

**PRECEDENTS OF THE 19TH CENTURY CARTOGRAPHY OF THE COASTS OF FLORIDA,  
MISSISSIPPI, ALABAMA, LOUISIANA AND TEXAS: SPANISH, ENGLISH AND FRENCH  
MAPS AND CHARTS, 1500-1800**

*CHIAS P., ABAD T.*

*University of Alcala, ALCALA DE HENARES (MADRID), SPAIN*

**BACKGROUND**

The first news about the Spanish discoveries in the New World arrived to Europe at the end of the 15th century, and the new territories were soon considered both a commercial and a strategic target, and a source of endless wealth. Thus, the plans to establish the political control over them new must be supported by a reliable and accurate knowledge of the lands and shores.

The former expeditions to the Southern coasts of North America took place in the early 1508, when their shores were accidentally discovered by the Spanish in their search for a suitable way to the Indies. Since then, winds and tides pushed the different expeditions of explorers to the north shores, and waves of adventurers and settlers supported by military campaigns were sent to America by the main European powers. Along the next three centuries, the civil explorers and the naval campaigns were essential pieces of a strategy that aimed to establish the political control over the new territories.

But the control could not be carried out without a proper knowledge of the new lands, and the main European powers –Spain, Britain, France and the Low Countries- encouraged the civil and military explorers to make written descriptions, as well as to draw maps and charts (Sandman 2004; Sandman 2007; Buisseret 2003, 91-132). According to Stevenson ([1908-09], 369) “[Maps] often indicate, by mere touch, a story of exploration or discovery, concerning which the written documents are silent”, and as a consequence the continuous cartographic works contributed to establish a close –and scarcely verified- connection between exploration and mapping.

The cartographic production increased along the three main centuries of the colonial period, according to the most relevant historical facts such as warfare and political exigencies, commercial and administrative needs, or scientific purposes. In Spain, the surviving cartography composes an important collection of more than one hundred extant manuscript and printed maps and charts of this period.

But for several reasons that we will also discuss, in the majority of cases the Spanish ancient cartography of America still remains unknown to the scientific community. The main historical arguments that were used to justify it were the following:

- Firstly, the maps were mostly manuscript, what made difficult their analogical copy and diffusion (before the digital era it was restricted to photographic pictures or engravings). But photography had also its own limitations, as the lettering and the details could be hardly read or appreciated when maps are not big enough.

- Secondly, the Spanish Augsburg monarchs considered that maps included essential and secret information that must be kept safe from foreign eyes. This theory is actually being discussed (Buisseret 2003, 106; Zandvliet 1998, 31), as it can be stated that some maps and even copies of the Padrón Real –the royal pattern chart produced by the Casa de Contratación in Seville- were sent as a gift to other European kingdoms.

The survival rate of the Spanish cartography of the colonial period is not at all poor, and the present paper will expose how far it was used on the following cartographic campaigns, including the coastal surveying of the 19th century.

**OBJECTIVES**

The paper studies the still extant maps and charts of the US coasts of the Gulf of Mexico and the Atlantic coasts of Florida that were drawn from the beginning of the 16th century until 1900. It includes the maps and charts of the States of Florida, Luisiana, Alabama, Mississippi and Texas, that are scattered in the main Spanish repositories: Museo Naval and Biblioteca Nacional in Madrid, Archivo General de Indias in Seville, Archivo de Simancas in Valladolid, among others.

The invaluable Spanish collections also include surviving textual documents and the –frequently related- colonial manuscript and printed cartography, drawn at different scales by the Spanish, British and French cartographers, and also those who were printed mainly in the Low Countries, London or Paris. Thus, we have compiled the list of the general maps and charts, the local topographical maps and even the detailed urban plans, and the main written records related to the territories that are being studied.

The search focuses on the following headings:

1/ the evolution of the image of the territories, the reliability of the different depictions, and the accuracy of the successive maps, deepening in the relationships established between the explorers and the mapmakers.

2/ the influence of the European changing image of the world, and of the cartographic traditions that can be appreciated in the maps and charts of the discovered lands.

3/ the cartographic improvements achieved in each campaign, related to the technical and scientific advances.

4/ the way maps and charts were reused and completed by later cartographers, studying the main changes, e.g. the evolution of the Indian, Spanish, French and English toponyms.

In short, the main target of our search is to compare all the cartographic documents, through the study of their main features, their contents and the evolution of their accuracy. As a second result we will discuss how far they were reliable precedents of the nautical charts located in the US Office of Coast Survey –as an example of the later modern cartography–, as maps and charts were usually reused and redrawn in several copies and editions until the 19th century.

## APPROACH AND METHODS

The first step of the search was to find the extant maps located in the different Spanish repositories and to build a database including textual data and a low resolution image with its related metadata (Chías & Abad 2010b). A high resolution image of each map was also stored on another database as it must help to study the documents in detail.

A compiled list of the extant maps and charts in the main Spanish repositories was got from the database, and included manuscript and printed maps drafted from 1501 to 1817 by the explorers, the naval officers, the military engineers and even by missionaries; some results can be seen on Table 1.

	1501-1699			1700-1817		
	AGI	CGE	IHCM	AGI	CGE	IHCM
<b>Maps</b>	12 (Spanish) 1 (French)	4 (Spanish) 1 (British) 2 (Low Countries)	1 (Spanish)	107 (Spanish) 14 (French) 1 (British)	33 (Spanish) 4 (French) 3 (British)	18 (Spanish) 2 (French) 1 (British)
<b>Plans (urban, architectural...)</b>	21 (Spanish)	3 (Spanish)	5 (Spanish)	146 (Spanish) 27 (French)	8 (Spanish)	8 (Spanish)
	34	10	6	295	48	29

AGI (Archivo General de Indias, Sevilla, Spain)

CGE (Centro Geográfico del Ejército, Madrid, Spain)

IHCM (Instituto de Historia y Cultura Militar, Madrid, Spain)

Atlases not included.

*Table 1. Maps and plans of the coastal areas of Florida, Mississippi, Alabama, Louisiana and Texas that are still extant in three main Spanish repositories.*

To study the accuracy and reliability of the maps series we used the digital technologies and the Geographical Information Systems, as they open new ways for integrating early maps with other information, combining the historical maps and their related textual and numerical information. We have implemented a GIS on ancient cartography related to the above mentioned database, in order to explore the possibilities that GIS tools and georeferencing bring to the study of the geometric frame –projections, scale– and the accuracy of the early maps and charts (Chías & Abad 2010a). Those methods were already applied by several teams of searchers, although mainly with cadastral purposes (Orciani et al 2007; Heere 2006).

We used as a cartographical reference the raster images of the charts of the US coastal surveyings of the 19th century and their related Memoirs (Bache 1861) (Fig.1).

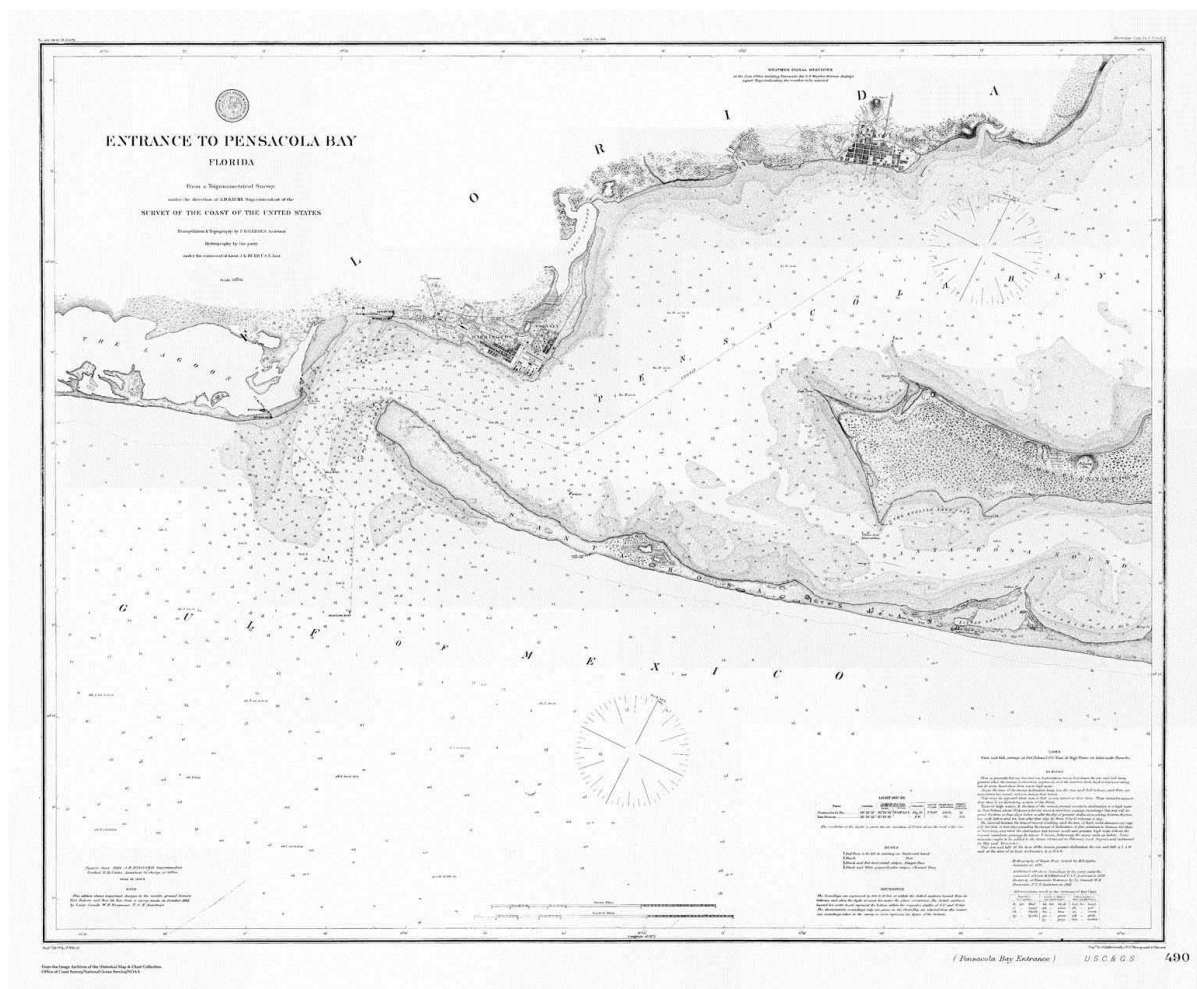


Figure 1. A.D. Bache, *Entrance to Pensacola Bay* (1866), US Coastal Survey, *Historical Maps & Charts Collection*.

On each sheet of the 1866 chart we identified the main control points, selected among the geodetic references and related to the Greenwich Meridian. Those points were the light houses of Pensacola ( $30^{\circ} 20' 47''$  N /  $87^{\circ} 18' 32''$  W) and Bar Beacon ( $30^{\circ} 20' 42''$  /  $87^{\circ} 18' 30''$  W), as well as others whose bearings were established in the 18th century maps with a high degree of accuracy (St. Augustine, Cape Canaveral, Tampa Bay, Mobile Port and the Mouth of the Mississippi River).

We also unified the scales of longitudes, as the ancient charts had their own longitude reference system. At this time, the Spanish maps use to set the longitudes' origin at the Isle of Hierro or in Tenerife, both in the Canary Islands; and French maps were referred to the Meridian of Paris (Table 2).

Map	Geographical Co-ordinates of Pensacola: Meridians of reference		
	Isle of Tenerife ( $16^{\circ} 40'$ W of Greenwich) or Isle of Hierro ( $18^{\circ} 20'$ W of Greenwich)	Paris ( $2^{\circ} 21'$ E of Greenwich)	Greenwich
1761, Joseph Porlier: <i>Plano del puerto de Panzacola</i> CGE USA & Canada no. 91	$30^{\circ} 14'$ N		
1768, JJ Elixio de la Puente: <i>Plano de las Provincias de La Florida</i> CGE USA & Canada no. 92	$30^{\circ} 10'$ N $285^{\circ}$ E		
1732, Sr. D'Anville: <i>Carte de la Louisiane</i> CGE USA & Canada no. 100		$28^{\circ} 15'$ N $92^{\circ} 20'$ W	
1775, Thomas Jefferys: <i>The Coast of West Florida and Louisiana</i> CGE USA & Canada no. 56	$35^{\circ} 20'$ N $69^{\circ} 60'$ W		$35^{\circ} 20'$ N $86^{\circ} 35'$ W
1782, Joachin de Peramar: <i>Plan de la bahía de Santa María de Galvez</i> CGE, USA & Canada no. 96	$30^{\circ} 20'$ N $287^{\circ} 34'$ E		
1783, Josef Portillo: <i>Plano de la Fuerte Plaza de Panzacola</i> AGS, MPD 12.090	$30^{\circ} 30'$ N $287^{\circ} 20'$ E		
1784, Evia: <i>Descripción hidrográfica de una parte de la costa de La Florida</i> CGE, USA & Canada no. 59	$30^{\circ}$ N $288^{\circ} 44'$ E (Tenerife)		
1866, A.D. Bache: <i>Entrance to Pensacola Bay</i> US Coastal Survey, <i>Historical Maps &amp; Chart Collection</i>			$30^{\circ} 20' 47''$ N $87^{\circ} 18' 32''$ W

Table 2. *Geographical Co-ordinates of Pensacola determined on a series of maps dated between 1761 and 1866.*

Those coordinates were later transferred to the old cartography, in order to establish a common reference grid to the different series of maps and charts (Balletti 2006; Boutoura & Livieratos 2006).

The strategies that were followed were:

- Firstly, to superpose the 19th century maps and the ancient ones.
- Secondly, to apply the transparencies to the old charts.
- Thirdly, to match the control points through the application of geometric transformations to the old charts, such as scaling, rotating, and even stretching.

The application of the scale factor and the rotation angle determine an affine transformation. In the cases where the triangles that were conformed by the control points were not affine, we found the different algorithms that fitted the maps, such as point based warping transformations (Balletti 2006; Jenny 2006).

On the other hand, our search focused also on the study of the contents of the maps, their depictions and the features they drew and considered according to the purpose of each map.

In order to compare them we chose a series of both manuscript and printed large scale maps and charts (case study 1), as well as another series of detailed maps of the Pensacola Bay (case study 2).

#### Case study 1: coasts from Mississippi River to the Gulf of Florida

Among the extant maps we chose a series of five maps and charts that were drawn from 1715 to 1784 (see Figures 2 to 6).

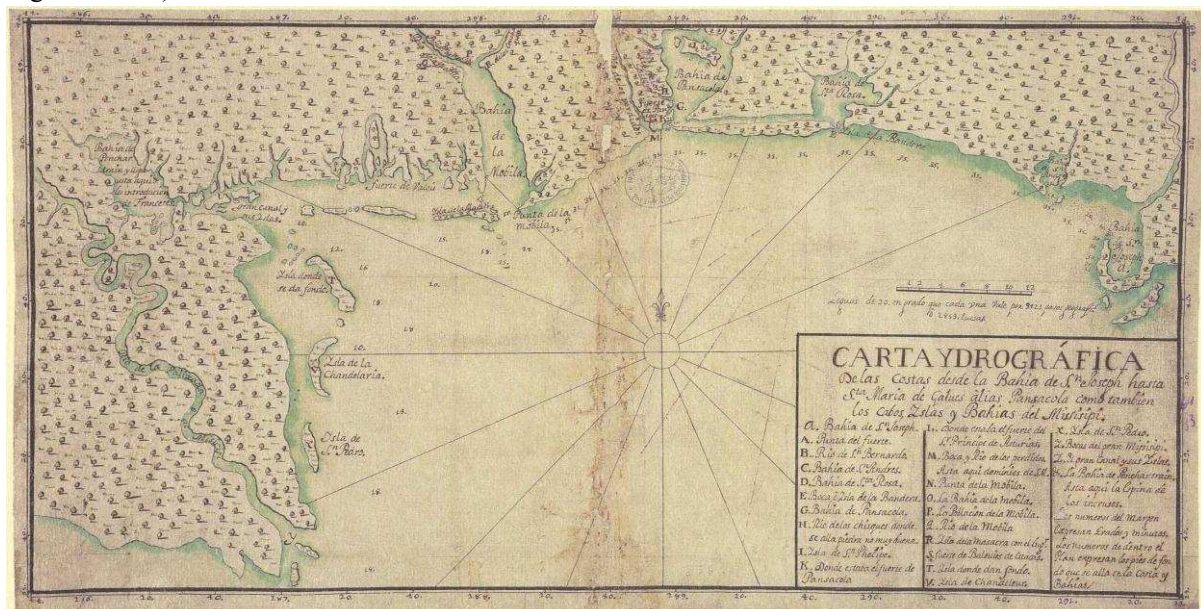


Figure 2. Anonymous, *Carta Ydrográfica de las costas desde la Bahía de Sn Joseph hasta Sta Maria de Galves alias Pensacola como tambien los Cabos, Islas y Bahías del Missisipi* (1715), Instituto de Historia y Cultura Militar (Madrid, Spain), USA & Canada no. 81.



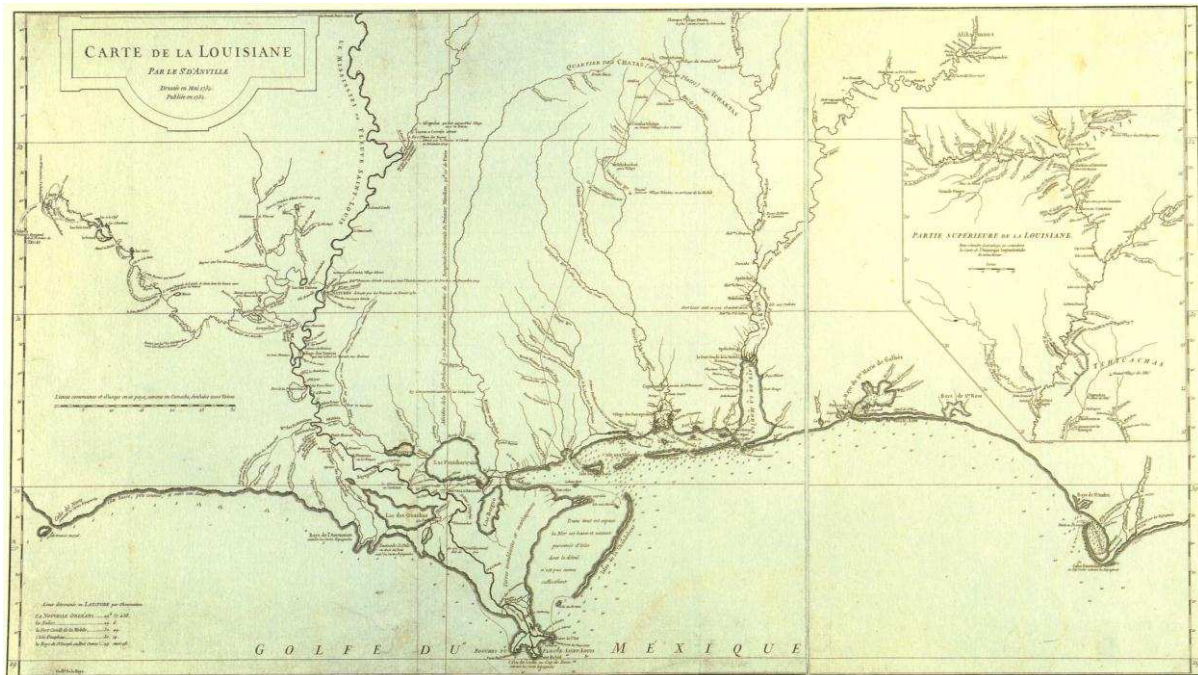


Figure 3. Sr. D'Anville, *Carte de la Louisiane* (1732), Centro Geografico del Ejercito (Madrid, Spain), USA & Canada no. 100.

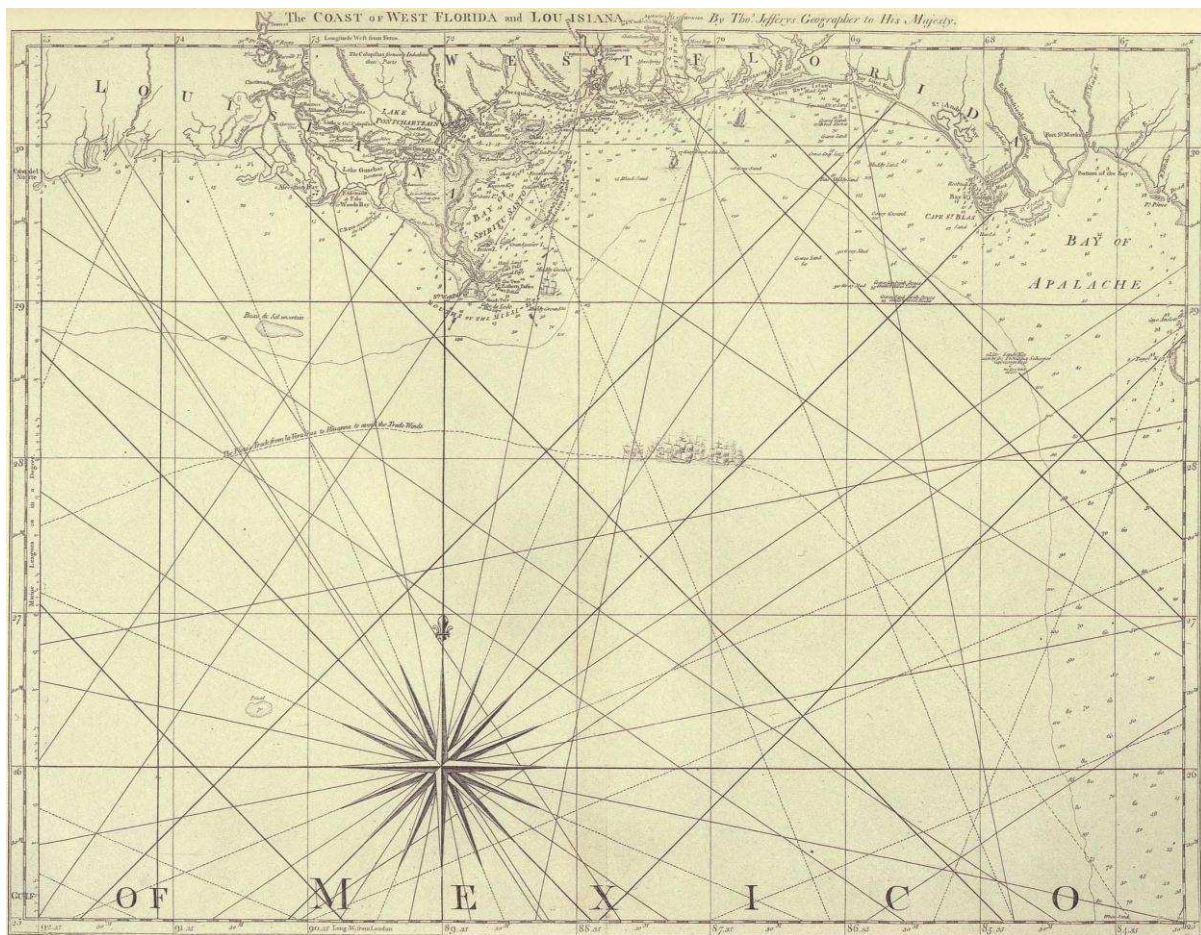


Figure 4. Thomas Jefferys, *The Coast of West Florida and Luisiana* (1775), Centro Geografico del Ejercito (Madrid, Spain), USA & Canada no. 56.



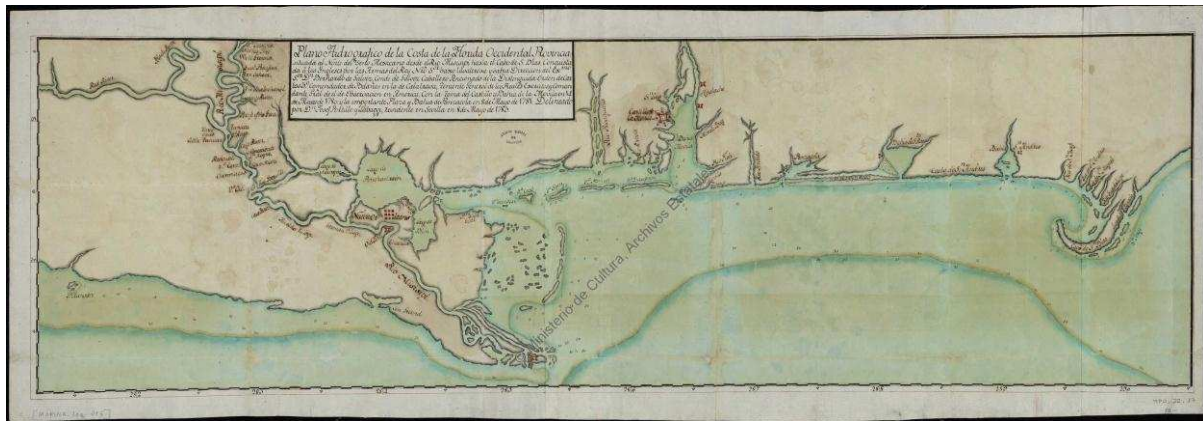


Figure 5. Josef Portillo, *Plano Hidrografico de la Costa de la Florida Occidental* Provincia situada al Norte del Seno Mexicano desde el Rio Misisipi hasta el Cabo de S. Blas (1783), Archivo General de Simancas (Valladolid, Spain), MPD. 22.017.

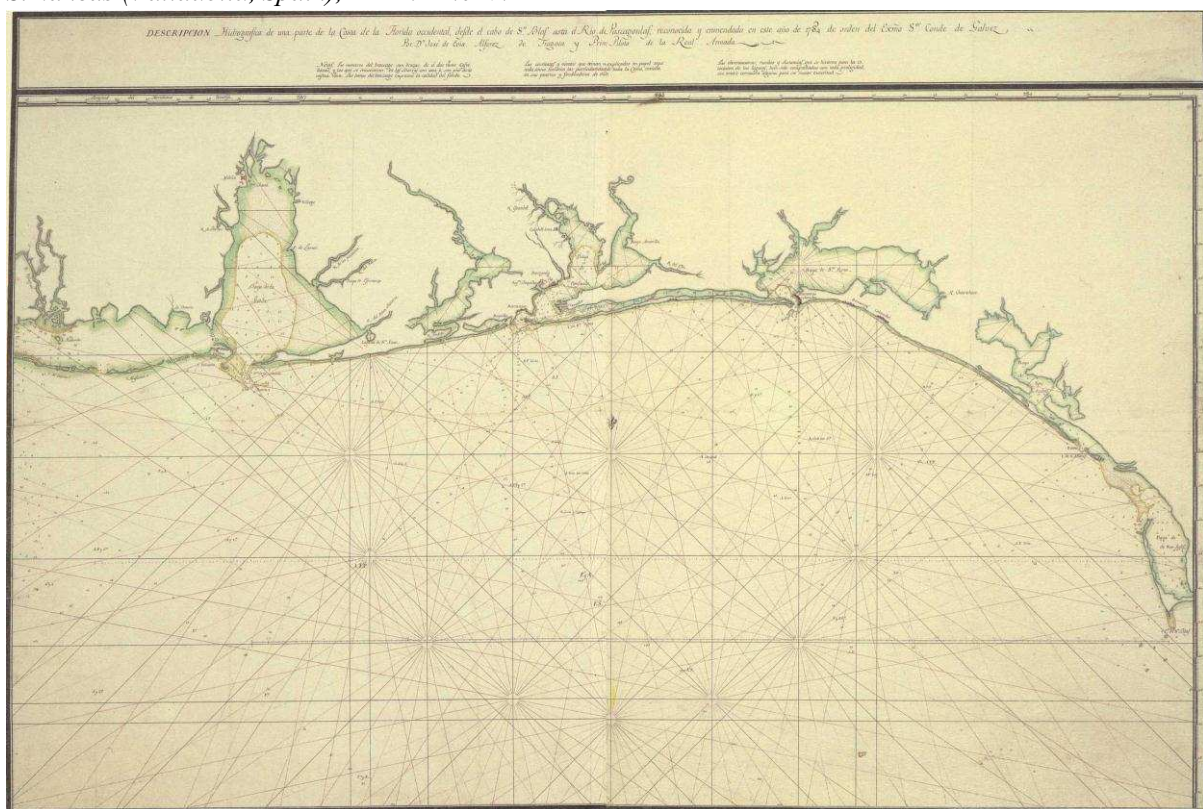


Figure 6. José de Evia, *Descripcion hidrografica de una parte de la Costa de la Florida Occidental* desde el Cabo de Sn Blas hasta el Rio de Pascagula (1784), Centro Geografico del Ejercito (Madrid, Spain), USA & Canada no. 59.

#### Case study 2: Pensacola Bay (Florida, USA)

The second series were chosen among the detailed maps and charts of Pensacola Bay, formerly known as Santa Maria de Galve Bay. It is composed by seven maps that also focus on different characteristics of the territory, according to the targets of the cartographer (see Figures 7 to 14).



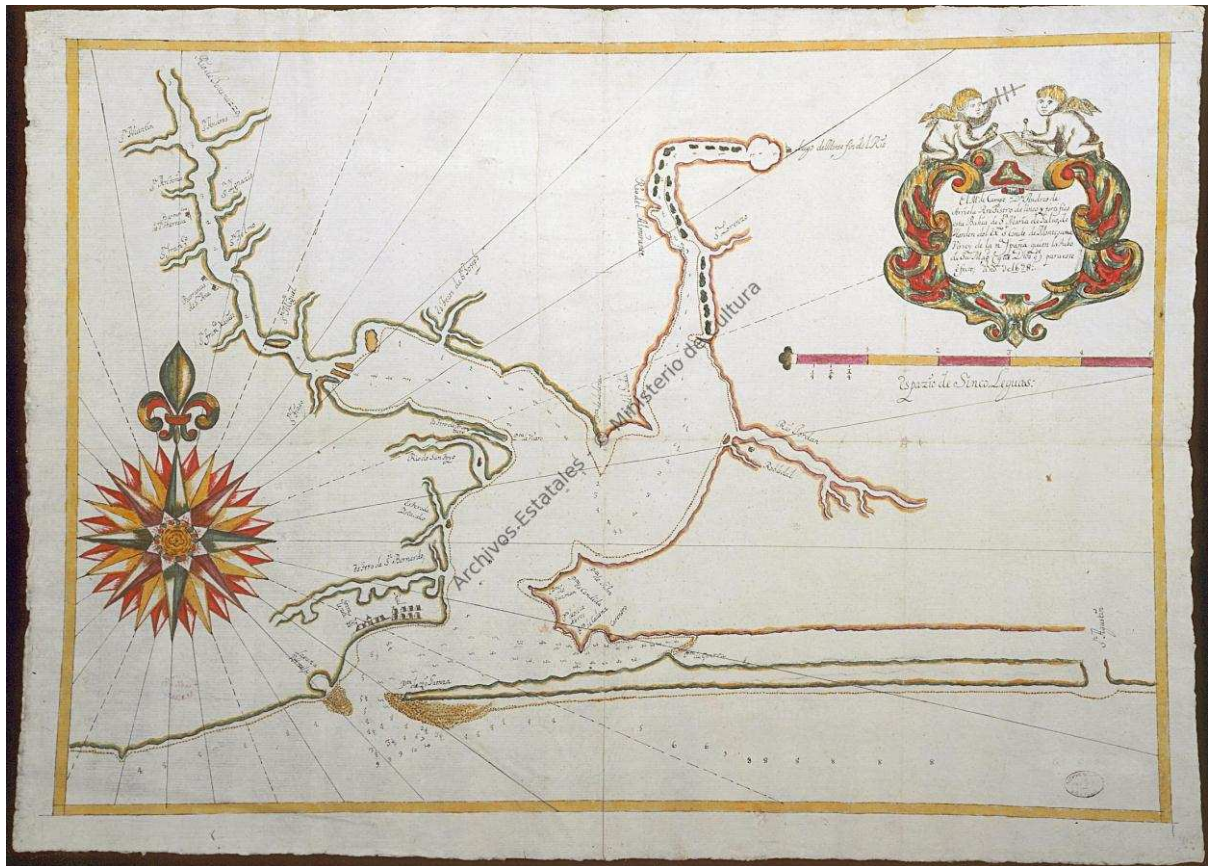


Figure 7. Andres de Arriola, Bahía de Sta. Maria de Galve (1698), Archivo General de Indias (Sevilla, Spain), MP Mexico 91.

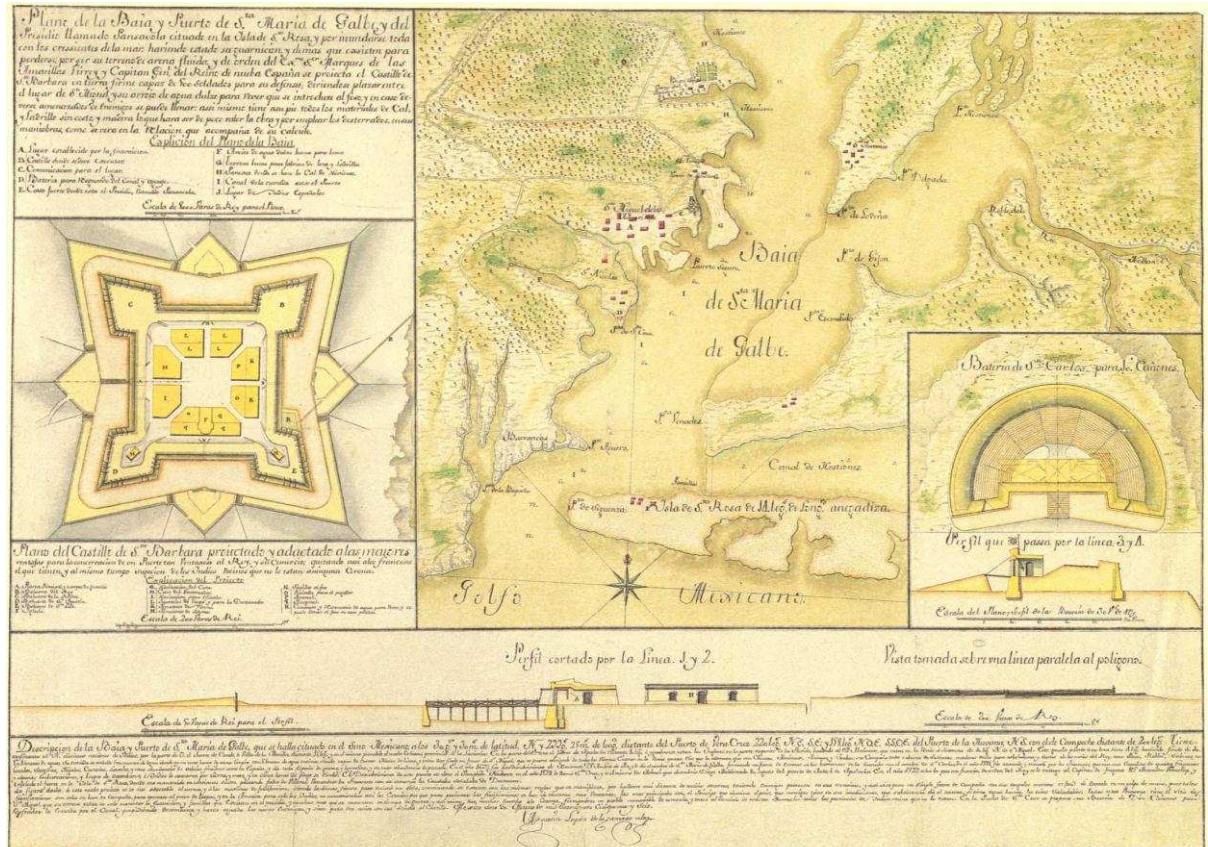


Figure 8. Agustin Lopez de la Camara Alta, Plano de la Baia y Puerto de Sta. Maria de Galve, y del Presidio llamado Pensacola (1756), Centro Geografico del Ejercito (Madrid, Spain), USA & Canada no. 90.







Figure 10. Francisco de Planas, *Plano de la Villa de Panzacola, Fuerte Jorge, y Fortificaciones adyacentes, ultimamente construidas por la Nación Británica, atacadas por las fuerzas españolas al mando del Mariscal de Campo Dn Bernardo de Galvez, y rendidas el 8 de mayo de 1781* (1781), Centro Geografico del Ejercito (Madrid, Spain), USA & Canada no. 94.

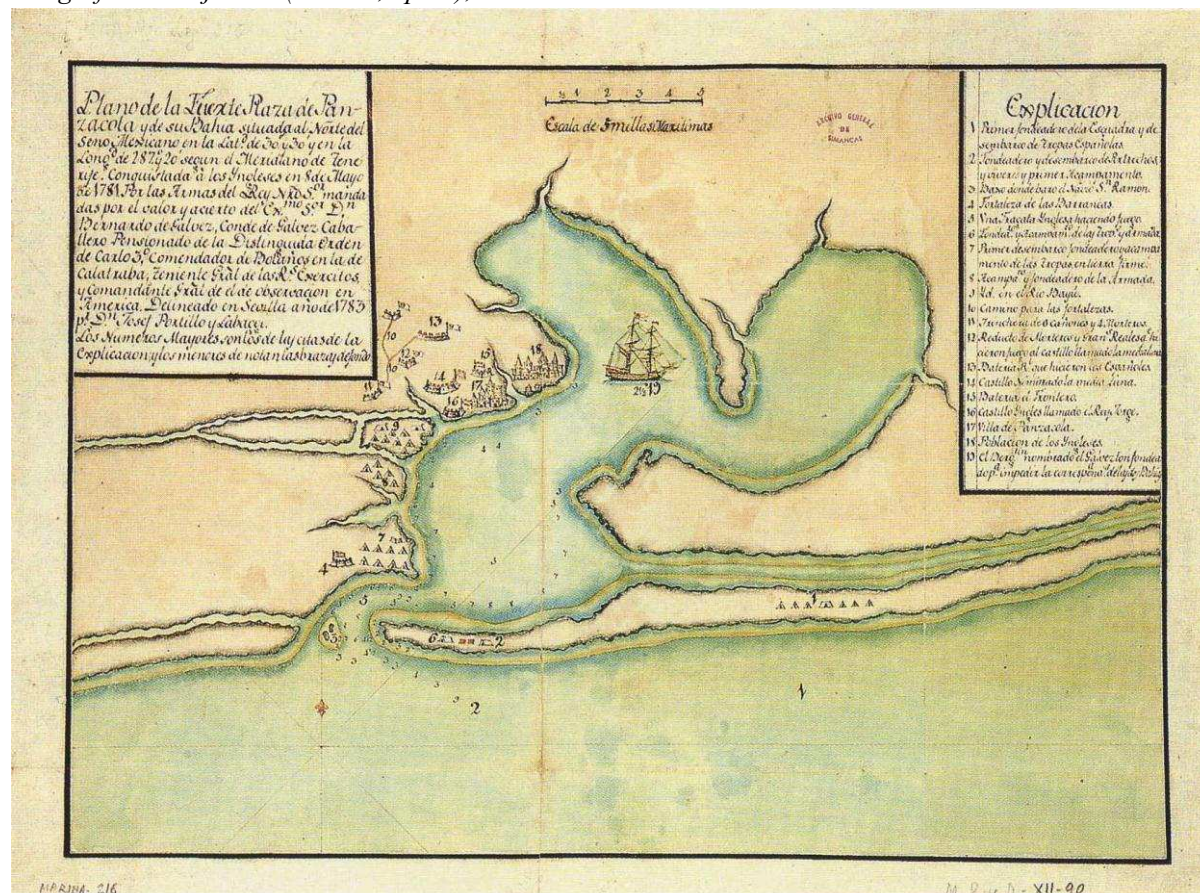


Figure 11. Josef Portillo, *Plano de la Fuerte Plaza de Panzacola y de su Bahía situada al Norte del Seno Mexicano en la Latd de 30° y 30' y en la Longd de 287° y 20' según el Meridiano de Tenerife* (1783), Archivo General de Simancas (Valladolid, Spain), MPD 12.090.



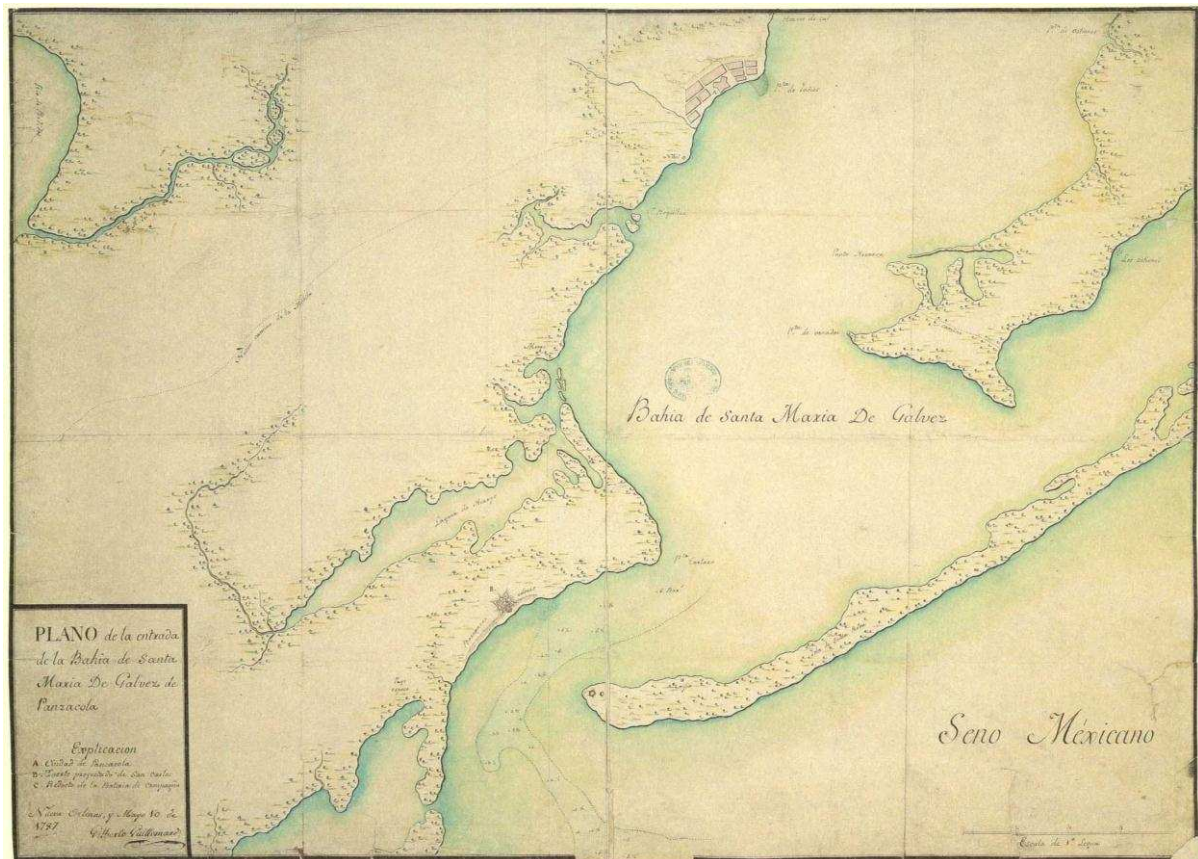


Figure 12. Gilberto Guillemard, *Plano de la entrada de la Bahía de Santa Maria De Galvez De Panzacola* (1787), Instituto de Historia y Cultura Militar (Madrid, Spain), USA & Canada no. 97.

## RESULTS

As a first result we will observe how far the cartographers applied the modern surveying and drawing techniques, and the great differences that can be appreciated between the oldest maps and the latests. But at the time, all of them were reliable enough depending on their use and the purposes of the draftsman, the officer, the engineer, or the surveyor, and their cartographic value and quality is outstanding.

Both scales show different ways to represent other features such as coast lines, soundings, navigational hazards, streams, settlements –Native American, Spanish, British or French-, bodies of water, mountain ranges, at different scales, altitudes, cities, towns, boundaries, et cetera; and also include more or less extensive annotations.

The series of large scale maps draw the reference grid of meridian and parallel lines, or include graduated scales on the frames. They all are plain charts and excepting the one of 1715 (more distorted in longitude and on the coastal line, and more naïf), their accuracy is similar.

The five maps focus mainly on the coastline and draw the rivers writing down their names, but the French and the British printed maps depict their course far away from the seashore, while the manuscript Spanish charts only show their low course.

All of them include information on soundings, the main islands, inlets and cays, and the navigational hazards. Particularly interesting is the depiction included on Jefferys' 1775 chart of 'the Flota's Track from la Vera Cruz to Havanna to avoid the Trade Winds', that is emphasized with the image of a fleet of vessels. The 1715 map, the Jefferys' chart and the Evia's chart depict the main rhumb lines, the winds rose and the compass.

The terrestrial features such as crops or roads, or even borderlines, are not included. But the 1715 manuscript chart depicts great areas covered of woods and Portillo's 1783 map includes the main forts, the presidios and the defences located along the coast, drawn in red with a clearly defined shape out of scale (Fort George, Fort S. Charles, batteries, et cetera).

The comparison of the toponymy of the Spanish, French, British and Dutch maps show the evolution of the names of the main geographical features such as rivers, towns, villages, capes, islands, bays, gulfs, mountains, fortifications and presidios (Table 3).



1733, Popple	1746, D'Anville	1755, López & Cruz	1778, Elixio de la Puente	1784, Brion de la Tour	1662, Kaert Roggeveen
<i>Apalatche Bay</i>	<b>B. d'Apalache</b>	<i>B. de Apalache</i>		<i>Apalaches</i>	
Apalatche or Ogelagana R.	Ogelagana R.	Ogelagana R.		R. des Apalaches ou de S. Marc	
					Plaia
			Pto. De Apalache		Tierra Lana
			Punta Casina		
					R. de Nieves
			R. Tagabona		
Ayavalla (fuerte)	Ayavala	Ayavala	R. Guacara		
		Machava			
	C. Escondido	C. Escondido		C.S. Balise ou Escondido	R. Escondido
				Ft Creve coeur detruit	
Ocon	Ocon				
					Arecife
Ilcombe					
St Marco	S. Marco	<i>S. Marcos</i>	S. Marcos	St Marc	
			Pta. de Meneses		
			R. de Lanas		
			Perros		
			R. de Palos		
			Viboras		
St Juan				St Jean Village Indien	
Capola					
Asapalaga	Asapalaga			Aspalaga	
Yapalaga	Yapalaga	Yapalaga			
Lau Chien					
				B. des Apalaches	
Apalachicola R.	Apalachicola R. ou des Cahuitas	Apalachicola		Apalachicola R.	
Spanish F. / built 1719	F. Esp.	F. Esp.		Fort	
C. St Blaise			C. San Blas		
			R. San Blas		
			R. San Migl.		
B. St Joseph	B. Sant Joseph				
B. de St Andre	B. de S. André		Pto de San Andres	B. de S. André	
Baye de St Rosa	B. de Ste Rosa	B. de Sta Rosa	B <sup>e</sup> de Sta Rosa	Be. de Ste Rose	
I. S. Rosa	I. de Ste Rosa			F. et I. de Ste Rose	
			R. Colorado		
			Punta Rasa		
P. de Venado					
Jordano R.			R. Jordán	Jordan River	
			S. Miguel		
			R. de los Perdidos		
Admirante R.					
Governador R.	R. del Gobernador				
<b>Pensacola</b>	<b>Pensacola</b>	<b>Pensacola</b>	<b>Panzacola</b>	B. de Pensacola	S. Maria
Perdido R.	B. Sta Maria de Galves R. Perdido		Bahia de Panzacola	<b>Pensacola</b>	

Table 3. Toponymy of several geographical features that appear in a series of Spanish, French, British and Dutch maps, 1662-1784: from *Apalachee Bay* to *Pensacola*.

The second series of detailed maps of the Pensacola Bay bring a closer look to this disputed area. All of them include a numbered scale bar, whose units vary from nautical miles to Spanish rods or leagues. Excepting the Guillemard's map, they draw a wind rose with rhumbs where the North is marked with a fleur-de-lis.

The main landmarks are mainly circumscribed to the coastline and the features that were important to navigation such as islands, ports, cays, inlets, bays, capes, channels, river mouths or low waters with their soundings and their related warnings.

The terrestrial features were those essentially related to war and military strategies, as fortifications (already built or projected) and settlements (see Camara Alta's 1756 map); but they also draw the marshes, woods and beaches. New roads such as the one to Mobila are also carefully described, as well as the paths between the settlements, the batteries and the forts.

It is particularly interesting the Planas' map of 1781, that describes carefully the shape and urban structure of Pensacola, its port and surroundings, the neighbouring fortified hills and the paths constructed between them.

The change of scale draws more detailed features, and the relationships that were established between them.

## CONCLUSION AND FUTURE PLANS

The main conclusion is that at that time, the level of accuracy that was reached by the cartographers of the main European powers was quite similar. They all used the scientific advances on the fields of navigation and georeferencing, and depending on their particular interests they depict different geographical features. The espionage and the tradition of copy is an evidence of how far the Spanish cartography was reused in the following hydrographic campaigns, and viceversa, even by the traditional enemies.



On the other hand, the accuracy and reliability that show those maps and charts is not far from the image that bring the modern 1866 charts by Bache.

As a future plan we propose a next stage of the search that will include the study of the cartography that is located in other foreign repositories as the National Maritime Museum in Greenwich, the Library of Congress in Washington and the Bibliothèque nationale de France in Paris, among others. We will complete the initial databases with new maps and charts, in order to continue their study and comparison.

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