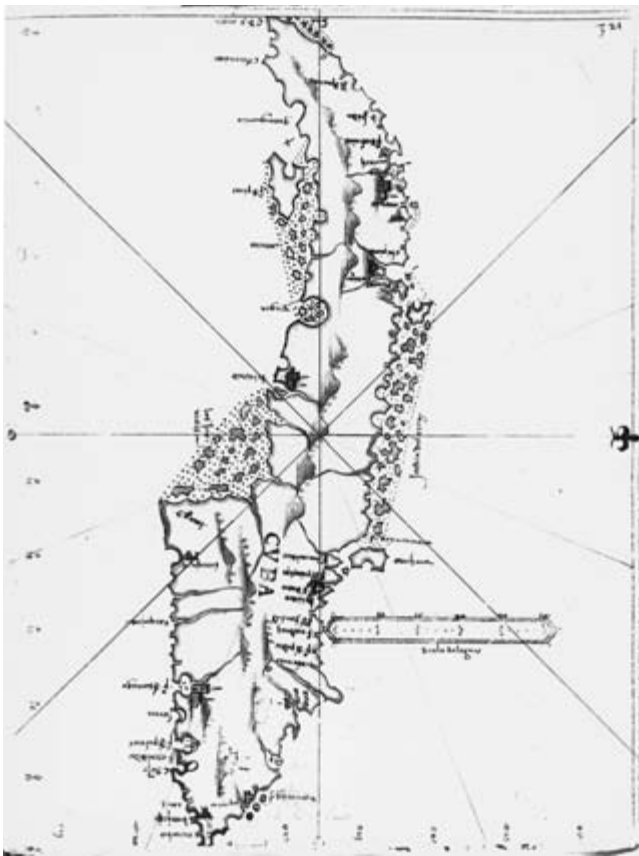


FIG. 41.1. ALONSO DE SANTA CRUZ, “CUBA” FROM THE “ISLARIO,” 1542. This map shows how Santa Cruz combined elements of the medieval portolan chart style (deep embayments, symbols for cities, etc.) with the new mathematical cartography, which included coordinates of latitude and longitude. The map also shows how thoroughly the Spaniards had grasped the main outline of the island and the sites of its chief settlements.

Photograph courtesy of Biblioteca Nacional, Madrid (Res 38, p. 321).

seminated, and, in the view of its latest editor, “one of the intentions in preparing the map was to define clearly Spain’s America for the other European powers who might have designs on the region.”<sup>15</sup> The map has curious features, such as the absence of a latitude scale and the omission of the line between Spanish and Portuguese possessions agreed to at Tordesillas in 1494 (fig. 41.2). But, with its detail of internal regions, it does represent a distinct stage in the Spanish understanding of the vast territories that they were in the process of controlling.

As we have seen, in 1572 Juan López de Velasco received the map collection of Alonso de Santa Cruz. The previous year, he had been appointed *cosmógrafo-cronista* and instructed by Philip II to obtain as much information as possible about the overseas territories; from that time forward, we detect the requests to the colonial administrators that would result in the *relaciones geo-*



FIG. 41.2. DIEGO GUTIÉRREZ, DETAIL FROM *AMERICA SIVE QUARTA ORBIS PARTIS NOVA ET EXACTISSIMA DESCRIPTIO* (ANTWERP, 1562). This extremely rare engraved map shows how the Spaniards were getting to know the internal features of their American conquests. Note that it was printed at Antwerp, for such complicated press work could not be undertaken in Spain.

Photograph courtesy of the Geography and Map Division, Library of Congress, Washington, D.C. (G3290 1562.G7).

*gráficas*, with their accompanying *pinturas*.<sup>16</sup> About one hundred of these extraordinary and unique images of the Spanish jurisdictions are known to have survived; they are now divided between repositories in Texas, Spain, and Mexico.<sup>17</sup> They were composed by a wide variety of au-

15. Described and reproduced by John R. Hébert in “The 1562 Map of America by Diego Gutiérrez,” <<http://memory.loc.gov/ammem/gmdhtml/gutierrz.html>>, in the online map collection of the Library of Congress.

16. Tabulated in Howard Francis Cline, “The *relaciones geográficas* of the Spanish Indies, 1577–1586,” *Hispanic American Historical Review* 44 (1964): 341–74, esp. 352, though this list could no doubt now be amended and enlarged.

17. Most *pinturas* are now separated from the reports that they once accompanied; much good work could be done in putting them together again, rather in the way of René Acuña, ed., *Relaciones geográficas del siglo XVI*, 10 vols. (Mexico: Universidad Nacional Autónoma de México, Instituto de Investigaciones Antropológicas, 1982–88). It seems

thors. A few of them had formal European training, but many seem to have been extemporary mapmakers, and some retained a purely indigenous style. Of course, this great variety of presentation made it very difficult for López de Velasco to combine the information into a set of detailed maps.

All the same, he did set to work on a huge “Geografía y descripción universal de las Indias,” which was completed in 1574, but then remained in manuscript form until 1894.<sup>18</sup> It seems to have been on this occasion that he produced a series of accompanying maps, a set of which is now preserved at the John Carter Brown Library at Brown University in Providence, Rhode Island. This set of manuscript maps became widely known after it was incorporated, with a few modifications, into the *Décadas* published by Antonio de Herrera y Tordesillas at Madrid between 1601 and 1615.<sup>19</sup> The maps of López de Velasco testify to a remarkably unified vision of the Spanish empire. First comes a general map of the Spanish world (fig. 41.3), and then twelve maps showing parts of the territories in greater detail, with the empire generally divided up by its *audiencias*, or judicial districts (fig. 41.4). The maps are not particularly detailed, but as a whole they testify to an extraordinarily coherent vision of the Spanish colonial enterprise; they provided a cartographic framework on which subsequent maps could have been built. In fact, this vision did not result in extensive large-scale mapping, in part because, as we have seen, the *pinturas* sent in response to López de Velasco’s appeal were often indigenous in style, and so difficult for the *cosmógrafo-cronista* to interpret and incorporate.<sup>20</sup> In spite of this failure, the original work of López de Velasco was extraordinary for its time; it would be many years before any other European power could produce anything like this full cartographic inventory of its possessions.

The next general survey to survive was that carried out during the 1610s and 1620s by Nicolás de Cardona, who summarized the material in his “Descripciones geográficas e hydrográficas de muchas tierras y mares.”<sup>21</sup> This manuscript contains forty-two maps, showing the areas in the Caribbean and Central America where Cardona had traveled. Compared to the work of Santa Cruz, these maps are remarkably crude and uninformative; they seem to be the jottings of a sea captain rather than the finished work of a cosmographer. However, Cardona probably intended them only as a sort of aide-mémoire.

While Cardona was traveling in Central and North America, Lucas de Quirós was collecting material for his great map of South America titled “Descripción corográfica de las provincias.”<sup>22</sup> This superbly colored map, probably produced for King Philip III, summarizes Spanish knowledge of Latin America about 1618. Quirós described himself on his great map as “cosmógrafo mayor del mar del sur.” The last *cosmógrafo mayor* whose work



FIG. 41.3. JUAN LÓPEZ DE VELASCO, MAP OF THE SPANISH WORLD, CA. 1575. This is the first map in an atlas showing the Spanish world of the 1570s. It is a general map, designed to locate the twelve detailed maps that followed and to show the main communication routes. It is a little difficult to read, because the ink of the maps has bled into facing pages over the centuries.

Photograph courtesy of the John Carter Brown Library at Brown University, Providence.

we need to take into account here was Sebastian de Ruesta, who held the post between 1652 and 1670. His

certain that such work would identify many hitherto unrecognized *pinturas*.

18. Juan López de Velasco, *Geografía y descripción universal de las Indias*, ed. Justo Zaragoza (Madrid: Establecimiento Tipográfico de Fortanet, 1894). They were again published in Juan López de Velasco, *Geografía y descripción universal de las Indias*, ed. Marcos Jiménez de la Espada (Madrid: Ediciones Atlas, 1971), but this great work remains a potentially fruitful source for research.

19. The precise relationship between the manuscript and printed versions of these maps has never been elucidated. For reprints of the *Décadas*, see Antonio de Herrera y Tordesillas, *Historia general de los hechos de los castellanos, en las islas, y tierra-firme de el mar oceano*, 10 vols., ed. J. Natalicio González (Asunción: Guaranía, [1944–47]), and another edition of the same work, *Historia general de los hechos de los castellanos en las islas y tierra-firme del mar oceano*, 17 vols. (Madrid: [Tipografía de Archivos], 1934–57).

20. This was interestingly interpreted by J. B. Harley in *Maps and the Columbian Encounter: An Interpretive Guide to the Travelling Exhibition* (Milwaukee: Golda Meir Library, University of Wisconsin, 1990), 115–21, as being part of the indigenous resistance to Spanish rule. But to most commentators it has seemed that indigenous mapmakers simply drew in the style to which they were accustomed.

21. Now preserved at Madrid, Biblioteca Nacional. For a facsimile and translation, see Nicolás de Cardona, *Geographic and Hydrographic Descriptions of Many Northern and Southern Lands in the Indies, Specifically of the Discovery of the Kingdom of California* (1632), ed. and trans. W. Michael Mathes (Los Angeles: Dawson’s Book Shop, 1974). The work of Cardona has not been closely studied, and would merit attention.

22. Now preserved at Madrid, Palacio Real.



FIG. 41.4. ANTONIO DE HERRERA Y TORDESILLAS, MAP OF CENTRAL AMERICA FROM HIS *DÉCADAS* (MADRID, 1601–15). This map of the *audiencia* of Guatemala is the printed version of one of the twelve detailed maps in the manuscript atlas whose key map is reproduced in figure 41.3. This coherent way of setting out the boundaries of Spanish possessions was remarkably precocious for the late sixteenth century in Europe.

Photograph courtesy of the John Carter Brown Library at Brown University, Providence.

most considerable surviving work is the “Carta náutica del mar, costas e islas de las Indias Occidentales” (1654), which is known to us through a Dutch copy. To judge from this copy, Ruesta was a meticulous cartographer in whose hands the coastline of South America, in particular, began to take on a new accuracy.<sup>23</sup>

The service of military engineers was quite separate from that of the royal cosmographers, and originated during the sixteenth century, when the emperor Charles V called on Italian engineers such as Francesco Paciotto to build great citadels with bastioned traces at places such as Antwerp and Turin.<sup>24</sup> At first, the Spanish settlements in the New World lacked fortifications of this kind, and in this period they were delineated only in a very amateurish fashion.<sup>25</sup>

However, the increasing threat from the English, Dutch, and French in the 1570s led Philip II to think about seriously fortifying his overseas possessions, and this became especially urgent after Sir Francis Drake’s piratical voyage of 1585, when he inflicted fearful damage on inadequately defended towns like Santo Domingo, Cartagena, and Saint Augustine. The Spanish response was to establish a royal commission to examine the forts of America, but even before that time, the Italian Leonardo Torriani had been sent to fortify the Canary Islands, an important staging post on the way to the New World. Torriani went there in 1584, and worked on the islands intermittently until 1593, when he returned to Europe and became the royal architect for Portugal.<sup>26</sup> During his work in the islands, he

produced a “Descrittione” in which he used a variety of mapping techniques to delineate both whole areas and specific fortifications.<sup>27</sup> Plate 41 shows his view of the port and fortification at Arrecife, on the island of Lanzarote. Torriani could produce views of this kind and also detailed, scaled plans of forts. Trained in Italy, he was also a humanist who included in his description images of the indigenous people.

Torriani had been educated in Lombardy, but probably picked up his knowledge of cartography on the job. In this, he resembled the dozen or so engineers whom we know to have worked in New Spain during the sixteenth and seventeenth centuries, before the age of military academies and drawing schools.<sup>28</sup> The majority of them were Spaniards, though they also came from the Low Countries and from Italy. It was indeed an Italian, Bautista Antonelli, who was the best-known of them, and left the most remarkable maps. As well as making plans of sites such as Portobelo, the city of Panama, Veracruz, Havana, Santo Domingo, and San Juan (Puerto Rico), he also drew a most unusual map of the road from Veracruz to Mexico City (discussed later).

The best-known Spanish engineer was Cristóbal de Rojas.<sup>29</sup> A teacher at the Academia de Matemáticas in Madrid, he published the first Spanish work on fortification, his *Teórica y practica de fortificación* (Madrid, 1598) and worked a good deal on Spanish sites such as Cádiz,

23. BL (Add. MS. 5027.22). The Ruesta brothers (Sebastian and Francisco), though little studied, are interesting examples of late members of the Casa de la Contratación. See the Duke of Alba [Jacobus Stuart Fitz-James y Falcó], ed., *Mapas españoles de America: Siglos XV–XVII* (Madrid, 1951), 281–300.

24. This development is well explained in Christopher Duffy, *Siege Warfare: The Fortress in the Early Modern World, 1494–1660* (London: Routledge and Kegan Paul, 1979), esp. 33 and 67–68.

25. The reader may be convinced of this in examining the relevant plates in González, *Planos de ciudades iberoamericanas y filipinas*.

26. See Leonardo Torriani, *Die Kanarischen Inseln und ihre Urbewohner: Eine unbekannte Bilderhandschrift vom Jahre 1590*, ed. and trans. Dominik Josef Wölfel (Leipzig: K. F. Koehler, 1940).

27. Now preserved at the University of Coimbra. This work has been described and reproduced in Fernando Gabriel Martín Rodríguez, *La primera imagen de Canarias: Los dibujos de Leonardo Torriani* (Santa Cruz de Tenerife: Colegio Oficial de Arquitectos de Canarias, 1986), 39–130.

28. Their names may be found in these works: José Antonio Calderón Quijano, *Las fortificaciones españolas en América y Filipinas* (Madrid: Editorial MAPFRE, 1996), and José Omar Moncada Maya, *Ingenieros militares en Nueva España: Inventario de su labor científica y espacial, siglos XVI a XVIII* ([Mexico City]: Universidad Nacional Autónoma de México, 1993), 19–27. For a summary of their work, see David Buisseret, “Spanish Military Engineers in the New World before 1750,” in *Mapping and Empire: Soldier-Engineers on the Southwestern Frontier*, ed. Dennis Reinhartz and Gerald D. Saxon (Austin: University of Texas Press, 2005), 44–56.

29. See Eduardo de Mariátegui, *El Capitan Cristóbal de Rojas: Ingeniero militar del siglo XVI* (Madrid: Imprenta del Memorial de Ingenieros, 1880).



FIG. 41.5. ANONYMOUS, ILLUSTRATION OF THE JESUIT CURRICULUM FROM THE PROSPECTUS OF THE COLLEGE OF CORDELLE (SPAIN, CA. 1750). Note that a quarter of the fields of study shown concern cartographic knowledge; “Geographia et Astronomia” and “Cosmographia” are placed among the religion, political studies, heraldry, and so forth.

Photograph courtesy of Special Collections, Loyola University, Chicago (378.46 A188).

Coruna, and Gibraltar. In the early seventeenth century, he compiled plans of the main Spanish strongholds in the New World: Cartagena, Havana, the city of Panama, and Portobelo. Like Antonelli, Rojas was acquainted with the latest European cartographic practices, producing city plans that were complete with scales and orientation, in contrast to the work of the years before the 1580s. The other seventeenth-century engineers produced plans that were technically correct, and would eventually be of great interest to historians who wished to understand the development of the great cities of Spanish America.

For the time being, the countryside was neglected, but toward the end of the seventeenth century the Jesuits began to map considerable areas of the provinces to which they were assigned.<sup>30</sup> Many of these Jesuits came from the central European Habsburg possessions: Austria, Bavaria, Bohemia, Croatia, and so forth. They had generally followed the standard Jesuit curriculum, the *ratio studiorum*, which in its various versions stressed the natural sciences, particularly cosmography and cartography (fig. 41.5). Though orders such as the Benedictines and the Franciscans became known for their work in history and music, respectively, the Jesuits were preeminently the order known for studies in the natural sciences. Consequently, when their central European fathers found themselves assigned to remote missions—and sometimes, indeed, excluded as non-Hispanics from metropolitan functions—they often put into practice their remarkable skills. It is no exaggeration to say that many areas of the Americas were more closely mapped by the Jesuits than they would again be until the late nineteenth century, the time of the national governments.

## THE MAIN AREAS OF SPANISH COLONIAL CARTOGRAPHY

### THE CARIBBEAN AND THE GULF OF MEXICO

The earliest example of Spanish terrestrial cartography in the New World is surely the little sketch, now preserved in the Palacio de Liria in Madrid, on which Christopher Columbus was once thought to have set out the north-west coast of the island of Hispaniola.<sup>31</sup> This sketch catches the main features of the coast accurately, as in fact the Spaniards caught the general outline of the Caribbean Sea, to judge from the Juan de la Cosa chart of 1500. The story about the Lucayan Indian who was able to show King João II of Portugal the main outline of the Caribbean islands suggests that the Europeans had some help.<sup>32</sup>

When Peter Martyr (Pietro Martire d’Anghiera) came to publish his *Décadas* at Seville in 1511, he was able to use a version of the Caribbean, probably drawn by Andrés de Morales, that had emerged from ten years of fairly intensive Spanish activity in that region (see fig. 30.8). Eight years later, the outline of the Gulf of Mexico and the Yu-

30. For a general survey of this work, see David Buisseret, “Jesuit Cartography in Central and South America,” in *Jesuit Encounters in the New World: Jesuit Chroniclers, Geographers, Educators and Missionaries in the Americas, 1549–1767*, ed. Joseph A. Gagliano and Charles E. Ronan (Rome: Institutum Historicum S. I., 1997), 113–62.

31. It is well reproduced in Duke of Alba, *Mapas españoles*, pl. I (facing p. 9); there has been some controversy regarding its author.

32. Bartolomé de Las Casas, *Historia de las Indias*, 3 vols. (Hollywood, Fla.: Ediciones del Continente, 1985), 1:324–25.

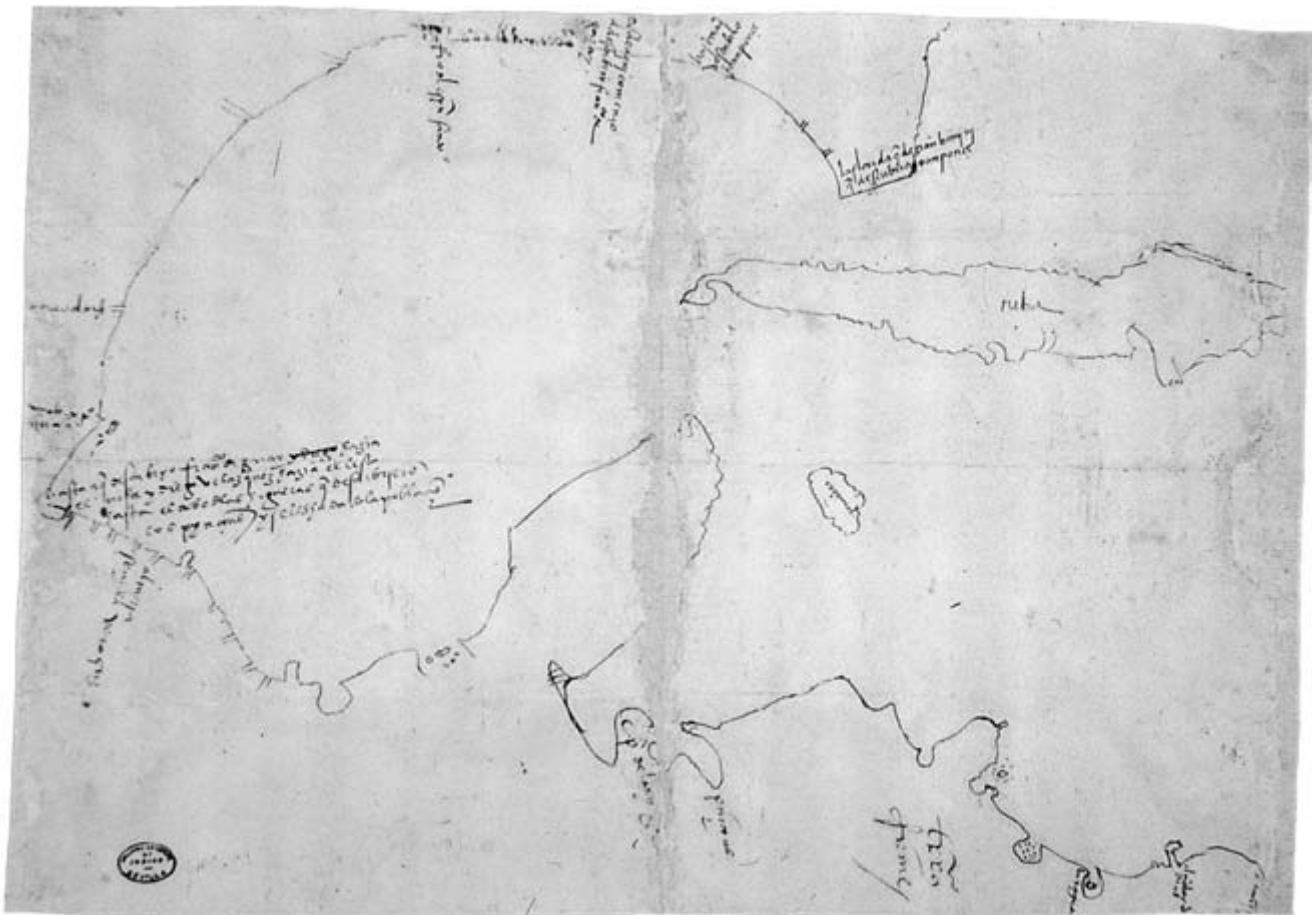


FIG. 41.6. ALONSO ÁLVAREZ PINEDA, MAP OF THE GULF OF MEXICO, 1519. This deservedly famous chart marked the end of the time when the Spaniards hoped that Cathay would prove to lie a little to the west of Cuba. It is remarkable for the fidelity with which it traces not only the line

of the Gulf, but also the outline of the Yucatán Peninsula, which would often be shown much less accurately in the years to come.

Size of the original: ca. 29.8 × 42.3 cm. Photograph courtesy Spain, Ministerio de Cultura, AGI (MP-México 5).

catán Peninsula was established by the expedition led by Alonso Álvarez Pineda, and fixed by the Pineda chart, now preserved at Seville (fig. 41.6).<sup>33</sup> The Pineda chart shows very few inland features on the Gulf Coast, but these began to appear in the map published in 1524 to accompany the second letter of Hernán Cortés.<sup>34</sup> By 1536, Santa Cruz was able to delineate the whole region, and much of the eastern coast of North America, with a dense sequence of coastal names. The map, shown in figure 41.7, included a north-south scale and a set of latitude readings, but remained silent on longitudes. Internal features were still few, apart from Mexico City and a mythical city toward the center of North America. Santa Cruz drew a further map of the area north of the Gulf in 1541, and then included the information from his previous maps in the two maps under “América” found in the “Islario.”<sup>35</sup> By then, the Spaniards had decided on the main features of the Caribbean and Gulf coasts, and their attention had turned

to the delineation of the extensive lands that had been seized after the landing of 1519 in Mexico.

The “Islario” also contains individual maps of several Caribbean islands: Hispaniola, Cuba, Jamaica, Puerto Rico, and Trinidad. The Santa Cruz version of Hispaniola drew on the previous maps of Andrés de Morales (1509)

33. See the excellent color reproduction in *Carlos V: La náutica y la navegación*, exhibition catalog (Barcelona: Lunwerg Editores, 2000), 419.

34. This map has often been reproduced; see, for instance, William Patterson Cumming, R. A. Skelton, and David B. Quinn, *The Discovery of North America* (New York: American Heritage Press, 1972), 68.

35. For reproductions of the “Islario,” see Duke of Alba, *Mapas españoles*, pl. XI (facing p. 71) to pl. XXVIII (facing p. 117), and Alonso de Santa Cruz, *Islario general de todas las islas del mundo*, ed. Antonio Blázquez y Delgado-Aguilera, 2 vols. (Madrid: Imprenta del Patronato de Huérfanos de Intendencia é Intervención Militares, 1918), esp. maps 2 and 3.



FIG. 41.7. ALONSO DE SANTA CRUZ, MAP OF CENTRAL AMERICA AND THE CARIBBEAN SEA, CA. 1536. This map shows how the Spanish cosmographers were drawing together information from a wide variety of sources to build up a list of the coastal toponyms in their newly acquired empire. Once this phase of investigation was over, succeeding cosmographers would turn to delineating the individual provinces in detail.

Photograph courtesy Spain, Ministerio de Cultura, Archivo Histórico Nacional, Madrid (Diversos Colecciones, car. 1, u. 2).

and an anonymous cartographer (1516).<sup>36</sup> The Morales map was remarkably full for so early a date, including at least a dozen cities, indicated with characteristic symbols, as well as offshore islands. The coast is shown without the embayments characteristic of the portolan chart style, and the sea is enlivened with what may be representations of the ships of Columbus. A sort of latitude scale, beginning at zero degrees at the eastern end of the island, runs along the bottom edge of the map. The anonymous map of 1516 marks a regression in some ways, for its coastal delineation is less accurate. But it does make some attempt to show the internal topography.

Although Santa Cruz used these two maps when he delineated the island, his coastline is characteristically shown with deep embayments. He offered a greater wealth of place-names than his predecessors, but he was working



FIG. 41.8. BAUTISTA ANTONELLI, PLAN OF SANTO DOMINGO, CA. 1592. The Antonellis were a family of Italian engineers who were very active in the realms of both Philip II and Philip III. They are good examples of the way in which the Spanish monarchs could call on a very wide range of technocrats throughout their extensive European empire. Photograph courtesy of Biblioteca Nacional, Madrid (MN 235).

on this map at a time when Spanish interest had decidedly shifted away from the Caribbean. This is shown very plainly in the next map, by Montemayor de Cuenca in 1658; the coastal outline is very approximate, and the number of place-names fewer than in the map by Santa Cruz.<sup>37</sup>

The map by Morales shows the city of Santo Domingo on the southwestern coast; this considerable center (now capital of the Dominican Republic) was several times mapped in the sixteenth century.<sup>38</sup> After Drake's raid, it was carefully delineated by the engineer Bautista Antonelli (fig. 41.8). Antonelli showed the outlines of two possible lines of walls and bastions, as well as the position of the main monuments within the walls. This plan also contains a bar scale and comments on the work to be undertaken; it is an excellent example of a plan designed to enable the members of the Council of the Indies to come to a decision about future building. Santo Domingo continued to be of importance to the Spanish crown, and many more plans were made of it, but few matched the elegance of Antonelli's work.<sup>39</sup>

36. For reproductions of these maps, see Emilio Rodríguez Demorizi, comp., *Mapas y planos de Santo Domingo* (Santo Domingo: Editora Taller, 1979), 5–9.

37. Vindel, *Mapas de América en los libros españoles*, 123–26.

38. Reproduced in Rodríguez Demorizi, *Mapas y planos de Santo Domingo*, pls. 8–11.

39. See the plates in González, *Planos de ciudades iberoamericanas y filipinas*, 1:310–14.



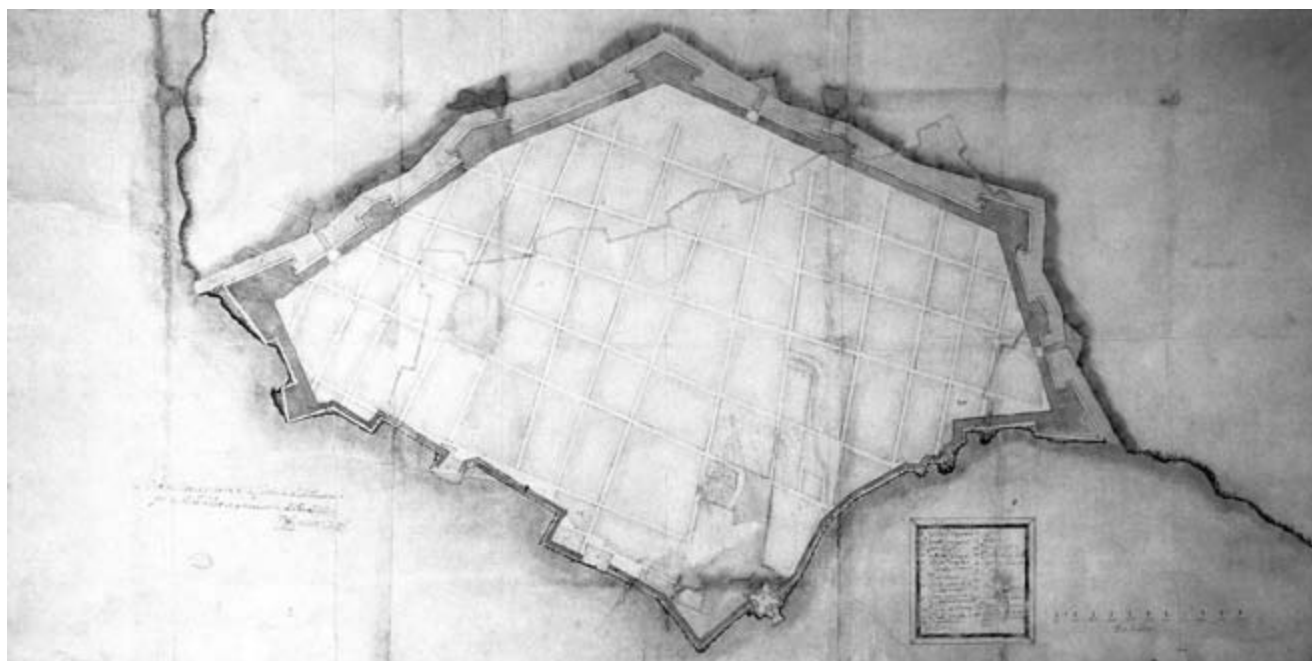


FIG. 41.9. CRISTÓBAL DE ROJAS, PLAN OF HAVANA, 1603. As the last port of call for the treasure fleets, Havana received much attention as a fortified base. This remarkable plan by the Spanish engineer Rojas shows not only alternative lines

of fortification, but also the line of the internal streets, and the citadel at the harbor's mouth. Size of the original: 58.1 × 114.2 cm. Photograph courtesy Spain, Ministerio de Cultura, AGI (MP-Santo Domingo, 20).

The second Caribbean island to receive separate treatment in the “Islario” of Santa Cruz was Cuba.<sup>40</sup> The earliest charts (Juan de la Cosa’s chart of 1500 and the Cantino map of 1502) show this island as having a curious scorpion’s-tail curve to its west end. Santa Cruz corrected these erroneous versions, giving a remarkably accurate outline of the island (see fig. 41.1). He also showed eight or so towns, and his version was followed both by Diego Gutiérrez (1562) and by Juan López de Velasco (1575). They did not show any further internal detail, because after 1519 Cuba had become a backwater in the Spanish empire. The land was relatively lacking in value, so the greater *estancias* defined their territory in terms of a certain radius from the main house; the resulting circles were impressed into some of the roads, and may still be detected today.

The chief city of Cuba was Havana, on the northwest coast, followed by Santiago, in the southeast. Antonelli worked on the fortifications of Havana, producing about 1593 a fine plan to illustrate a project for closing the harbor with a chain.<sup>41</sup> Even more striking are the plans of Cristóbal de Rojas, in particular his 1603 “Descripción” showing the fortifications, with the work to be done in yellow, as was customary (fig. 41.9). Havana continued to attract engineers who made plans of the growing city, which was essential to the homeward passage of the *flota* (fleet). Santiago, to judge from the crudeness of the plans

of that city, came a poor second to Havana, for it held no such central place in the Spanish empire.

The same was true of the island of Jamaica, which until the end of the sixteenth century was a possession of the Columbus family. This probably accounts for the crudeness of Santa Cruz’s delineation of the island in the “Islario,” showing a distorted coastline and very little internal detail. The island was no better shown by López de Velasco in 1575, or by Cardona in 1632; its importance in the general scheme of Spanish strategy was not sufficient to warrant a general survey. All this changed in 1655, when the English seized the island. From the following year dates a reasonably accurate scaled and oriented map by Gerardo Coen, royal *cosmógrafo*; there were also several detailed maps, showing the extent of the English incursion.<sup>42</sup> These maps were not particularly accurate, but they contain much information, and are interesting examples of what Spanish field commanders could produce. Their efforts to recover the island failed, and the English soon began producing detailed maps of

40. See the excellent color reproduction of this map in Duke of Alba, *Mapas españoles*, pl. XIX (facing p. 95).

41. Reproduced in Diego Angulo Iníguez, *Bautista Antonelli: Las fortificaciones americanas del siglo XVI* (Madrid: Hauser y Menet, 1942), fig. 3 (facing p. 52).

42. Reproduced in Francisco Morales Padrón, *Jamaica Española* (Seville, 1952), 233–34, and see p. 58 for Coen’s map.

their new possession, which came to have great economic and strategic importance.<sup>43</sup>

Santa Cruz's map of Puerto Rico (San Juan, as it was then called) was more accurate than his version of Jamaica, but the island as a whole was very poorly served by Spanish cartographers up to 1700.<sup>44</sup> Attention centered, in fact, on the city of San Juan, for which four sixteenth-century plans survive at the AGI. They are relatively crude, having presumably been drawn by local soldiers.<sup>45</sup> The last island shown in some detail by Santa Cruz was Trinidad. Its general outline was relatively accurate, indeed, better than it would be on the López de Velasco map of 1575. Trinidad never enjoyed the prominence in the Spanish empire attained by Puerto Rico, and had no city to compare with San Juan, so its cartography was neglected right up until the eighteenth century.

Considering the history of Spanish mapping of Hispaniola, Cuba, Jamaica, Puerto Rico, and Trinidad (the Greater Antilles), we might well be tempted to conclude that it was characterized by neglect. This is understandable, because after a lively start, particularly in Santo Domingo, the islands failed to live up to the Spaniards' expectations and were consequently almost disregarded, apart from the great ports, while great effort went into the conquest and delineation of the mainland.

#### FLORIDA AND LOUISIANA (NORTH AMERICA)

The seas to the west of the Caribbean islands were progressively investigated between 1508 and 1519, the date when Alonso Álvarez Pineda drew his map. With the line of the Gulf of Mexico fixed, various expeditions were sent to the north of it, in the hope that civilizations as rich as that of Mexico might be discovered. All these expeditions failed to find easy wealth, so for many years the permanent Spanish presence north of the Gulf was confined to the fortress at Saint Augustine, with a few neighboring missions, and eventually to settlements on the upper reaches of the Rio Grande. Maps were made of these areas, and some survived from the various expeditions. The cartography of the area at the mouth of the Mississippi River began to emerge once the Spaniards had been alerted to French ambitions in that region by the voyage of Robert Cavelier de La Salle in 1682.<sup>46</sup>

The fortress of Saint Augustine, founded in 1565 to control the narrows through which Spanish vessels had to pass on their way home to Spain, was sometimes mapped, but in no great detail until the eighteenth century.<sup>47</sup> The settlement on the upper reaches of the Rio Grande, founded by Juan de Oñate in 1598, was shown in a remarkable sketch of 1602 by Enrico Martínez (fig. 41.10). Born in Hamburg about 1555 as Heinrich Martin, he went to Mexico in 1589 as *cosmógrafo del rey*, and also carried on a business as a printer.<sup>48</sup> Known for his fine library and collection of

scientific instruments, he was involved in attempts to drain the area around Mexico City. His sketch of 1602 seems to have been made following the information of a soldier on the Oñate expedition.<sup>49</sup> It shows not only the settlements, described in the accompanying key, but also country to the northeast, investigated by Oñate's band. The sketch is much foreshortened in an east-west sense, but gives a good idea of the Canadian and Arkansas Rivers; it is typical of the type of maps generated by expeditions, and as "the very earliest extant map of any portion of the American West, is therefore a document as accurate (within its bounds and character) as it is precious."<sup>50</sup>

The land to the east of this region had been traversed in part by the expedition of Hernando De Soto (1539–43), and a map generated from this expedition was found among the papers of Alonso de Santa Cruz.<sup>51</sup> It gives an extraordinary impression of the southern part of what is now the United States (fig. 41.11). Florida is well observed, as are the various rivers leading into the Atlantic. The rivers leading into the Gulf of Mexico are also shown, and one of them can be traced back a long way to its origins in the east, as if the cartographer had received some information about the course of the Ohio River. A line of mountains is shown around the position of the Ozarks, and names for settlements are given frequently. Among the rivers emptying into the Gulf of Mexico, there is no indication yet of the Mississippi, but the map is in general a good example of the way in which a vast territory could

43. These large-scale maps have been analyzed by B. W. Higman in *Jamaica Surveyed: Plantation Maps and Plans of the Eighteenth and Nineteenth Centuries* (1988; reprinted Kingston: University of the West Indies Press, 2001).

44. Reproductions in Duke of Alba, *Mapas españoles*, pl. XXI (Puerto Rico, facing p. 99) and pl. XX (Jamaica, facing p. 97).

45. See Ricardo E. Alegría, *Descubrimiento, conquista y colonización de Puerto Rico, 1493–1599* (San Juan de Puerto Rico: Colección de Estudios Puertorriqueños, 1992).

46. A development described by Robert S. Weddle, *The French Thorn: Rival Explorers in the Spanish Sea, 1682–1762* (College Station: Texas A&M University Press, 1991).

47. See the maps reproduced in González, *Planos de ciudades iberoamericanas y filipinas*, 1:125–28.

48. See Francisco de la Maza, *Enrico Martínez: Cosmógrafo e impresor de Nueva España* (Mexico City: Sociedad Mexicana de Geografía y Estadística, 1943), 16–23.

49. See George Peter Hammond and Agapito Rey, *The Rediscovery of New Mexico, 1580–1594: The Explorations of Chamuscado, Espejo, Castaño de Sosa, Morlete, and Leyva de Bonilla and Humaña* (Albuquerque: University of New Mexico Press, 1966), 63.

50. Carl I. Wheat, *Mapping the Transmississippi West, 1540–1861*, 5 vols. (1957–63; reprinted Storrs-Mansfield, Conn.: Maurizio Martino, [1995]), 1:32, and map reproduced in vol. 1, facing p. 29.

51. Reproduced with commentary in *Carlos V*, 422–23 and 426–27, and in William Patterson Cumming, *The Southeast in Early Maps*, 3d ed., rev. and enl. Louis De Vorsey (Chapel Hill: University of North Carolina Press, 1998), 108–11 and pl. 5.

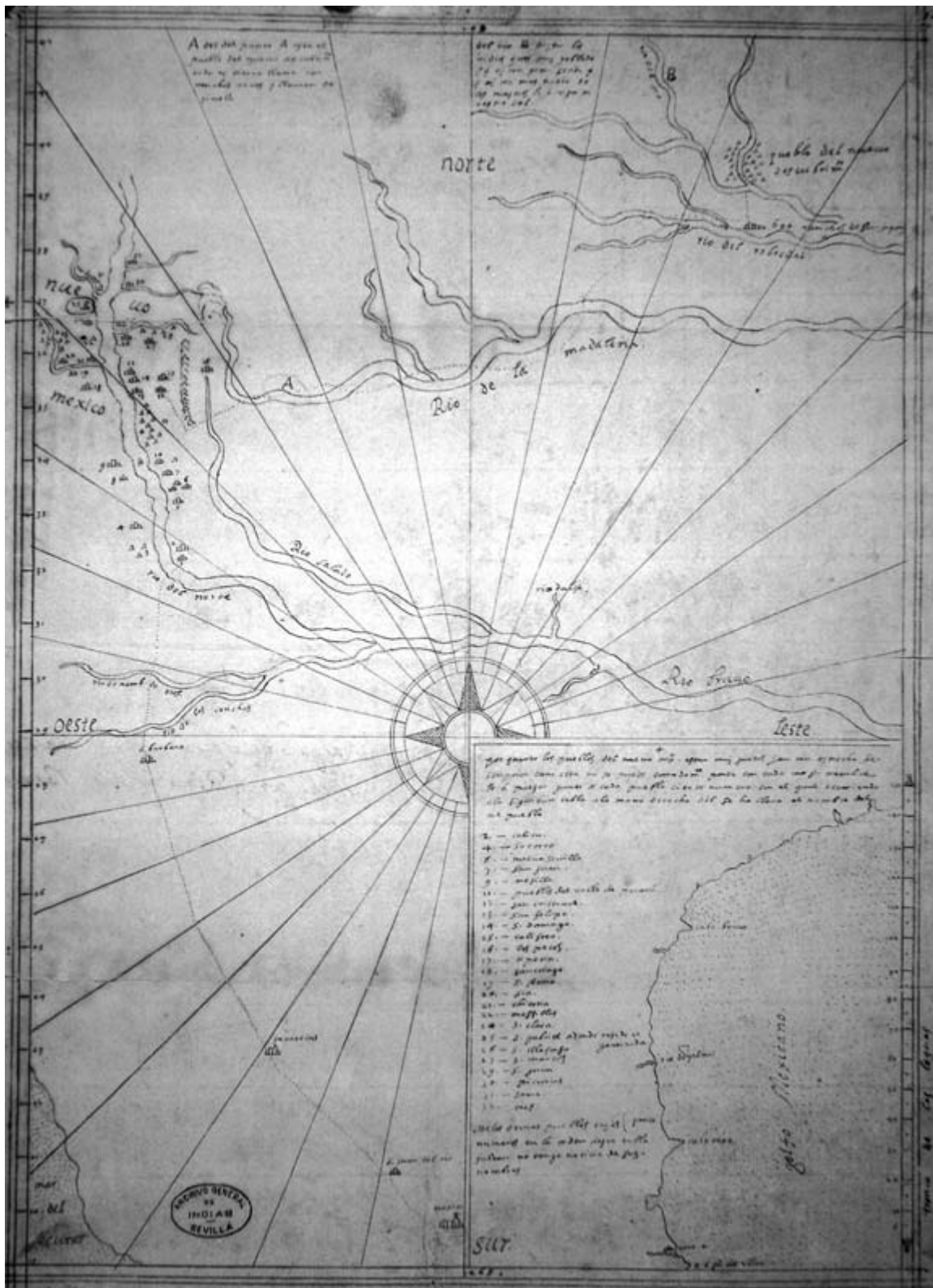


FIG. 41.10. ENRICO MARTÍNEZ, SKETCH OF THE PROVINCES OF NEW MEXICO, 1602. This map shows not only the upper reaches of the Rio Grande, but also some detail of the rivers to the east. It thus dates from the time when

the Spaniards still hoped to find easy riches in what would become the central United States.

Size of the original: 42 × 30 cm. Photograph courtesy Spain, Ministerio de Cultura, AGI (MP-México, 49).

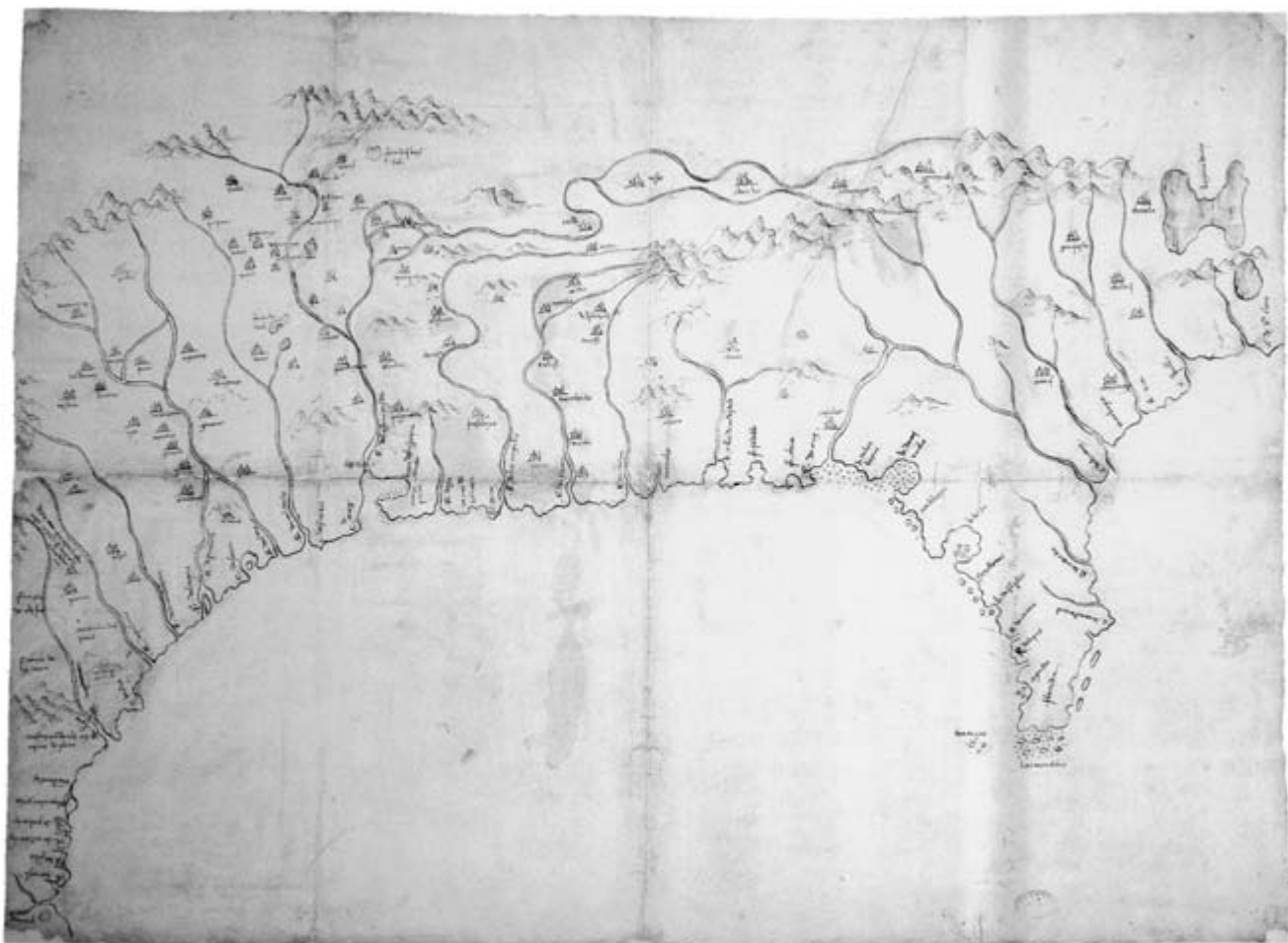


FIG. 41.11. ANONYMOUS, MAP OF THE GULF OF MEXICO, 1544. Dating from the 1540s, this map shows a great many regions to which the Spaniards had not yet gone and so must have relied to a considerable extent on native informants;

their information seems to have been remarkably accurate. Size of the original: 44 × 59 cm. Photograph courtesy Spain, Ministerio de Cultura, AGI (MP-México, 1).

be quite effectively visualized through information from an expedition and from native informants.

About the time that Hernando De Soto was trying to explore what is now the southeastern United States, Hernando de Alarcón was investigating its southwestern coast. Leaving from Acapulco in 1540, he spent two years exploring the coasts of the Gulf of California, eventually sailing twice up the Colorado River in search of the mythical city of Cibola, shown in the map of figure 41.12 as “La Ciudad de Cibora.” This map has a curious history, for it is not clear how it is related to the pilot Domingo del Castillo, who was on the Alarcón expedition and is named in the cartouche. The map first appeared in this printed form in the *Historia de Nueva España* by Hernán Cortés, published at Mexico City in 1770.<sup>52</sup> The Californian peninsula is well observed, but commentators have pointed out that there are many inaccuracies,

whether committed by Castillo or by the much later engraver. The failure to find Cibola was only one of many disappointments encountered by the Spaniards in their early Californian exploration, and it is rather surprising that Sebastián Vizcaíno was sent back to the region in 1602–3, making a sailing guide that accurately maps many of the harbors on the coast.<sup>53</sup>

On the whole, the Spaniards had been disappointed by the northern ventures, and for the later sixteenth century,

52. Reproduced in Henry Raup Wagner, *The Cartography of the Northwest Coast of America to the Year 1800*, 2 vols. (Berkeley: University of California Press, 1937), 1:31 (pl. VIII).

53. Fully reproduced in Demetrio Ramos Pérez, “La expansión Californiana,” in *Historia general de España y América*, vol. 9.2, *América en el siglo XVII: Evolución de los reinos indios*, 2d ed., ed. Demetrio Ramos Pérez and Guillermo Lohmann Villena (Madrid: Ediciones Rialp, S. A., [1990]), 79–127, esp. 97–109.



FIG. 41.12. DOMINGO DEL CASTILLO, MAP OF THE CALIFORNIA AREA, 1541. The Spaniards mapped areas that would prove to be very hard to settle, and this map is a good example of that kind of effort. After the 1540s, this region in fact received little attention from Europeans until the Jesuits began extending their missions to it in the late seventeenth century.

From Hernán Cortés, *Historia de Nueva España* (Mexico City: En la imprenta del Superior Gobierno, del Br. D. Joseph Antonio de Hogal en la Calle de Tiburcio, 1770). Photograph courtesy of the John Carter Brown Library at Brown University, Providence.

as well as much of the seventeenth, they concentrated their efforts in Central and South America. However, La Salle's expedition from French Canada to the mouth of the Mississippi River in 1682 put an end to this period of somnolence, for the Spaniards feared that the French were hoping not only to hem in the English colonies to the east, but also to advance on the Spanish mines in northern Mexico.<sup>54</sup> In a further expedition in 1684, La Salle had sought to establish a French base at the mouth of the Mississippi. This venture had not succeeded, but it incited the Spaniards to mount no fewer than eleven expeditions between 1685 and 1699.<sup>55</sup> A good many maps were produced in the course of these expeditions, including those by Martin de Echagaray in 1684, Carlos de Sigüenza y Góngora in 1689, Alonso de Leon in 1690, and Domingo Theran in 1691.<sup>56</sup>

As part of their larger strategy, the Spaniards began to consider making Pensacola Bay, rather than Saint Augustine, their major base in this part of the world, and following the expedition led by Andrés de Pez in 1693, Sigüenza y Góngora, a creole cartographer whom we will meet again in Mexico, drew an elaborate map of what was called the Bay of Santa María de Galve.<sup>57</sup> In the end, Pensacola proved to be an unsatisfactory base, and the Spaniards eventually concentrated on peopling the area

around what is now San Antonio, on the river of that name in Texas, while the French established themselves at New Orleans early in the eighteenth century. An uneasy coexistence then set in, roughly on what is now the border between Texas and Louisiana. The French were thus barred from the Mexican silver mines, and the Spaniards began mapping the area around San Antonio in much greater detail.

## MEXICO

Though the mapping of Florida and Louisiana had been somewhat episodic, driven by the chance of expeditions and changes in the balance of political power, the mapping of Mexico was quite systematic, for it concerned a region of central interest to the Spanish monarchy from 1519 onward. The fate of this region was settled in Mexico City, which was mapped in the early 1520s. The Spaniards probably followed an indigenous plan, for this was an area in which the meso-American peoples had a long and well-established mapping tradition.<sup>58</sup> When Santa Cruz made his large-scale map about 1540, he drew heavily on this tradition to produce an extraordinary image of the huge and complex rectilinear city.<sup>59</sup>

Because of its centrality to the empire, Mexico City continued to be mapped from the late sixteenth century onward.<sup>60</sup> The other city that early received much attention was the port of entry at Veracruz, protected by the fort of San Juan de Ulloa.<sup>61</sup> Figure 41.13 shows the rather impressionistic image produced by Nicolás de Cardona in 1622, when the fortifications were still rudimentary. Periodically attacked by English and French pirates, the site was taken in hand during the 1680s by the engineer Jaime Franck, who made numerous plans of it. On the west

54. For these suspicions, see Weddle, *French Thorn*, 3–25.

55. Enumerated in William Patterson Cumming et al., *The Exploration of North America, 1630–1776* (New York: G. P. Putnam's Sons, 1974), 150–52.

56. For a listing, see González, *Catálogo de mapas y planos de la Florida y la Luisiana*, 14 (Sigüenza y Góngora), and Torres Lanzas, *Catálogo de mapas y planos de México*, 1:62–63 (Echagaray), 67–68 (Leon), and 69–70 (Theran).

57. Reproduced in James R. McGovern, ed., *Colonial Pensacola* (Hattiesburg: Printed at the University of Southern Mississippi Press, 1972), 24.

58. See Mundy, "Mesoamerican Cartography."

59. Reproduced in Albert B. Elsasser, *The Alonso de Santa Cruz Map of Mexico City & Environs: Dating from 1550* (Berkeley: Lowie Museum of Anthropology, University of California, Berkeley, [1974?]). Like some other material once in the archives of the Habsburg empire, this map is now in Stockholm.

60. For reproductions of a long series of plans, see González, *Planos de ciudades iberoamericanas y filipinas*, 1:204–19.

61. On this, see José Antonio Calderón Quijano, *Historia de las fortificaciones en Nueva España* (Seville: [Escuela de Estudios Hispano-Americanos], 1953).

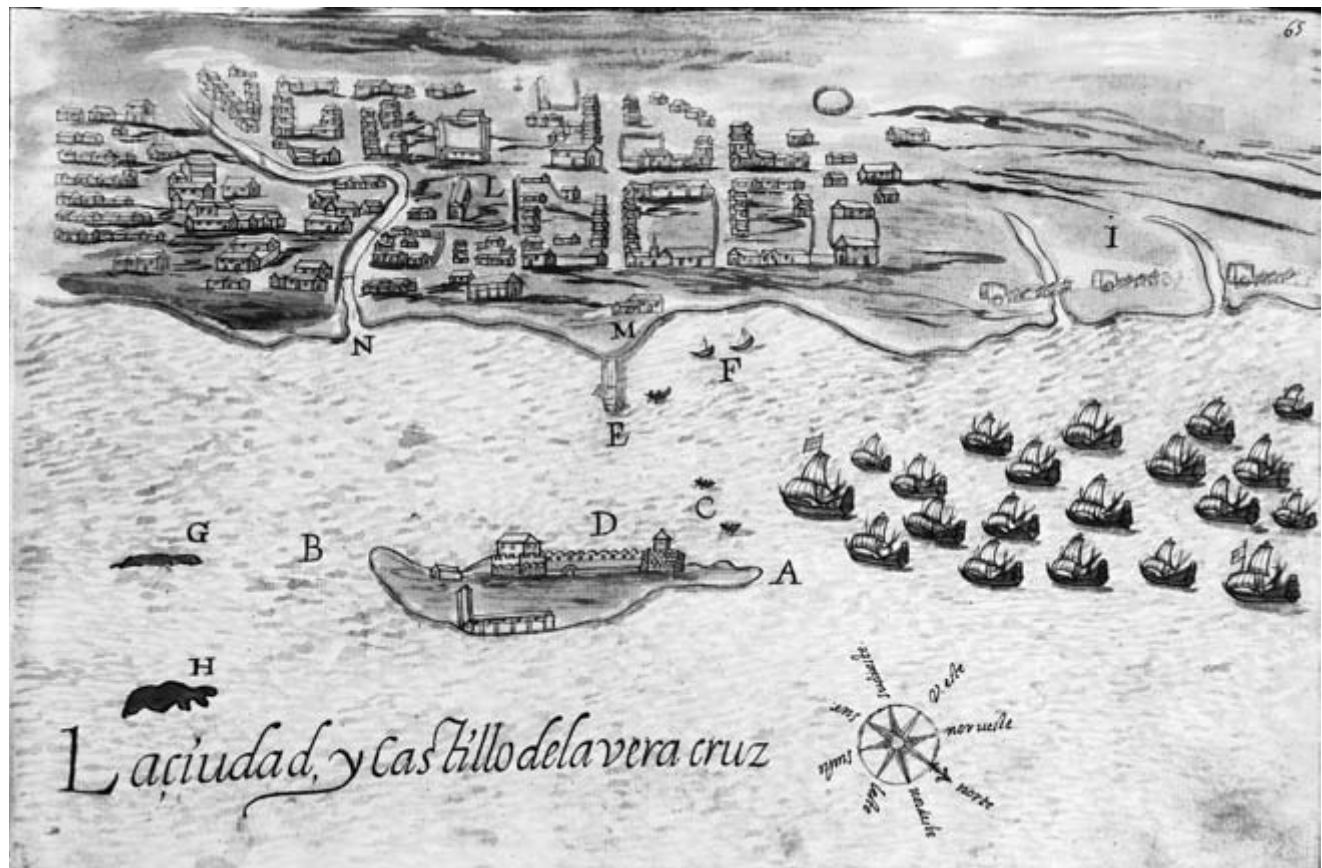


FIG. 41.13. NICOLÁS DE CARDONA, VIEW OF VERACRUZ AND SAN JUAN DE ULLOA, 1622. This view of the “town and castle of Vera Cruz” was the work of a sea captain who intended it as a sort of aide-mémoire to accompany his travel account. It is sharply different from the sort of scaled

plans produced by the engineers for deliberations by the king and his councils.

Photograph courtesy of Biblioteca Nacional, Madrid (MS. 2468 65).

coast, Acapulco was the port to which the Manila galleon went, and that city, too, was often mapped, notably by Adrian Boot, whose heavily accented shadowing gave an unforgettable idea of the port (fig. 41.14).<sup>62</sup>

The *pinturas* ordered by Philip II to accompany the *relaciones geográficas* generated many maps of the Mexico region.<sup>63</sup> Some were almost totally indigenous in style, some showed a mixture of meso-American and Spanish influences, and a few were frankly European.<sup>64</sup> Among these was a pair of maps of the Veracruz region, studied by Cline. The same author has suggested that some of these *pinturas* may have contributed to the maps of New Spain published by Abraham Ortelius between 1579 and 1584 in successive editions of his *Theatrum orbis terrarum*.<sup>65</sup> Harley maintained, on the other hand, that the style of most *pinturas* would have been beyond the comprehension of the Spanish cosmographers,<sup>66</sup> but it does seem possible that some were in fact helpful; that had indeed been the original intention of Philip II.

Another kind of manuscript map that made its way into the corpus of European printed maps was the work

62. See the long series of plans of Manila in González, *Planos de ciudades iberoamericanas y filipinas*, 1:138–56. See also José Antonio Calderon Quijano, *Nueva cartografía de los puertos de Acapulco, Campeche y Veracruz* ([Seville]: Escuela de Estudios Hispanoamericanos, 1969), 6–10, pl. 4.

63. Cline, “*Relaciones geográficas*,” 352.

64. See Barbara E. Mundy, *The Mapping of New Spain: Indigenous Cartography and the Maps of the Relaciones Geográficas* (Chicago: University of Chicago Press, 1996), and David Buisseret, “Meso-American and Spanish Cartography: An Unusual Example of Syncretic Development,” in *The Mapping of the Entradas into the Greater Southwest*, ed. Dennis Reinhartz and Gerald D. Saxon (Norman: University of Oklahoma Press, 1998), 30–55.

65. Howard Francis Cline, “The Patiño Maps of 1580 and Related Documents: Analysis of 16th Century Cartographic Sources for the Gulf Coast of Mexico,” *El México Antiguo* 9 (1961): 633–92, and idem, “The Ortelius Maps of New Spain, 1579, and Related Contemporary Materials, 1560–1610,” *Imago Mundi* 16 (1962): 98–115.

66. Harley, *Maps and the Columbian Encounter*, 115–21.



FIG. 41.14. ADRIAN BOOT, VIEW OF THE PORT OF ACAPULCO, 1618. Boot went to Mexico from the Low Countries in 1612 (via France, which at that time had become friendly toward Spain), and worked there on a wide variety of projects until his death in 1648. He was an expert not only in fortifications, but also in hydraulic engineering, and drew many plans to accompany his projects. Photograph courtesy Spain, Ministerio de Cultura, AGI (MP-Impresos, 34).

of the Jesuits. As early as 1662, an anonymous Jesuit produced a remarkable map of the northwestern region of Mexico.<sup>67</sup> Preserved at the Central Jesuit Archives in Rome, it gives a sketchy but comprehensive portrayal of the rivers draining into the Gulf of Mexico, as well as a good idea of the hills of northern Mexico. Like most Jesuit work, it is technically advanced, with a northern orientation and an indication of latitude and longitude. The Jesuits were often remarkable for their cartographic skills, as we have seen, for many of those active in the remote missions of northern Mexico had come from central Europe, where they had followed a version of the *ratio studiorum* that stressed geography and cartography.

About 1683, for instance, Juan María Ratkay from Croatia drew a map of Tarahumara (fig. 41.15).<sup>68</sup> He enclosed the whole work with a lattice of latitude and longitude, taking care to show not only the Indian missions, but also their relationship to the rivers, hills, and plains. Many other Jesuits labored in this same area, the most famous of whom was Eusebio Francisco Kino. Arriving in Mexico from Bavaria and Austria in 1681, between 1683 and 1710 Kino produced about thirty maps of different parts of Mexico, relying in large part on his many travels; in these maps he used to good effect the cartographic techniques that he had learned. His early work was summarized in a master map of 1701, first printed in 1705, which “deservedly brought him wide recognition as an explorer and cartographer.”<sup>69</sup> For many years afterward,

mapmakers followed his version of the California/Mexico region, so we find traces of his work in the maps of Guillaume Delisle, Tomás López, and Rigobert Bonne, to name only a few.

When Kino first arrived in Mexico, he met with Carlos de Sigüenza y Góngora, and for many years he remained in contact with this Mexican savant. Sigüenza y Góngora had also been a Jesuit between 1660 and 1667, when he left the order, becoming in 1672 professor of mathematics at the Royal University of Mexico.<sup>70</sup> In 1680, he was named “Royal Cosmographer of the Realm,” and sometime after this produced his great map of what he called “Nueva España” (fig. 41.16). This detailed image reflects his years spent studying both the Aztec civilization and European scientific techniques, and throughout his life he continued to draw maps to illustrate activities with which he was associated. In 1689, for instance, he drew a map to set out the route of Alonso de Leon into Texas; in 1691, he drew another that set out the best way to drain the marshes in Mexico City; and in 1693, as we have seen, he made a careful map of Pensacola Bay, which he was anxious for the Spaniards to occupy as a base against the French.

Other Mexicans were drawing maps, though it is hard to identify them. Apart from those who worked to produce the *pinturas* that accompanied the *relaciones geográficas*, there were probably churchmen who drew maps to set out the boundaries of the newly established bishoprics. The *Teatro eclesiástico* of Gil González Dávila (de Ávila) published at Madrid between 1649 and 1655, thus contains a superb map of the Bishopric of Mechuacan.<sup>71</sup> This work, whose author remains unknown, was technically abreast of the latest European maps; the image is full and accurate, finely engraved, and set off with magnificent ornamentation.

Some of these early maps cover quite small areas, or even just towns. In 1608, for instance, Enrico Martínez produced a “Descripción de la comarca de México y obra del desagüe de la Laguna,” which shows just Mexico City and its surroundings; the map was primarily designed to explain proposed drainage works, but it gives a good idea of how the great city was set in its valley.<sup>72</sup> Another spe-

67. Reproduced in Burrus, *La obra cartográfica de la Provincia Mexicana*, pl. IV (facing p. 32).

68. Buisseret, “Jesuit Cartography,” 116 and pl. 2.

69. Ernest J. Burrus, *Kino and the Cartography of Northwestern New Spain* (Tucson: Arizona Pioneers’ Historical Society, 1965), 68.

70. On his leaving the order, see Irving Albert Leonard, *Don Carlos de Sigüenza y Góngora: A Mexican Savant of the Seventeenth Century* (Berkeley: University of California Press, 1929), 9–10.

71. Gil González Dávila, *Teatro eclesiástico de la primitiva iglesia de la Nueva España en las Indias Occidentales*, 2d. ed., 2 vols. (Madrid: Jose Porrua Turanzas, 1959), facing 160.

72. Reproduced in Maza, *Enrico Martínez*, 107.





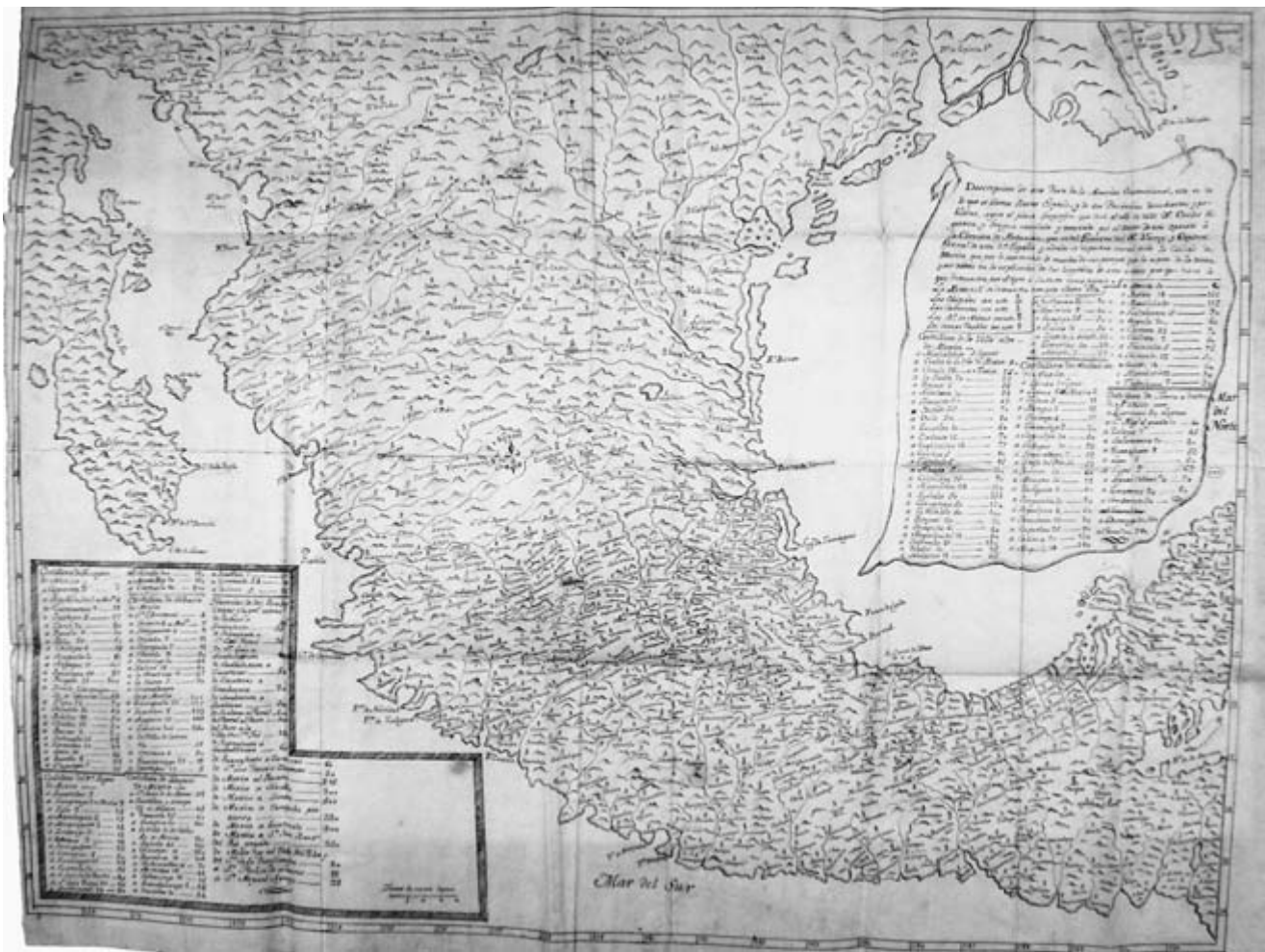


FIG. 41.16. CARLOS DE SIGÜENZA Y GÓNGORA, MAP OF MEXICO, 1691. This great map of Mexico testifies to Sigüenza y Góngora's intimate knowledge of the region, in whose ancient civilizations he was keenly interested.

Size of the original: 55 × 72 cm. Photograph courtesy of the Real Academia de la Historia, Madrid (Colección Boturini, vol. 8).

teenth century a “Yucatecan school of cartographers” had formed, meaning that there were significant numbers of indigenous mapmakers.<sup>75</sup> Similar detailed work needs to be carried out for other provinces so that we can eventually assess the nature of cartography in this whole region.

#### CENTRAL AMERICA

From about 1530 onward, the general shape of the isthmus containing the countries we now know as Belize, Costa Rica, Ecuador, Guatemala, Honduras, Nicaragua, Panama, and El Salvador was well known. By 1536, the chart of the Caribbean and Gulf of Mexico region drawn by Santa Cruz accurately outlined the coastline both on the Pacific and on the Caribbean sides.<sup>76</sup> About ten years later, in the “Islario,” Santa Cruz provided maps not only of the Yucatán Peninsula, but also of the north coast of

Honduras. The whole area was thinly populated, but the main rivers and mountains had been identified.

This rather crude outline was refined in the 1570s by López de Velasco or his informants. His maps, appearing as we have seen in the *Décadas* of Herrera y Tordesillas, considerably improved on the outline of Santa Cruz, and gave detailed descriptions of the *audiencias* of Guatemala and Panama. However, both the coastline and the topography of Central America are very complex to delineate, and there was very little improvement on the work of López de Velasco during the seventeenth century; this area was indeed a part of the empire outside the main preoccupations of the Spanish crown. Detailed internal mapping was confined to the area around the city of Panama.

75. Antochiw, *Historia cartográfica*, 269–84.

76. See figure 41.7.

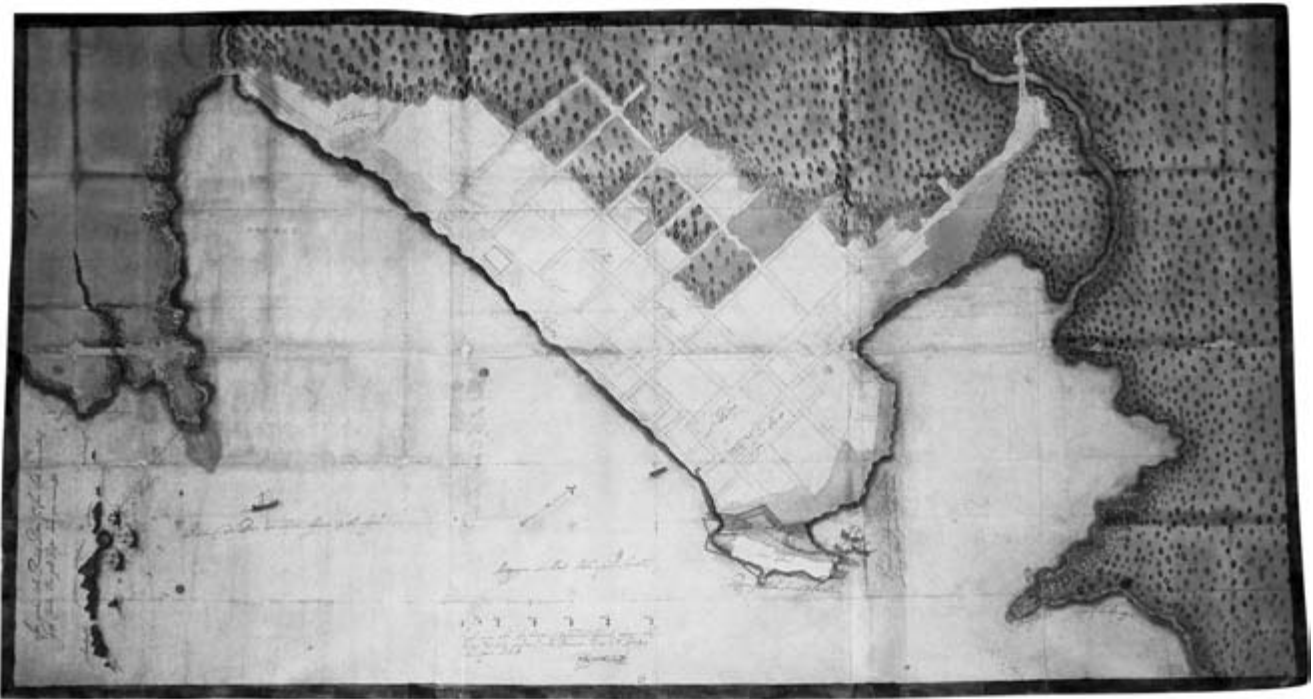


FIG. 41.17. CRISTÓBAL DE ROJAS, PLAN OF THE CITY OF PANAMA, 1609. The city of Panama formed a vital link on the Spanish route between the Pacific and Atlantic Oceans, upon which the great *flotas* or treasure fleets operated. Hence

the care with which Rojas delineated not only the city, but also the surrounding countryside.

Size of the original: 66 × 125 cm. Photography courtesy Spain, Ministerio de Cultura, AGI (MP-Panamá, 27).

In 1609, the little town was superbly portrayed by Cristóbal de Rojas (fig. 41.17), a royal engineer whom we have already encountered at Havana. Like Antonelli, who also worked at Panama, Rojas drew accurate planimetric maps, complete with scale, orientation, and a wealth of conventional symbols. Panama was the Pacific transit point for treasure, which was then carried across the isthmus to the harbor of Portobelo, where it was collected by the *flota* for the journey to Europe. Portobelo was also heavily fortified by the Spanish engineers, though both places fell to the buccaniers in the late seventeenth century; both also continued to be mapped after their recovery, for they long remained crucial links in the Spanish empire.<sup>77</sup>

#### VENEZUELA AND COLOMBIA

The north coast of South America had begun to take shape in the earliest Spanish maps (see fig. 30.8). By the 1540s, Santa Cruz could give a good idea of the coastline north of the equator, both to the east and to the west, and this information was summarized in the work of Gutiérrez (see fig. 41.2). The Herrera y Tordesillas version of López de Velasco's map of what is now called Colombia, titled the *Descripcion del avdiencia del Nvevo Reino*, was exceptionally full, for it could rely on the north-south line of two

great rivers, the Cauca to the west and the Magdalena to the east, the two running on either side of the Cordillera Central (fig. 41.18); these major features gave shape to the whole area. On the north coast, too, there were distinctive features such as the Gulf of Urabá in the west, followed to the east by Cartagena and then Santa Marta. The place-names on the map are relatively numerous and well sited, perhaps relying on a map of the 1570s produced as a *pintura* accompanying the *relaciones geográficas*.<sup>78</sup> The archives of Bogotá hold almost fifty maps of the country before 1700, and if these could be reproduced and studied, the results would be of great interest.<sup>79</sup> It has not been possible to consult them for this chapter.

On the coast, by far the most important port was Cartagena. It was mapped from at least 1571 onward, though at first in a rather cursory way. The disastrous sack of the town by Sir Francis Drake in 1586 had the same effect as in some other Spanish sites; the commission sent out by Philip II included engineers who drew plans like the one in

77. See the series of plans in González, *Planos de ciudades iberoamericanas y filipinas*, 1:261–73.

78. Now preserved at Madrid, Real Academia de la Historia. See the color reproduction in Duke of Alba, *Mapas españoles*, pl. XXXI (facing p. 129).

79. Vicenta Cortés Alonso, *Catálogo de mapas de Colombia* (Madrid: Ediciones Cultura Hispánica, 1967).

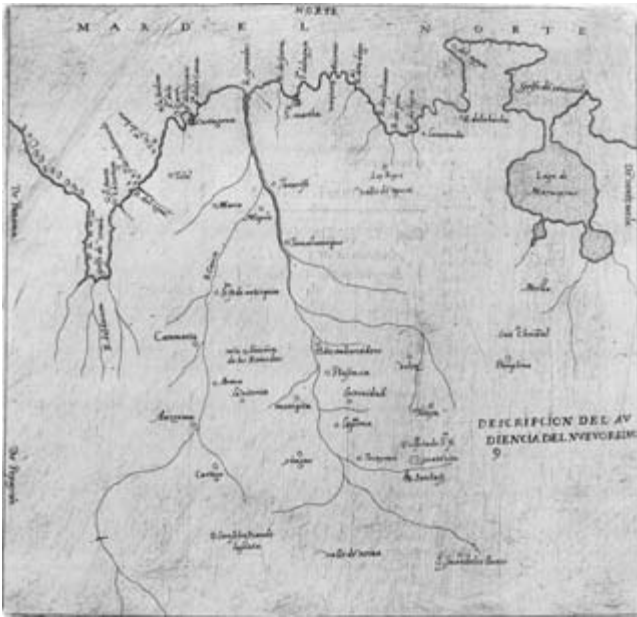


FIG. 41.18. ANTONIO DE HERRERA Y TORDESILLAS, MAP OF COLOMBIA, FROM HIS *DÉCADAS* (MADRID, 1601–15). This is one of the subsidiary maps in the manuscript atlas composed by López de Velasco (see also fig. 41.3) and then printed, with modifications, by Herrera (see fig. 41.4). It shows a part of South America where Spanish settlement came relatively early, with many towns established alongside the great rivers.

Photograph courtesy of the John Carter Brown Library at Brown University, Providence.

figure 41.19. This plan shows the old center of Cartagena as Bautista Antonelli proposed to fortify it in 1595, setting out not only the new fortifications, but also the line of the streets and some structures in the adjacent countryside. When Antonelli left, Cristóbal de Rojas took over from him, working at Cartagena between 1609 and 1631 and generating several more plans.<sup>80</sup> These showed a progressive expansion of the fortifications that continued through the seventeenth century and eventually enabled the city to resist the English admiral Edward Vernon's attack in 1741. Some other cities of Colombia—La Palma, Santa Marta, and Tolú—were also the subject of plans during the seventeenth century, but Cartagena generated by far the largest number of them; indeed, more plans of Cartagena are preserved in the AGI than of any other overseas Spanish city.

The López de Velasco map in figure 41.18 shows toward its eastern side the great Lake Maracaibo, which was from the start a prominent feature in the maps of the province of Venezuela. The most satisfactory general map of Venezuela was surely the one drawn by Francisco de Ruesta in 1634 (fig. 41.20). It gives a reasonably accurate delineation of the coast, but also shows internal mountain ranges, rivers, and some settlements. The offshore islands

are also shown with care, and the same year Ruesta also drew a map devoted to just one of these islands, the “Descripción de la isla de Curaçao.”<sup>81</sup> It was during 1634 that the Dutch seized Curaçao (still part of the Netherlands Antilles), and Ruesta no doubt produced this map with a view to advising on a possible Spanish counterattack. The shape of the island is rather gross, considering how long the Spaniards had been inhabiting it, but the main features are carefully marked and keyed.

Several other sites and islands on the north coast of South America received some attention. In 1623, for instance, Cristóbal de Rojas made a detailed map of the Araya salt pans, with their approaches and the best way to defend them.<sup>82</sup> The cartography is somewhat impressionistic, but there is a scale and orientation that allow us to accurately situate the proposed works. The whole province of Cumaná, by the Araya Peninsula, was carefully mapped, as was the pearl-fishing island of Margarita.<sup>83</sup> Pearls and salt, which have come to occupy rather peripheral positions in the modern economy, were of great importance during the seventeenth century and were indeed the reasons for the Spanish interest in this coast. Some large forts were therefore constructed to protect the salt pans. One of these was the fort called San Daniel, whose plan Cristóbal de Rojas drew when it was under construction from 1622 onward (fig. 41.21). These accurate scaled drawings provide us with precise views of important sections of the coast.

Venezuela has been exceptionally well served in the enumeration of its early maps, and these lists show that the maps were drawn almost exclusively to describe sites along the coast.<sup>84</sup> It was not until the late seventeenth century, with the spread of missions in the interior, that the course of the Orinoco River began to be known in some detail. Among the European printed maps, which belatedly recorded the growth of knowledge about this region, it was the 1690 map by Vincenzo Coronelli that first began to reflect the information collected by these religious cartographers. It is possible to gain an excellent idea of the span of cartography in this region, because many of the most important maps were reproduced in the 1897 publication of the Venezuelan Boundary Commission to make recommendations on the boundary between what

80. One, curiously, is preserved at the BL, Add. MSS. 1617. See also Enrique Marco Dorta, *Cartagena de Indias: La ciudad y su monumentos* (Seville: Escuela de Estudios Hispano-Americanos, 1951).

81. Now located in AGI, Indiferente, 2569.

82. Listed in González, *Catálogo de mapas y planos de Venezuela*, 31.

83. See the work by Hermann González, *Atlas de la historia cartográfica de Venezuela*, 2d ed. ([Caracas]: E. Papi Editor, [1987]).

84. See Francisco Morales Padrón and José Llavador Mira, *Mapas, planos y dibujos sobre Venezuela existentes en el Archivo General de Indias*, 2 vols. ([Seville]: Escuela de Estudios Hispano-Americanos, [1964–65]).



FIG. 41.19. BAUTISTA ANTONELLI, PLAN OF CARTAGENA, 1595. Cartagena was not only very intensively mapped, but also very heavily fortified during the seventeenth and eighteenth centuries, so that eventually, in a 1741 battle that has become a famous example of land resistance, it was

able to resist the assault of the English admiral Edward Vernon.

Size of the original: 41 × 59 cm. Photograph courtesy Spain, Ministerio de Cultura, AGI (MP-Panamá, 10).

was then British Guiana and Venezuela.<sup>85</sup> In much the same way and at about the same time, the Brazilian and French governments both produced atlases of facsimiles of early maps, as we will see later.

#### PERU AND CHILE

The western coast of South America was delineated more slowly by the Spanish cosmographers than the eastern had been, but by the 1540s Santa Cruz gave its general outline in his “Islario,” and in 1562 Gutiérrez set out the whole coastline following the campaigns of Pedro de Valdivia in the 1550s. In 1575, López de Velasco mapped the main ports along the coast, showing the *audiencias* of Quito, Charcas, and Lima, and the province of Chile.<sup>86</sup> For the interior, we have at least the early map of 1584, the “Cordillera en que habita la nacion Chiriguana”

(fig. 41.22). It may well have been composed to accompany the *relaciones geográficas*, and is oriented eastward, with Potosí at the center front and the Rio Grande on the left, curving away into Brazil. This work is accurate and fastidiously drawn.

The mapping of the immense basin of the Amazon River may be followed on the atlases of facsimiles composed by the Brazilian and French governments when in the late nineteenth century they were submitting their territorial

85. *Maps of the Orinoco-Essequibo Region, South America: Compiled for the Commission Appointed by the President of the United States “to Investigate and Report upon the True Divisional Line between the Republic of Venezuela and British Guiana”* (Washington, D.C.: [U.S. Government Printing Office], 1897), and also Buisseret, “Jesuit Cartography,” 124.

86. See the set of manuscript maps preserved at the John Carter Brown Library at Brown University, Providence, R.I.

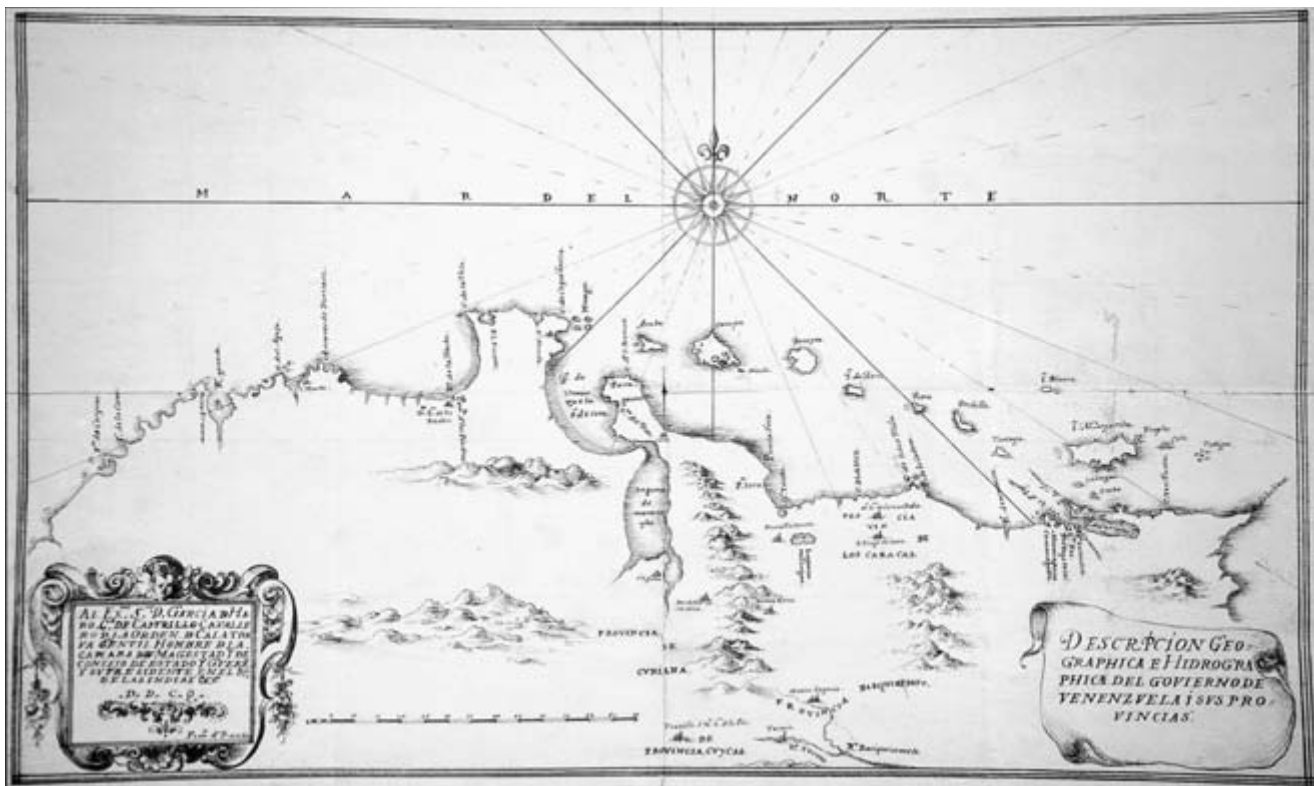


FIG. 41.20. FRANCISCO DE RUESTA, THE GOVERNMENT OF VENEZUELA, 1634. This map was designed to give a full impression of the coast of the province of Venezuela, no doubt upon the occasion of the seizure of Curaçao by the Dutch in 1634. The island may be seen immediately below the

compass rose, with Aruba to the left and the important island of Margarita far to the east.

Size of the original: 40 × 55.8 cm. Photograph courtesy Spain, Ministerio de Cultura, AGI (MP-Venezuela, 19).

cases for arbitration to the government of Switzerland.<sup>87</sup> From the beginning of the sixteenth century, world maps showed some form of huge river running across the middle of South America from west to east; cartographers often gave this aptly named Amazon River great and fanciful loops. The mapping of the basin began in earnest at the end of the seventeenth century, when Father Samuel Fritz arrived in 1686 at the Jesuit college of Quito, sent there from his native Bohemia.<sup>88</sup> Quito represented the western end of the basin, just as Pará was the great terminus at its eastern mouth on the Atlantic Ocean. A Spanish expedition from Quito had in fact reached Pará in 1636, so alarming the Portuguese authorities there that in 1637 Pedro Teixeira led an expedition in the opposite sense, and in 1639 attempted to define the boundary between the two European powers with the Act of Possession. Fritz thus entered an area under contention and himself made a journey from Quito to Pará in 1690–91; after this time, he spent several years working in the missions along the river, until in 1707 he published his map *Gran Rio Marañon, o Amazonas* (fig. 41.23). This extraordinary work, stretching from Quito in the west to Pará in the east, showed a large number of the tribes and missions alongside the great

river, and formed the basis of Amazonian cartography for many years to come.

At the bottom left corner of Fritz's map may just be seen the city of Lima, with its port of Callao. This was an important base for Spanish activity in the whole region, and was quite often mapped.<sup>89</sup> There was a great flurry of mapping in the mid-1680s, when the Flemish Jesuit Juan Ramón Koninck drew a plan to show the proposed new fortifications needed against English pirates. This plan, optimistically showing a fine bastioned defensive line

87. Some of these atlases were sumptuous; see, for instance, *Mémoire contenant l'exposé des droits de la France dans la question des frontières de la Guyane française et du Brésil, soumise à l'arbitrage du gouvernement de la Confédération Suisse* (Paris: Imprimerie Nationale, 1899).

88. On Fritz, see still George Edmundson, ed. and trans., *Journal of the Travels and Labours of Father Samuel Fritz in the River of the Amazons between 1686 and 1723* (London: Printed for the Hakluyt Society, 1922). It would seem that this remarkable figure needs more study.

89. See the work by Juan Gunther Doering, ed., *Planos de Lima, 1613–1983* (Lima: Municipalidad de Lima Metropolitana, 1983); Richard L. Kagan, *Urban Images of the Hispanic World, 1493–1793* (New Haven: Yale University Press, 2000), 169–76; and Guillermo Lohmann Villena, *Las defensas militares de Lima y Callao* (Seville: Escuela de Estudios Hispano-Americanos, 1964).

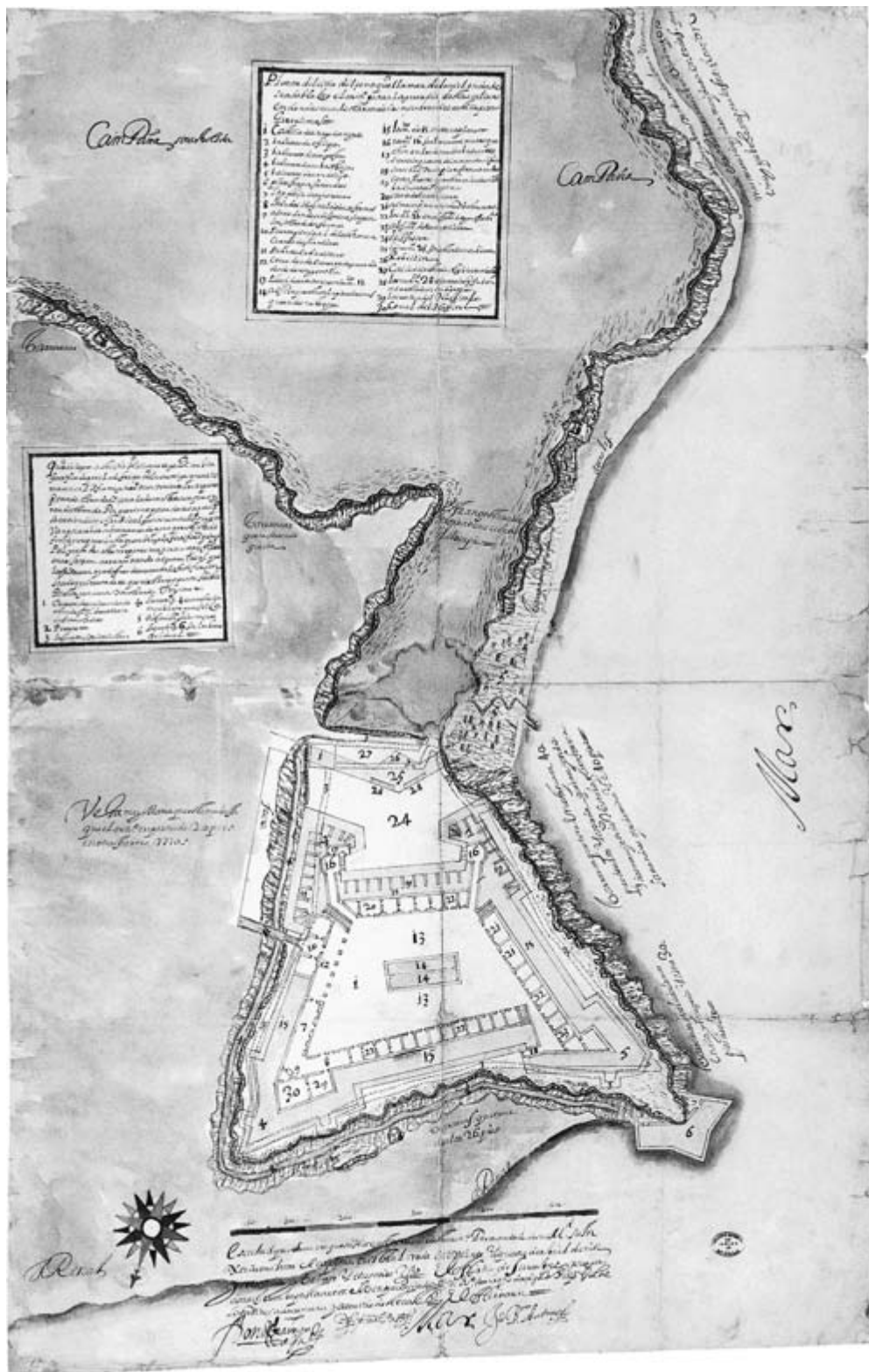


FIG. 41.21. CRISTÓBAL DE ROJAS, PLAN OF THE FORT OF SAN DANIEL, 1623. This is a typical example of the way in which engineers delineated strong points, inserting not only the fortification work itself, but also the outline of the sur-

rounding countryside. This particular fort was constructed to protect the salt pans of Araya. Size of the original: 75.4 × 48.2 cm. Photograph courtesy Spain, Ministerio de Cultura, AGI (MP-Venezuela, 12).

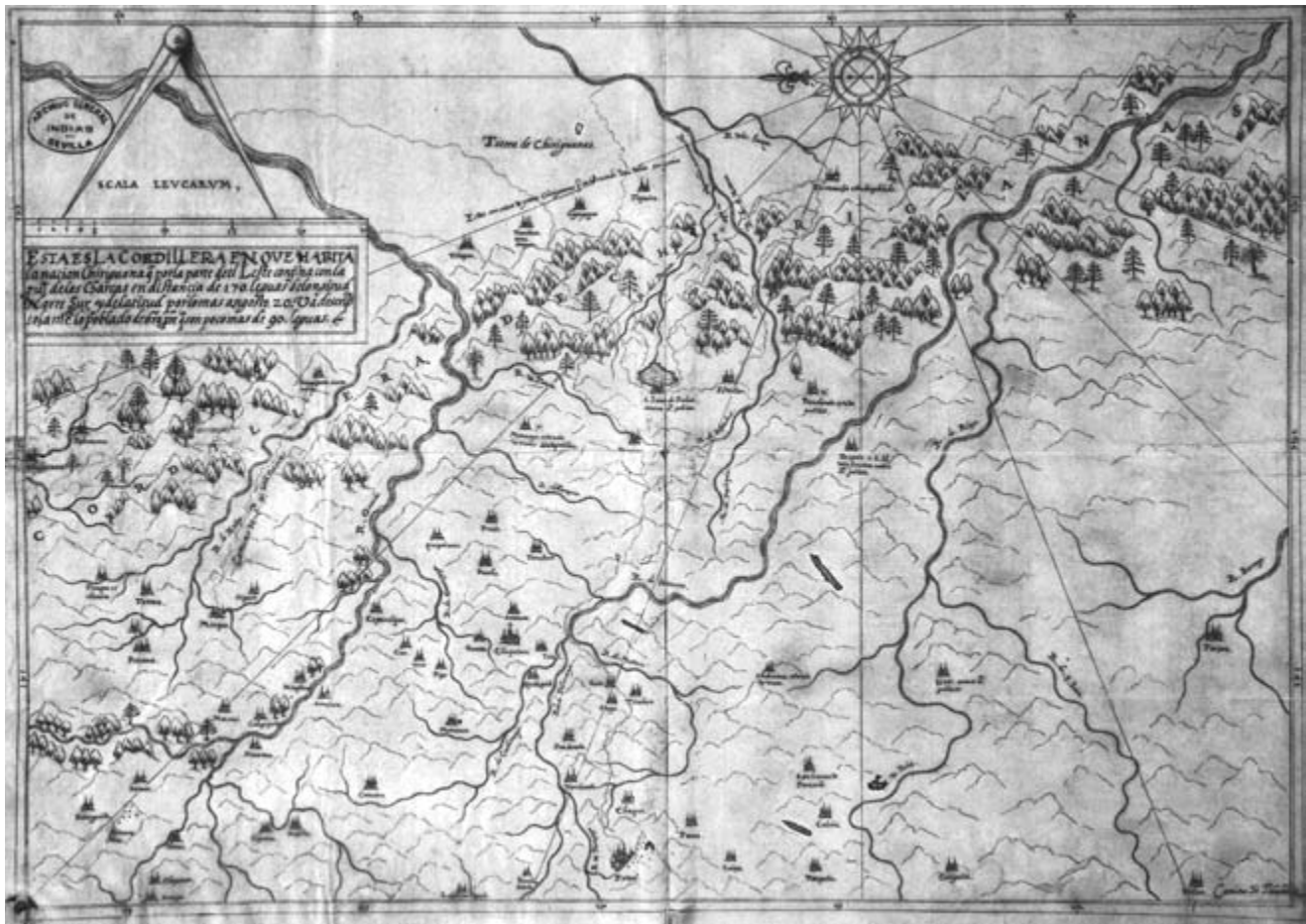


FIG. 41.22. ANONYMOUS, “CORDILLERA EN QVE HABITA LA NACION CHIRIGUANA,” 1584. This elegant map sets out the country east of Potosi (front center) in what is now Bolivia. It shows that the Spaniards were concerned to set out the lines of the rivers and the sites of settlements,

some time before it was built, was repeated in 1687 by Fray Pedro Nolasco, a Mercedarian friar whose large work (46 × 66 cm) was, in detail and execution, fully the equal of similar city plans drawn in triumphal style in Europe at this time. Some other important cities were also mapped, particularly including the mining center of Potosi, source of so much Spanish wealth; in 1600, this was the object of a fine planimetric plan, as well as numerous perspective views.<sup>90</sup>

The province of Chile was among the last to be mapped in South America. There had been an intensification of interest in the Strait of Magellan during the 1580s, when the engineer Tiburzio Spanochi, well known for his work on the Spanish Peninsula, was sent to work out plans for fortresses to control the strait; these plans have been well reproduced.<sup>91</sup> However, the work was never undertaken, probably because the Spaniards suspected what the Dutch showed in 1615–16, when an expedition sailed around

without being able to take account of the very complicated geography.

Size of the original: 28 × 40 cm. Photograph courtesy Spain, Ministerio de Cultura, AGI (MP-Buenos Aires, 12).

Cape Horn, thus negating any purpose in controlling the strait. In 1618–19, the Spanish captains Bartolomé García de Nodal and Gonzalo de Nodal were sent to confirm this report; they succeeded in circumnavigating Tierra del Fuego and generated a map that was much more accurate than the one produced by the Dutch (fig. 41.24).<sup>92</sup>

The province of Chile itself remained unmapped until about that time, when the Jesuit Antonio Ruiz de Montoya produced a map published at Rome in 1646 in the *His-*

90. See the reproductions and commentary in Kagan, *Urban Images*, 101–5 and 186–98.

91. See Carlos Martínez Shaw, ed., *El pacífico español de Magallanes a Malaspina* (Madrid: Ministerio de Asuntos Exteriores, [1988]), 16–17.

92. According to Clement R. Markham, ed. and trans., *Early Spanish Voyages to the Strait of Magellan* (London: Printed for the Hakluyt Society, 1911), 187. See also Mateo Martinic Beros, *Cartografía magallánica, 1523–1945* (Punta Arenas: Ediciones de la Universidad de Magallanes, 1999).



FIG. 41.23. SAMUEL FRITZ, MAP OF THE AMAZON BASIN, 1707. This extraordinary printed map summarizes the investigations of the Bohemian Father Samuel Fritz, S.J., who from 1686 onward made a series of journeys through this vast territory. No doubt using other Jesuit maps, as well as information from informants, he worked out a scheme of the Ama-

zon and Orinoco Rivers which, while including some folklore, nevertheless corrected the works of his even more fanciful predecessors.

Size of the original: ca. 31 × 41.5 cm. Photograph courtesy of the BL (\*Maps 83040[4]).

*torica relacion del reyno de Chile* of Alonso de Ovalle. This map, measuring 36 by 47 centimeters, was a reduction from the very rare original, which measures 58 by 117 centimeters.<sup>93</sup> Figure 41.25 shows the right, southern side of the larger map, with Tierra del Fuego in the middle right. The line of the Andes is rather conventionally drawn, but many rivers and settlements have been inserted, and numerous cartouches attempt to give an idea of the nature of the country. This map published by Ovalle would influence the way in which Chile was shown on maps for about 150 years, down to about 1780. Ovalle's work also included plans of Santiago, Valparaiso, Coquimbo, and Quintero, but those plans, although apparently accurate, were truly vestigial, reflecting the very slow development of this part of Spain's empire.

#### BUENOS AIRES

The area around the mouth of the Rio de la Plata, on the other hand, was mapped early and thoroughly, as befitted a region of such obvious promise. Santa Cruz gave a fair impression of it in his "Islario" of the 1540s, and sixty years later it was more closely mapped by the Jesuit Father Diego de Torres. According to the Argentine historian Cárdiff, the influence of Torres then extended to the maps published in Europe by Joannes de Laet, Willem Jansz. Blaeu, and Johannes Janssonius.<sup>94</sup>

93. See Lawrence C. Wroth, "Alonso de Ovalle's Large Map of Chile, 1646," *Imago Mundi* 14 (1959): 90–95.

94. Fúrlong Cárdiff, *Cartografía jesuítica del Río de la Plata*, 21–23.





FIG. 41.24. BARTOLOMÉ GARCÍA DE NODAL AND GONZALO DE NODAL, MAP OF THE SOUTHERN PART OF SOUTH AMERICA, 1621. This remarkable printed map derives from the Nodals' voyage of 1618–19, after which their observations were drawn together by the royal cosmographer, Pedro Teixeira Albernas. The surprisingly accurate delineation

of these very inhospitable waters is accompanied by the use of wind roses that seem to derive from the portolan charts. Size of the original: ca. 39.6 × 33.9 cm. Photograph courtesy of Special Collections and Rare Books, Wilson Library, University of Minnesota, Minneapolis (TC Wilson Library Bell 1621 Ga).

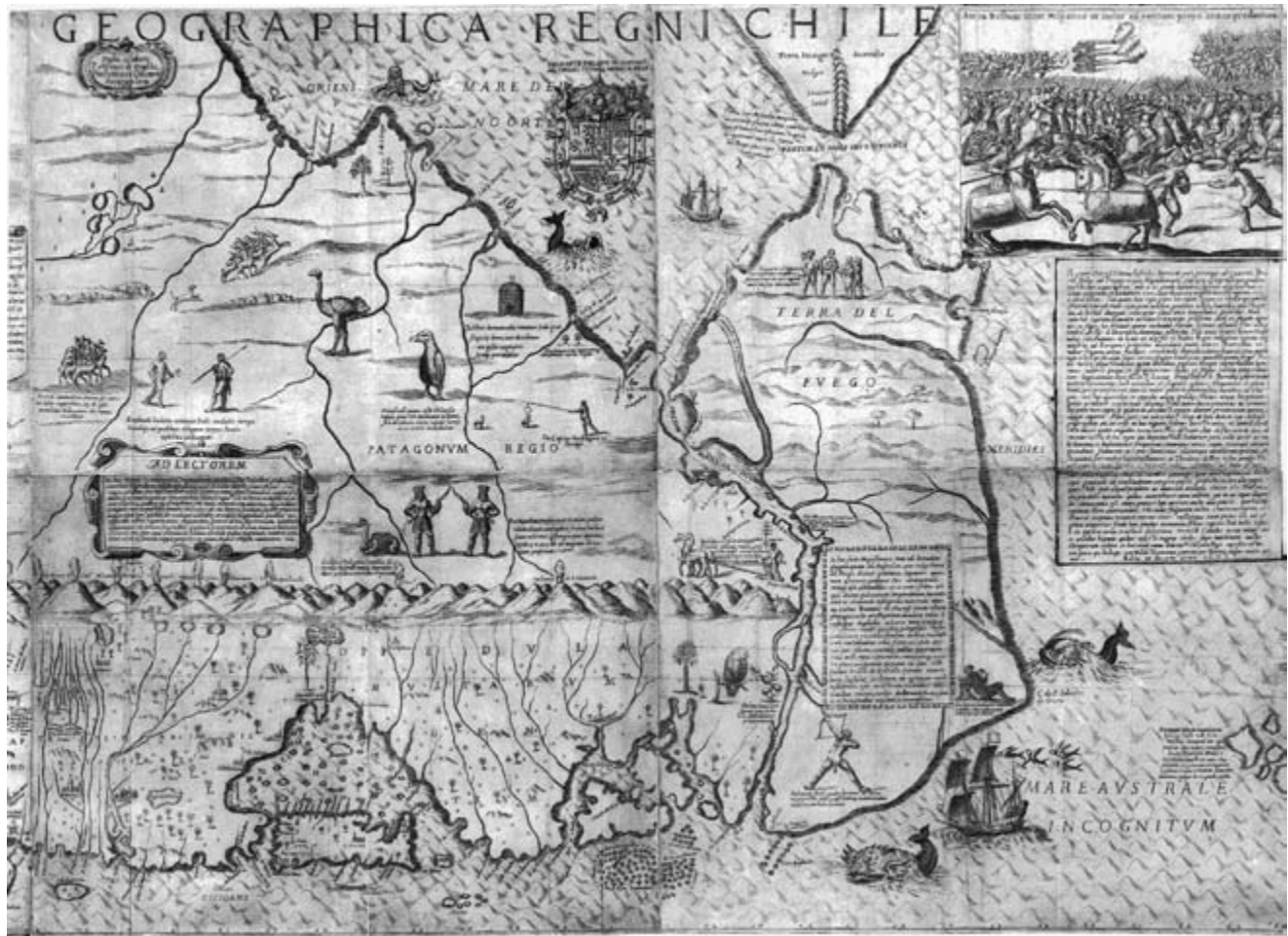


FIG. 41.25. ALONSO DE OVALLE, DETAIL FROM THE MAP OF CHILE, 1646. This map shows a huge area from the Atlantic to the Pacific Ocean, with the rivers and a few towns carefully inserted. It also harks back to the medieval *mappae-mundi* in its insertions in blank spaces of appropriate images.

Size of the detail (right half): ca. 58 × 79.4 cm. From Alonso de Ovalle, *Historica relacion del reyno de Chile* (Rome: Por Francisco Cauallo, 1646). Photograph courtesy of the John Carter Brown Library at Brown University, Providence.

Of course, the Jesuits were centrally interested in the line of the great rivers running northward into the interior, where they were in the process of establishing their missions, the *reducciones*. Eventually, they ran into territory claimed by the Portuguese of Brazil, and a conflict ensued, which was resolved in the late eighteenth century by the expulsion of the Jesuits. Before then, though, they had made many maps, beginning with that made around 1600 by Juan Romero, one of the earliest superiors.<sup>95</sup>

Like many of the Jesuit maps, this one cannot now be found, but their influence on the maps printed in Europe is quickly seen. In 1667, Joan Blaeu published *Paraquaria, vulgo Paraguay*, dedicating it to the Jesuit superior general Vincenzo Caraffa (fig. 41.26). This map accurately sets out the courses of the Paraguay, Paraná, and Uruguay Rivers, identifying the names of the chief Indian tribes along these rivers and their towns. Spanish cities and Jesuit “reductions” (missions) are shown, as are Franciscan

missions; it was possible with a map like this to form a quite accurate impression of the way in which the church and the crown were penetrating this land.

As on the west coast, on this east coast, too, the cities were slow to develop and never rivaled the great early cities of the Caribbean. However, some of the towns of what became Argentina were mapped early, if generally rather crudely; thus, we have images of Buenos Aires (1583), Mendoza (1561 and 1562), San Juan Bautista de la Ribera (1607), San Juan de la Frontera (1562), and Talavera de Madrid (1668).<sup>96</sup> These plans were almost all quadrilateral in form, and so look almost like diagrams

95. Fúrlong Cárdiff, *Cartografía jesuítica del Río de la Plata*, 20–21, and also Buisseret, “Jesuit Cartography.”

96. See the reproductions in González, *Planos de ciudades iberoamericanas y filipinas*, 1:1, 11–13, and 17–19.

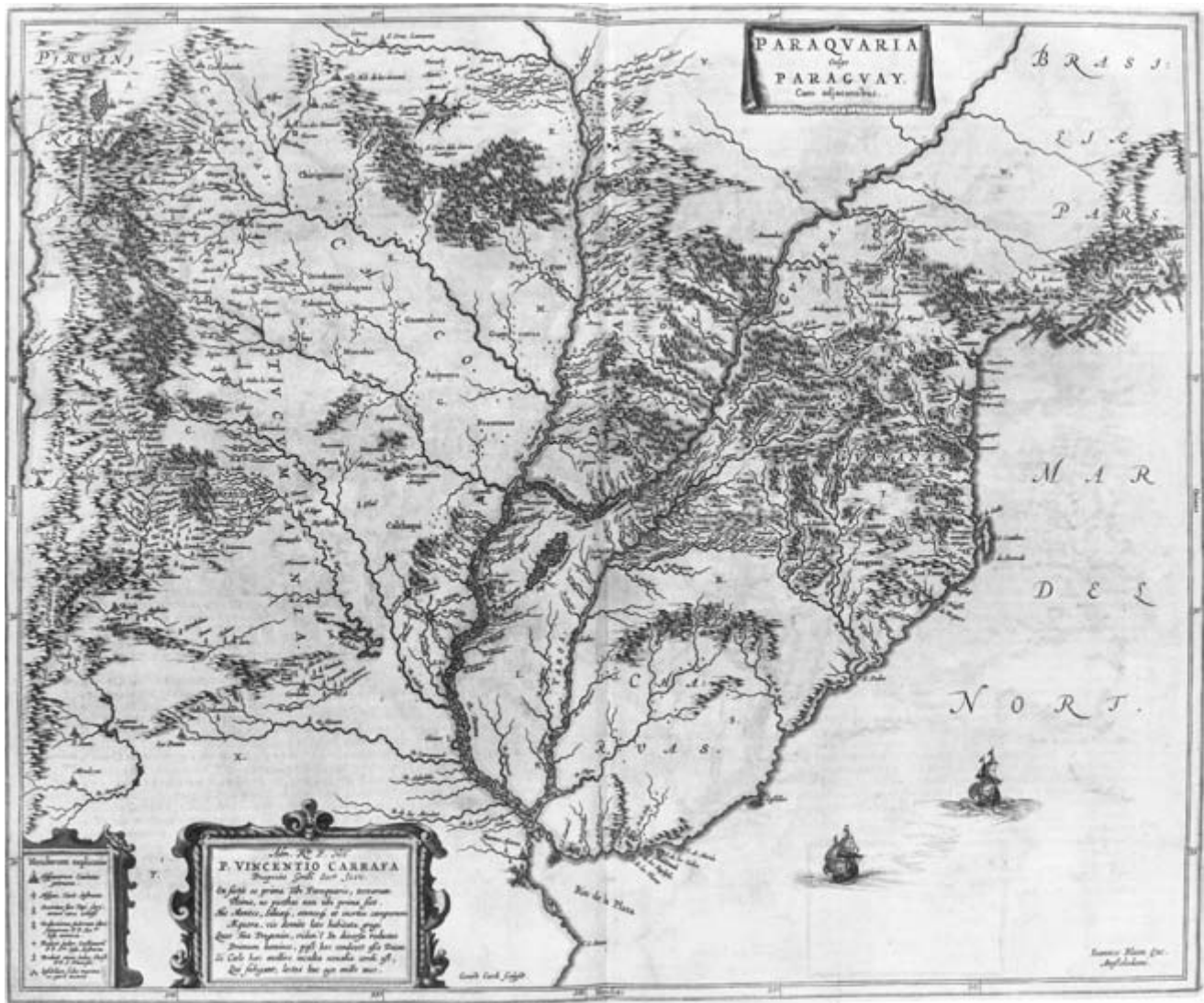


FIG. 41.26. JOAN BLAEU, *PARAQVARIA, VULGO PARAGVAY* (AMSTERDAM, 1663). When Joan Blaeu printed this map and dedicated it to the Jesuit superior general, he was no doubt acknowledging the way in which the members of that order had mapped out the course of the great rivers. This is the

country in which the experiment of the settlements known as “reductions” took place, before their destruction in the later eighteenth century and the expulsion of the Jesuits. Size of the original: ca. 45 × 55.2 cm. Photograph courtesy of the Newberry Library, Chicago (Ayer\* 135 B63 1663).

setting out the part played by public and private lots in building up the new urban centers.

#### THE PHILIPPINE ISLANDS

It was not until the 1540s that islands more or less recognizable as the Philippines began to appear on European world maps. The first Spanish cartographer to show Palawan and Mindanao was Santa Cruz, in his “Islario”; however, his knowledge was thin and inaccurate. The general shape of the islands was better delineated about 1551 by Sancho Gutiérrez, son of the older Diego Gutiérrez. His world map shows the chain of islands in general outline and in roughly the correct place; Sancho was in

fact one of the cartographers called on to give an opinion on the position of the Philippines and the Moluccas, at Seville in 1566.<sup>97</sup>

During 1564 and 1565, an expedition led by the Basque Miguel López de Legaspi visited the Philippines, and four charts made by pilots who accompanied that expedition are preserved at the AGI in Seville.<sup>98</sup> They did not show much detail of the islands, however, and the first relatively

97. Illustrated with commentary in *Kartographische Zimelien: Die 50 schönsten Karten und Globen der Österreichischen Nationalbibliothek*, ed. Franz Wawrik et al. (Vienna: Österreichische Nationalbibliothek, 1995), 62.

98. See Pedro Torres Lanzas, *Relación descriptiva de los mapas, planos, etc., de Filipinas . . .* (Madrid, 1897), 4.

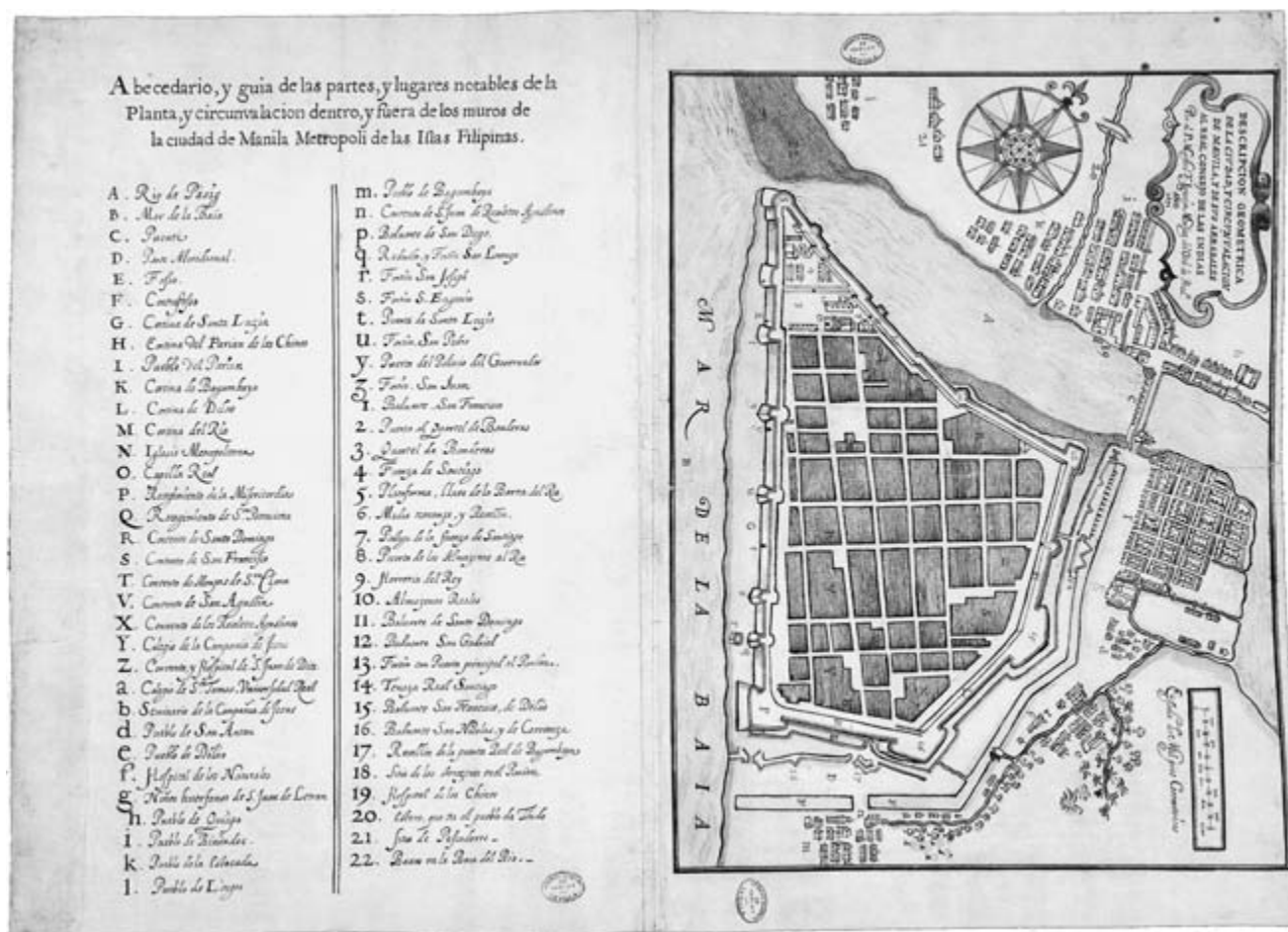


FIG. 41.27. IGNACIO MUNOZ, *DESCRIPCION GEOMETRICA DE LA CIUDAD Y CIRCUNVALACION DE MANILA* (MANILA, 1671). In the later seventeenth century, the settlement at Manila grew fast, and this rather optimistic image by Ignacio Munoz catches the city in that phase. The

letters and numbers in the key are numerous and show that Munoz offered a detailed analysis of the city. Size of the original: 47.3 × 60.4 cm. Photograph courtesy Spain, Ministerio de Cultura, AGI (MP-Filipinas, 10).

detailed map was the one drawn about 1572 by Diego López Povedano. This showed the island of Negros in some detail, though in a very naïve way. In the map of the western Pacific Ocean compiled by Juan López de Velasco about 1575, the shape of the island was still very approximate, though this had been largely corrected in the printed version of this map published at Madrid by Antonio de Herrera y Tordesillas in 1601.<sup>99</sup>

The Spaniards progressively occupied the Philippine Islands during the first half of the seventeenth century, and this was reflected in the cartography. By 1659, Manuel de Orozco, using sources that we do not know, produced a map at Madrid that showed virtually all the islands of the archipelago, with some internal detail.<sup>100</sup> About that time, there were other attempts to delineate internal areas, such as the anonymous “Map of Ituy and other provinces in northern Luzon.”<sup>101</sup> On the whole, though, the internal areas were not rich enough to draw detailed cartography from the Spanish colonists.

The earliest surviving town plans for the Philippines show Cavite, which was being fortified about 1640. These planimetric images were the work of engineers such as Ricardo Carr, described as a “Dutch engineer,” and the Spanish Juan de Somovilla Tejada.<sup>102</sup> At about that time, Manila was also developing, and in 1671 it was shown in the *Descripcion geometrica de la ciudad y circunvalacion de Manila* (fig. 41.27). The author was Father Ignacio Munoz, of the Dominican order of preachers, and even though he mingled the vertical and oblique views, he of-

99. See the Velasco manuscript (fig. 41.3), and also Herrera y Tordesillas, *Historia general* (1944–47), and idem, *Historia general* (1934–57).

100. Cited by Carlos Quirino, *Philippine Cartography (1320–1898)*, rev. ed. (Amsterdam: N. Israel, 1963), 84.

101. Now preserved in the AGI.

102. See the plans reproduced in González, *Planos de ciudades iberoamericanas y filipinas*, 1:131–33, and also their descriptions, 2:119–22.

ferred scale and orientation and succeeded in giving a convincing impression of the emerging capital city. As the economic center of Spain's Eastern trade, and home of the Manila galleon, it would be mapped very often during the eighteenth century.<sup>103</sup>

### CONCLUSION

The task facing the Spaniards in the spatial representation of their territories was immense. The Portuguese, it is true, had expanded as far and as fast, but they were not concerned to establish colonies of settlement, and so were content with accurately charting the sea lanes from Portugal. There was no need for Portuguese mapmakers to produce detailed images of territory that they did not intend to occupy. The one exception to this was Brazil, where indeed they eventually established a well-mapped colony of settlement. When the other European powers began to expand in the later sixteenth century, they did so more gradually, and mapped their new possessions much less systematically than the Spaniards. In the case of the English, cartography was left to private enterprise, and the French never attempted, for instance, to establish anything like the equivalent to the Casa de la Contratación at Le Havre or Marseille. Only the Dutch followed the Iberian lead, with their navigation schools at Amsterdam and at Batavia.

By the end of the sixteenth century, the work of the Casa de la Contratación had established the outlines of the Spanish New World, and López de Velasco had shown how it was possible to map all these regions in a uniform fashion. Philip II undoubtedly wanted to carry this work further and to use the *pinturas* accompanying the *relaciones geográficas* to work out detailed maps of the whole empire. This ambitious project failed, not only because of the nature of the *pinturas*, whose information was often inaccessible to cartographers of the European tradition, but also because toward the end of the century Philip II and his successors were increasingly diverted by their problems in Europe.

The intrusion of foreign powers into the New World during the 1580s had the paradoxical effect of forcing the Spaniards seriously to fortify their major cities for the first time, and that, in turn, led to the work of engineers who

could not only plan bastioned traces around them, but also delineate their main features, often set into the adjacent countryside. From 1517 onward, a series of laws had set out the ways in which cities were to be founded in the New World. They were to be located near fresh water and not too far from the sea, with the streets oriented to the four cardinal points, provision left for two main squares, and so forth. We thus find great numbers of town plans in which the old quadrilateral city centers—laid out in accordance with these laws of the Indies—were now to be surrounded by powerful walls and bastions. This process of fortification and its corresponding maps would last down to the end of Spanish overseas power.

At first there had been little prospect that the countryside would be closely mapped, following the failure of Philip II's venture of the 1570s. But then came the arrival of the Jesuits, toward the end of that century. Trained in mathematics and cartography at many of their colleges, which began to dot Catholic Europe, they brought their skills even to the most remote missions. This was true not only in the Spanish world, in places such as northern Mexico, the Orinoco River Valley, and the region of Paraguay, but also in French Canada and Portuguese Brazil. Their work, which came about as an almost accidental meeting of their skills and unexpected opportunities, meant that many regions were better known in their manuscript maps than they would be until the twentieth century, with its great advance in cartographic techniques. The Jesuits were eventually expelled from the overseas possessions in the 1770s, and their remarkable work came to an end.

At the beginning of the eighteenth century, the last Habsburg king, Charles II (r. 1665–1700) died; his successor was the French prince known as Philip V (r. 1700–1746). Long before 1700, though, the influence of the French Bourbons had been felt in Spain, as the power of the Spanish Habsburgs ebbed away. One of the many inviting subjects in the history of Spanish overseas cartography is indeed the process by which Bourbon influence penetrated the peninsula. But that is only one among many such potentially fruitful subjects for research.

103. See González, *Planos de ciudades iberoamericanas y filipinas*, 1: 138–56, for numerous plans of Manila.