

The Spanish Influence on Surveying and Mapping in the Americas

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Spanish surveying and mapping activities in the Americas seems to be a well-kept secret. Most of the well-studied surveying and mapping activities begin with British and American efforts, with a quick passing reference to those of the French. Overlooked are the Spanish coastal charting and mapping, beginning with Columbus in the latter part of the 16th century and ending in the latter part of the 18th century in Nootka. Forgotten also are the surveys on land, first on the seaports and later surveys of town sites, roads, and lands granted to settlers. Kino's maps of northwestern New Spain, in the late 17th and early 18th centuries, and after 1711, the efforts of the Spanish Royal Engineers such as Miguel Constanso in the western part of the Americas and the Philippines are little known. This paper presents an overview of Spanish surveying and mapping activities in the Americas, and places them in the proper niche in the history of surveying in the Americas.

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Spanish mapping and charting was an integral part of the efficient administration of an empire that stretched over much of what was known to Europe. Spanish mapping served a number of imperial purposes:

1. Sailing from point A to point B safely and as quickly as possible, pushing the technology envelope all the way.
2. Political purposes— in the Age of Exploration the first representative of a European King to land on a shore planted a flag and claimed all for his sovereign.
3. Military needs to fortify the lands claimed, and to show relative locations of towns and land routes between them.

For the purpose of this brief presentation I am limiting discussion to present day Mexico, and the southwestern part of the United States, known as the Spanish Borderlands. Combined, they are referred to as New Spain. There is certainly much more to tell, but perhaps another time.

United States history classes largely ignore Spanish influence along the Pacific seaboard. Heavy, almost smothering, emphasis is placed upon the English rootstock and recounts little more than the quest of the United States to move west in pursuit of what was called “Manifest Destiny.” The history of the State of California, where I live, is taught in terms of the Gold Rush in 1849, and the railroad connecting California to the East! Notwithstanding the Spanish names applied to cities and street names, the major recognition of Spanish influence in California is the romanticized mission trail— largely a tourist entrapment program dating to the mid-twentieth century.

Very few Spanish maps of the New World find their way into the decorative market either in California or elsewhere. I believe there are a number of reasons for this— partly access and partly custom are two that come to mind. The highest prices go the decorative maps, and not to no-nonsense administrative maps.

As early as 1493, two months after Columbus returned from his first voyage, Pope Alexander VI set a line of longitude as the boundary between discoveries made by Portugal and Spain at 100 leagues west of the Azores. No one really knew how to find this line, but it certainly seemed a political solution of perhaps the same worth as those down to the present time. The line did have impact and is the reason present day Brazil is rooted in Portuguese rather than Spanish.

Insofar as Spain is concerned, by mid 16th century trade had developed between the Philippines, New Spain, and Old Spain. Armed convoys ploughed the seas in total

darkness as far as longitude is concerned. Imagine, for a moment, departing Manila, and heading for Acapulco or La Paz and knowing exactly when and where you would hit North or Central America. It became imperative to have good sailing charts so that no matter where the convoys made landfall on the Pacific Coast, safe harbors and provisioning stations could be found. The need became so critical that Phillip III of Spain offered a substantial lifetime fortune to any one who could find the longitude. Latitudes could be located, but the other part of the coordinate was needed to enable good maps to be made and sailing across the open seas to be something other than hit and miss. Commerce and military activities required the ability to go out and back following the same route.

The main port of entry on the Atlantic side in New Spain was Vera Cruz. Mariners had little trouble getting there. They followed Columbus' path. Columbus was not seemingly a person much interested in mapping and charting. However, he was an expert navigator using the dead reckoning techniques common at the time— a combination of compass direction and sounding. An example is found in the following instruction, translated into modern English from a 15th century Portuguese sailing book:

When you come out of Spain, set your course north-northeast. When you reckon you are two thirds of the way across to England, if bound for the Severn go north by east until you come to soundings. If you find 100 fathoms depth, go north until you sound again and at 72 fathoms find fair gray sand.

Although mapping along the coastal areas was the first step in map preparation, this process involved little more, insofar as New Spain was concerned, than sailing along and making visual observations and soundings. Well into the late 18th century, detailed coastal information was collected by sounding line and compass, and was blended with personal observations and impressions. The result was not precise in orientation or in proportions.

One of the intriguing elements that make Spanish mapping unique is the imperial ideology of mapping. The golden age of Spanish mapping occurred during the reign of Phillip II (1556-1598). Phillip was interested in making his territories visible through maps, and he had both the money and the power to have his way. His efforts resulted in local mapping of New Spain, as well as his coastal and sailing maps. His local mapping program — *Relaciones Geograficas* as they were called— give valuable insight into the ways in which Phillip — a renaissance prince — used maps to shape his nation state. One of Phillip's many mapping projects was a 50-item questionnaire circulated in New Spain. The replies formed the basis for the *Relaciones Geograficas*.

Phillip's first attempt to map New Spain by sending his chief cosmographer, Francisco Dominquez, in 1571, to measure latitudes and ground distances. No one is sure

what he did, or even how he intended to go about it because he never produced anything. Phillip's next attempt fell to Juan Lopez de Velasco. He was to map without seeing. Hence the questionnaire. With the returns Velasco expected to obtain the information needed to compile a map. The answers would enable him to compile the definitive chronicle-atlas that Phillip required. Landscape was a direct focus of 14 questions, and three requested maps. Results were dismal in terms of mapping New Spain. But some surprising work was returned. Several examples are shown on the accompanying plates.

Perhaps only one respondent truly shared Velasco's vision of the relationship of image and text, and how they complement each other. At this period, mapping and description went hand in hand— it was the cutting edge level of technology, and lasted until the mid 19th century.

The impetus provided by Phillip lasted until latter part of the 18th century when Spain's empire in the New World was on the wane.

Spain continued funding charting expeditions along the Pacific Coast of the Americas as far north as Alaska where an outpost was established along with several other European nations. In fact it was pressure from English, Russian, and French exploring parties on the Borderlands (present day California Arizona and New Mexico) that incited Spain to send most of their expeditions in the latter part of the 18th century. The need for exploring and mapping was gone, but the political need to protect the empire remained.



Fig 1. Meztitlan by Gabriel de Chavez, 1579. Chorograph map of the *Relaciones Geograficas* combining his own views as well as those of indigenes. Used with permission of the Benson Latin American Collection, General Libraries, Univ. of Texas Austin.

While much of this paper deals with the first stage of mapping — exploration, description, and imaging, some comment about the practical side of mapping seems appropriate.

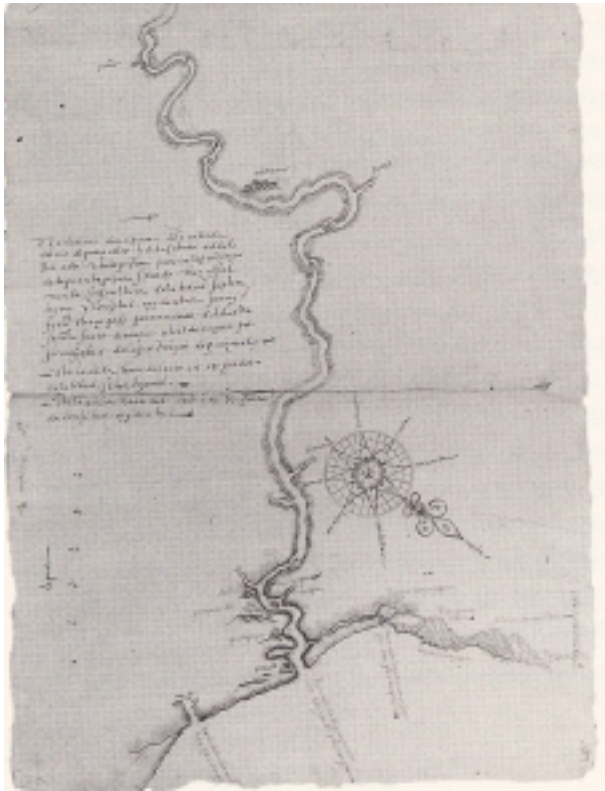


Fig. 2. Portion of the *Relaciones Geograficas* map of Coatzacoalo 1580 The Alcalde, responding to the questionnaire, asked a mariner to create this map. The river was a passage of importance. Used with permission of the Benson Latin American Collection, General Libraries, Univ. of Texas Austin.

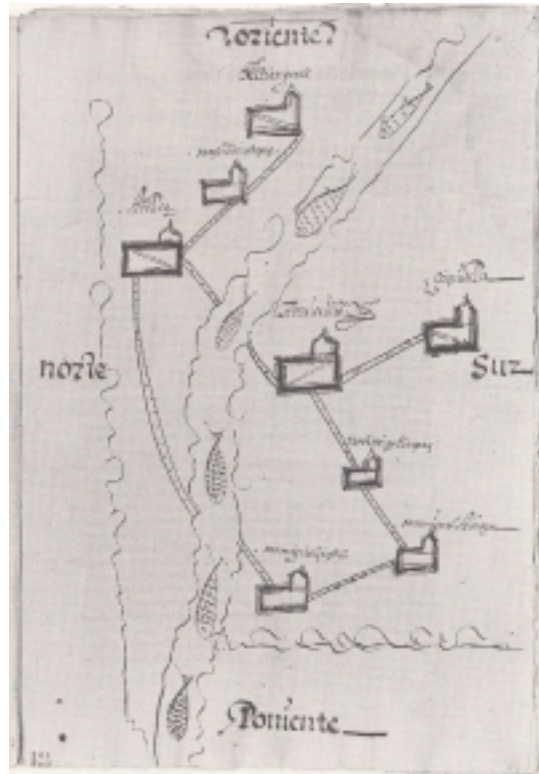


Fig 3. Itinerary map of Tecuicuilco prepared in response to the *Relaciones Geograficas* request. Itinerary maps were in common use throughout Europe, and it is not surprising that it was chosen for the response. Itinerary maps have not proportion or scale, but they provide an image of impression. This is the Rio Grande in the present state of Oaxaca. Note that the fish suggest the flow of the river. Used with permission of the Benson Latin American Collection, General Libraries, Univ. of Texas Austin.

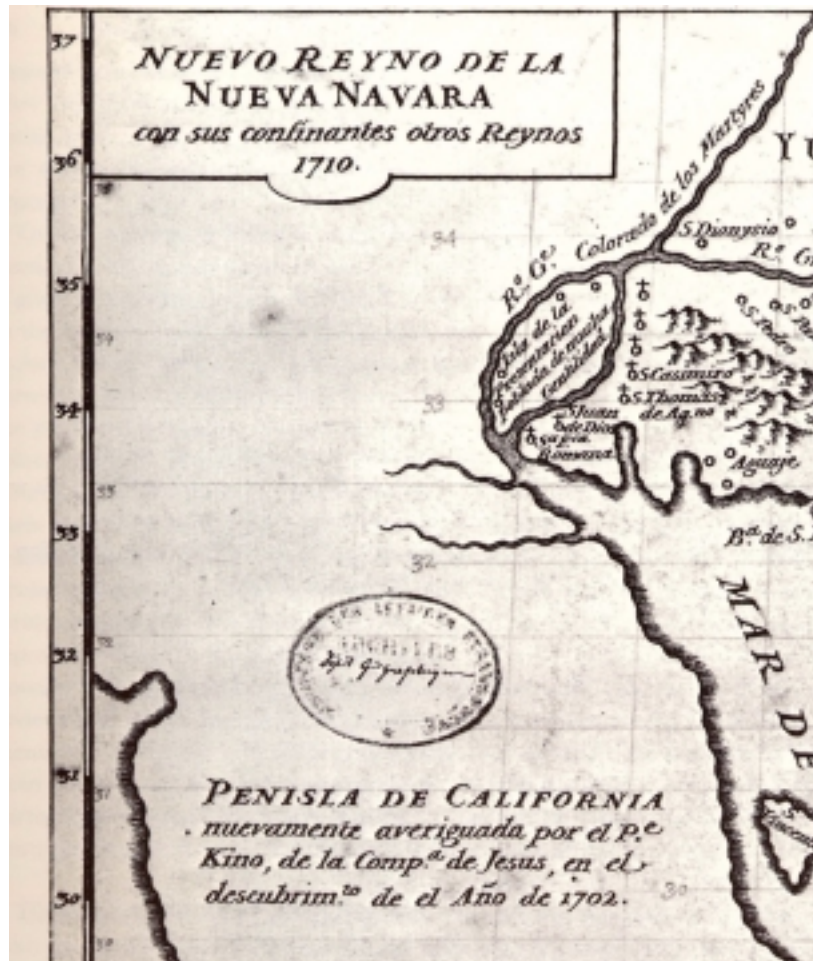


Fig 4. 1710 Map by Eusebio Francisco Kino, S.J. (1645-1711) Kino was an ardent cartographer and geographer. This was his last map culminating a career, beginning in 1683, of traveling through New Spain and the Spanish Borderlands. His travels, and body of work, are unique for the time of his travels— he greatly reduced the amount of white spaces on maps. This particular map was chosen because it dispelled the myth that California was an island—a feature on many maps for the preceding decades. This is a portion of Plate XIII and is taken from the Kino book listed in the references.

The methods employed for land or estate surveying must have been similar to those employed in Europe. Distances and angles would have been measured and assembled into a manuscript map. Maps were made of towns, forts and accompanied grants of land. Surveying and mapping became less precise as the distance from Mexico City increased. For example, in the Borderlands two riders, running at gallop, with a measuring rope between them, would leapfrog each other for the required distance.

There was, even in the Borderlands, a framework for measuring and mapping. Each Alcalde sent his badge of office, an stick, to Mexico City for calibration against a bar

set in the wall of the cathedral. Some said the bar was made of gold but I have not been able to verify this. There the marks for a standard vara measurement were made in the stick, and the stick then became a local standard when it was returned to the office holder. Several of these Alcalde sticks are on display at the California State Museum in Monterey.

CONCLUSION

Historical maps are not isolated documents issued for the amusement of bibliographers or for hobbyists, and they fall into our hands after their best days are done. Every serious map is a product of circumstances and exerts a force in shaping events within its scope. By recognizing a map's utility we demonstrate its importance as historical evidence. Certainly Spain's New World reflected the importance of description and image to the integral running of the empire from simple property transfers to maps of islands and coastlines.

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BIOGRAPHIC NOTE

Roy Minnick is Vice President and corporate staff underwriter for waterways and boundaries for First American Title Insurance Company. In this capacity he prepares and reviews land descriptions and maps, and analyzes title and boundary and survey problems related to First American's activities throughout the United States, Mexico, and other countries. He is well known as a college and seminar instructor and from frequent appearances at conventions and meetings. He is a Land Surveyor in several states, and active in professional organizations. Roy is co-editor of *The Surveying Handbook*, and co-author of *Advanced Land Descriptions*. He is author of *Water*

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