The Cartographic Work of the General Statistics Board of Spain, 1856–1870

FRANCESC NADAL, LUIS URTEAGA, AND J. IGNACIO MURO

University of Barcelona / Spain

Abstract
This article presents a general description of Spanish official cartography between 1856 and 1870, emphasizing its institutional and organizational aspects. During those years, responsibility for both map production and statistical information was allocated to a single institution, the General Statistics Board, which laid the foundations for contemporary cadastral and topographical cartography in Spain.

Introduction
Historians of statistics and historians of cartography, following their separate paths, are arriving at a common ground. In the nineteenth century, cartography and statistics were not the distinct disciplines they are now. Statistics and administration were tied together almost umbilically (Woolf 1989); the same was true for cartography and the state (Nadal and Urteaga 1990; Kain and Baigent 1992). Censuses, cadastral surveys, and topographical maps were different administrative operations, each having specific requirements and methodologies, but all were state-sponsored surveys, and all were seen as basic tools of government. Filipe Folque, a leading Portuguese geographer, wrote in 1842:

It is indisputable that statistics, topography and the cadaster are the three great instruments of the science of government from which knowledge of facts is derived, which is [the basis for] true knowledge, and it is therefore the strict obligation of every government that calls itself enlightened, to establish these [instruments] of government ....

The cadastral survey provided one of the clearest links between statistics, cartography, and statecraft. Without maps of properties, it was almost impossible to establish a rational cadastre. Without the cadastre, the collecting of agricultural and territorial statistics was also an impossible task. Not surprisingly, the First International Statistical Congress, held in Brussels in 1853, adopted a resolution pressing governments to adopt a map-based cadastre.

The institutionalization of cartography and statistics was a national process, and its developments differed markedly from nation to nation. In countries such as Great Britain and France, responsibility for map production and statistical information was allocated to separate administrative bodies. In other countries, the organization of such services was a path-dependent process, with a single institution taking charge of both cartography and statistics. Spain followed this latter course.

In previous works we have studied the development of topographic cartography in Spain (Urteaga and Nadal 1989; Nadal and Urteaga 1990), the evolution of Spanish military maps (Muro 1991; 1992; 1993), and the first cadastral maps surveyed in Spain during the nineteenth century (Muro, Nadal, and Urteaga 1992). We present here a general panorama of Spanish official cartography between 1856 and 1870, emphasizing its institutional and organizational aspects.

Administrative History of the General Statistics Board
The General Statistics Board (Junta General de Estadística), set up in the middle of the nineteenth century, was the first institution to get off the ground a mapping program envisioned by enlightened liberal rulers a century earlier. At the end of the 1840s, following a short period of relative political stability, institutions were set up that would lay the foundations for the majority of topographical and thematic mapping in contemporary Spain. In

1. Quoted in Nadal and Urteaga 1990: 31

Francesc Nadal is Professor of the History of Cartography at the University of Barcelona. His academic interests include aspects of cultural geography. His current research is on the survey and edition of the topographical map of Spain.

Luis Urteaga is a specialist in historical geography at the University of Barcelona. His academic interests range from environmental history to the history of cartography. His current research is on the survey and edition of the topographical map of Spain.

José Ignacio Muro is a specialist in the history of geography at the University Rovira i Virgili, Tarragona. He is the author of several studies on Spanish military cartography, and, with Francesc Nadal and Luis Urteaga, of Geografía, estadística y catastro en España, 1856–1870 (Barcelona 1996).
1849, the Geological Map of Spain Commission was established, including a special geographical-meteorological section. Two years later, the Madrid Astronomical Observatory was revived, and in 1853 the Directive Commission of the Geographical Map of Spain was set up within the Ministry of Development. For the first few months, this last agency incorporated the Geological Map Commission, but when the Directive Commission was placed under War Office control at the end of 1853, the Geological Map Commission was set up as a self-governing body under the auspices of the civil service.

This organizational expansion provided the Spanish state with wide-ranging systematic information regarding its territories, in which mapping and statistical compilation played a fundamental part. Cartographical and statistical services were thus not merely organized on a par with each other, they actually converged during this early period of institutionalization. One major step in this direction was the creation by a moderate government in 1856 of the General Statistics Commission of the Kingdom (Comisión de Estadística General del Reino). At first, it was organized into four different sections, one of which was in charge of undertaking surveys for the geographical map of Spain, topographical-cadastral plans, forestry and geological charts, and everything connected with geographical communications. Until the middle of 1858, the Statistics Commission had few financial resources or specific powers. In fact, it operated more as an advisory body than as an active compiler of maps or statistics. Thus, for example, although it was in charge of the work of the Directive Commission of the Map of Spain, the Directive Commission was not formally incorporated into the Statistical Commission until 1860.

One of the main objectives of the General Statistics Commission (which became the General Statistics Board in 1861) was to set up a cadastral survey. Like other European countries, Spain saw the need for having a proper register of land parcels at its disposal. From the middle of the 1840s onwards, Spanish cadastral cartography expanded considerably, but the majority produced was of either a municipal or a private nature. At the end of 1856, in order to make a general cadastral survey, the Statistics Commission decided to put cadastral surveying under the control of the War Office. In 1857, as a result of this decision, the War Office organized a Topographical Cadastre Commission to begin this work.

When a liberal government came to power in the middle of 1858, a major change took place in the management of the Statistics Commission: geographers and economists such as Francisco Coello, Pascual Madoz, and Laureano Figuerola joined the commission and gave it a new driving force and focus. In the same year, Coello (1822–96), a geographer, proposed unifying all the geographical work that had been carried out in separate government branches, including the cadastral survey, under one administrative centre. Coello’s suggested reforms uniting the Statistics Commission’s cartographic efforts were made concrete by the Territory Measurement Law of 6 June 1859 (Ley de Medición del Territorio). The law expressed the state’s need for a basic geodetic grid, as well as for nautical, geological, hydrological, forestry, urban, route, and cadastral mapping.

During the first half of 1860, the implementation of the Territory Measurement Law placed various mapping projects under the direct control of the Statistics Commission (in the hierarchy of the Presidency of the Cabinet Council). Although these projects had previously been within their jurisdiction, they had been managed under the authority of various ministries. Thus, as we noted earlier, the Directive Commission of the Map of Spain and the Topographical Cadastre Commission were handed over to the Statistics Commission. In like manner, the Statistics Commission absorbed the Geological Map Commission, the forestry mapping operations of the Forestry Statistics Commission, and hydrological mapping; all of their cartography had been previously administered by the Ministry of Development. When these enterprises became part of the Statistics Commission’s united cartographic effort, their work moved forward rapidly. In May 1860, two brigades, led by the forestry engineers under the authority of the General Statistics Commission, were formed to get the forestry map of Spain under way. A month later, additional brigades were formed under the Statistics Commission to begin hydrological surveying.

We should note that some cartographic tasks called for by the Territory Measurement Law were not at any time carried out by the General Statistics Commission or its successor, the General Statistics Board. For example, nautical charting was carried out by the Hydrography Directorate under the Naval Office. Urban plans were drawn up independently by local institutions, which had access to greater funding (for example, in Madrid and Barcelona). Neither does there appear to have been any push within the Statistics Board to create route maps, although, in 1865, Coello presided over a commission within the Statistics Board charged with the production of a general railways plan.

In April 1861, in order to facilitate completion of the cartography project laid out by the Territory Measurement Law, a liberal government decided to reorganize the Statistics Commission into a General Statistics Board. The new institution was divided into five departments, three of which were concerned with map production: Geodetic Operations, Topographical-Cadastral Operations, and Special Operations. This last department, directed by a forestry engineer, Agustín Pascual, was responsible for geological, forestry, and hydrological cartography. Three years later, in October 1864, the moderates came back into power and started the first reform of the General Statistics Board. The moderate government eliminated one of the general departments, though the three geographical departments would continue to operate. In addition to considerable cutbacks in human and economic resources, the moderate reform in 1864 began the
process of disintegration of Coello’s 1858 cartography project as it was realized in the operations of the Statistics Board. In 1865, for example, the Ministry of Development, headed by the moderate Antonio Alcalá Galiano, attempted to disconnect the geological projects from the General Statistics Board. The moderate mandate was relatively brief, however, and, in July 1865, the liberals once again took over. A few weeks later, they initiated yet another reform of the General Statistics Board. The new organizational plan called for consolidating the existing four departments into two, and moving the hydraulic work to the Ministry of Development. From then on, the General Statistics Board was organized into two large departments: Geographical Operations and Statistical Operations. This meant that, for the first time, geodetic, topographical-cadastral, and special operations were controlled by one department—Geographical Operations—all under the direction of Fransisco Coello.

This situation, however, would last for only one year. In July 1866, the moderates returned to power and there was a radical shift away from the cartographic policy pursued since the 1859 Territory Measurement Law, effectively ending the unitary cartography project envisioned by Coello. First, a Royal Decree of 21 July 1866 withdrew all budgets for special cartographic operations. Then, on 21 August 1866, the War Office was put in charge of making the national topographical map. So from the summer of 1866 to the creation of the Geography Institute in 1870, the General Statistics Board remained in charge only of cadastral cartography.

Despite these frequent reorganizations during the period 1858–66, Coello tried to bring under the control of one administrative centre a great variety of cartographic projects the Spanish government had undertaken during the nineteenth century, and so to make cartographic methodology and design as uniform as possible.

Cartography at the General Statistics Board
Cartographic production at the General Statistics Board was extensive and, because of its many objectives, diverse. In general, individual solutions were adopted for each type of cartographic document, though conversely, in many projects, attempts were made in some cases to develop publishing standards in order to produce uniform map series. The second part of this article summarizes the characteristics of cartographic material published by the Board between 1856 and 1870, the latter year marking its virtual disappearance as an executive body. We shall begin with a survey of the results of topographical and cadastral cartography, then focus on the cartography of the special brigades, and conclude with two examples of thematic cartography relating to population and transport.

TOPOGRAPHICAL AND CADASTRAL CARTOGRAPHY
Producing a topographic map of Spain was, as in other countries, a slow business. No concrete results of the Board’s effort in this area were realized until the first sheet of the national topographical map was published in 1875 by the Geography and Statistics Institute (Instituto Geográfico y Estadístico). However, even in its early stages, this work was of great importance to all of the cartography produced by the Board. For example, geodetic measurement provided for the fixing of points and measurement of large surface areas with small margins of error, which in turn improved the quality of the cadastral and special operations. Various plans showing the "State of the Geodetic Triangulation" tracked the progress of this work, which went on over a number of years until 1866 (Figure 1). Noteworthy too is the topographical plan of the surroundings of the Madridejos geodetic base (1859), one of the first topographical maps put together according to the new scientific criteria.

The Board’s cadastral surveys produced a rich collection of maps of the province of Madrid and neighbouring areas, the vast majority of which are manuscripts, and hitherto poorly known. Some of these manuscripts were published in the period between 1866 and 1869. To date, we have counted over sixty published maps, some of which consist of several sheets (Muñoz, Nadal, and Urteaga 1992).

The cadastral topography includes maps drafted on different scales and with distinct objectives. For example, small-scale maps (1:100,000 or more) of the whole province of Madrid were published to show the extent of cadastral work. One such map, the Mapa de los perímetros municipales de la provincia de Madrid (published in 1866 on a scale of 1:400,000), could be regarded as the first Spanish municipal district map. Another set of cadastral maps were drawn up to show not only land parcels, but agricultural land use in parts of the provinces of Madrid, Cuenca, Toledo, and Guadalajara. Sets of maps published on a much larger scale (1:20,000) covered more than twenty municipal districts in the province of Madrid. Issued together with these was a series of maps, on the same scale, of royal estate properties in the surrounding districts of Madrid, such as the Plano del Real Sitio de El Pardo y Vélez (1867) and the Plano del Real Sitio de Aranjuez (1868) (Figure 2). Various municipalities of Madrid were also mapped by a major series of sheets, each covering one square kilometre at a scale of 1:2000. These maps represented relief in five-metre contour intervals. They also indicated the geometrical grid and the patterns of urban and built-up areas. In some instances, they include highly detailed plans of built-up areas of special significance, such as major buildings in urban areas. Another cadastral product of the Board, the Parcelario Urbano de Madrid, is a self-contained group of documents. This survey includes sheets drawn on three
scales: district sheets on a scale of 1:2,000; city blocks on a scale of 1:1,000; and special areas on the still more-detailed scale of 1:500. Most of them were lithographed in colour, and include statistical information on the number of plots, buildings, and houses represented in each sheet.

The majority of this cartography was lithographed at the General Statistics Board, though some plans were prepared and printed at private lithographers (for instance, the aforementioned Plano del Real Sitio de El Pardo y Viñuelas was lithographed by Nicolás González). Different methods of reproduction were used for the publication of these maps and plans. Some were engraved in stone, others were autographed, and a small proportion were photolithographed, using photographic techniques to reproduce those that had already been published using other methods.

At the beginning of the 1860s, the General Statistics Board set up a department of engravers and a team of photographers under the supervision of Amalio Maestre, a mining engineer, and the photographer José Albiñana. Among the engravings produced by this department are the sheets of the Parcelario Urbano de Madrid, published between 1866 and 1868, engraved by Gustave Pfeiffer, Manuel Vierge, José Reinoso Osler, and F. Hernández. Pedro Peñas was in charge of the engraving of the Plano del Real Sitio de El Pardo y Viñuelas (1867) and Mapa de Madrid y sus contornos (Figure 3), the direct predecessor of the first sheet of the 1:50,000 topographical map published by the Geography Institute in 1875. Later, some of these artists were to become the main engravers at the Institute. José Reinoso, for instance, was the engraver of the Plano Parcelario de Madrid, published by the Geography and Statistics Institute in 1872–74; and Pedro Peñas was in charge of the preparation of the first sheet of the Mapa Topográfico Nacional, covering Madrid.

THEMATIC CARTOGRAPHY

The creation of the General Statistics Commission in 1856 yielded broad-ranging developments in thematic cartography, particularly in the work carried out by the various corps of engineers concerned with mining, public works, and forestry. From its early years, the Commission had tried, largely unsuccessfully, to impose a set of uniform cartographic standards. Among the efforts at standardization was the adoption in 1859 of a single map that would be the base for future geological, forestry, route, and hydrological maps. Among the maps the Commission considered were Domingo Fontán’s Gata geométrica de Galicia (Paris 1845; scale 1:100,000), Guillermo Schulz’s Mapa topográfico de la provincia de Oviedo (Madrid 1855; scale 1: 127,500), and Francisco Coello’s Atlas de España y sus provincias de Ultramar (Madrid 1847–70; scale 1:200,000). None was eventually chosen as standard, although Coello’s map was subsequently used in many projects. Neither were proposals followed up to standardize the scales, colours, and other elements of thematic maps.

GEOLICAL AND AGRONOMIC MAPS

In general, the mining and geological engineers assigned to the General Statistics Board carried on the work of the former Geological Map Commission. Their work between 1860 and 1866 was primarily concerned with provincial geological maps and drafts, although they also published a general geological map of Spain and a large-scale map of agricultural soil quality. All of these were clearly of a provisional nature.

The publication of geological maps by the Board from 1861 onwards was variable in conception and quality, although certain minimum standards were imposed. Francisco Coello himself determined the scales selected (1:200,000 and 1:400,000), and he selected the Board personnel and public contractors who compiled, drew, and printed each map. He proposed that all the special work having to do with a specific area should be published on the same scale and at a similar size, so that maps could be easily collated and compared. These standards were hard to implement in practice, in part due to the uncooperativeness of the powerful and entrenched engineering corps, and above all because of the high cost of map engraving. For example, the Mapa geológico estratigráfico de las montañas de la provincia de Palencia (1861) compiled by Casiano de Prado and engraved by Pfeiffer, cost 13,000 reales to publish. This was an amount equivalent to the annual salary of the best draftsman at the General Statistics Board. In the same year, the Statistics Board published an even more expensive map, de Prado’s Mapa geológico de la provincia de Madrid, which was included in the first part of his Description física y geológica de la provincia de Madrid (designed on a scale of 1:200,000). It used Coello’s base map, and was engraved in seven colours by Pfeiffer. For the publication of this map, the Commission gave express orders that the legend should read, “Geological Map of the Province of Madrid published by the General Statistics Commission of the Kingdom in 1861 and Compiled by D. Casiano de Prado as a Member of the Former Geological Map Commission in 1859.”

Another work by Casiano de Prado published by the Board was the Reseñas geológicas de la provincia de Avila y de la parte occidental de León (1862). It contains a short abstract of Prado’s painstaking field work in the provinces of Valladolid, Segovia, León, Avila, Salamanca, and Zamora.

The Board also published geological studies by another mining engineer, Amalio Maestre. In 1862, the Board approved publication of 1000 copies of his Bosquejo
Figure 3. Junta General de Estadística, Sección de Trabajos Catastrales. Mapa de Madrid y sus contornos, scale 1:100,000, one sheet, engraved by Pedro Peláez. Biblioteca Nacional de Madrid.
geológico, industrial y de aguas minerales de la provincia de Santander (scale 1:200,000) as part of his Descripción física y geológica. The map was prepared for the press by Benito Cuarrante (again on Coello's base), and published by the lithographer José Aragón. The bad quality of the first trials, however, delayed the printing of the map until 1864, although the copies kept the original date of 1862.

As we have seen, the geological brigades conducted their surveys on a provincial scale. However, momentum for a geological map of the entire peninsula had been generated by previously published work by both Spanish and foreign scientists. At the end of 1861, the General Statistics Board commissioned Maestre to draft a geological map of Spain on a scale of 1:1,000,000, "representing as many as possible of the data that can be found in archives and publications." Coello's map was once again to be the base map. As in the case of the provincial maps, the publication of the Bosquejo general geológico de España encountered some printing problems. It was finally reduced to a smaller scale (1:2,000,000) and published in 1864 by chromolithography.

Other geological works based on field work completed some years earlier were also published in the 1860s. Among them was the study of the province of Teruel by the geology professor Juan Vilanova y Piera, submitted to the Board for publication through the Ministry of Development. The Board decided to publish it in 1863, but the project was held up because Vilanova tried to retain copyright. Finally, the geological map was included in the Ensayo de descripción geognóstica de la provincia de Teruel en sus relaciones con la agricultura (1863), without acknowledging Vilanova's authorship. The map, drawn at a scale of 1:400,000, has the title Teruel, por el coronel de Ingenieros D. Francisco Coello 1868, escala 1: 400.000. It was engraved in stone by José Reinoso, and did not appear until 1868 (Figure 4).

After the publication of Vilanova's map of Teruel, only two further maps in this category were published. These were very different in kind from those discussed above. One was a panoramic view of the Jalón River, drawn and lithographed by a teacher of landscape drawing at the Mining School in 1865. This panorama was part of the geological work carried out by the mining engineer Félix Martín Donayre in the province of Zaragoza. The other was an agronomic map of the municipal district of Madrid (scale: 1:20,000) compiled by Vilanova and chromolithographed by the Board in December 1867. This plano exofórmico del término municipal de Madrid (scale 1:20,000) shows, in different colours, the variety and quality of the soils in this district, and includes contour lines and several profiles.

Overall, between 1860 and 1866, the geological surveys undertaken by the Board produced fifteen provincial maps, of which five were published. To these should be added the non-provincial and agronomic maps started during the last stage of the General Statistics Board, with the cooperation of personnel not strictly involved with the geological brigades. Casiano de Prado's death in 1866 and budget cuts in the following years stymied the geological survey, which was not revived until 1870 (Urteaga 1988).

**FORESTRY MAPS**

The objective of forestry studies carried out under the auspices of the General Statistics Board was to locate, quantify, and classify Spain's abundant woodlands. The handful of forestry engineers who took part produced inventories showing not only geographical distribution of trees by species, but also the property classifications of woodlands and the distribution of species with specific economic potential. In order to achieve these objectives, at a cost of 150,000 pesetas to the Board of the General Statistics Board, the immense task of gathering statistics and data across the entire peninsula and the overseas territories. Within the Board, the engineers—coordinated by two of their number, Francisco García Martino and Ramón Xercó e Idigoras—made progress on the compilation of provincial forestry maps, and conducted the first experiments in the mapping of ravines and farm tracks.

Between 1860 and 1866, three engineers completed forestry drafts of twenty-eight provinces, a cadastral-agronomic plan, a topographical plan, and maps of ravines in six Spanish provinces. Faced with a lack of sufficiently detailed maps for some provinces, they used general maps by Henry Dufour and Tomás López, making the necessary geographical refinements themselves. The small number of forestry engineers and the shortage of fieldwork assistants hampered the conclusion of a general forestry map of the entire peninsula.

Only two of the forestry drafts—those of the provinces of Oviedo and Santander—were ever published, both signed by the forestry engineer Francisco García Martino. Though they were finished in 1862, as with the Board's geological maps, engraving problems delayed their publication until 1863. The Bosquejos descriptivos de Oviedo y Santander were made on a scale different from that of the geological ones (1:250,000), and the base maps used in this case were Coello's provincial maps and Schulz' topographical map.

Meanwhile, two forestry engineers, Andrés Anton y Villacampa and Agustín Romero López, surveyed a cadastral-agronomic map and a topographical map of the woodlands of El Espinar (Segovia). Only the first was published, at a scale of 1:20,000: the Plano de rodados del Monte de La Garganta de los Troncos del Espinar, which was engraved and chromolithographed by Federico Kraus in 1863.

After 1866, responsibility for forestry maps was separated from the General Statistics Board, and cartographic activity in this area ceased for several years. In 1869, forestry mapping was transferred to the Ministry of Development, with dramatic results: only four years later, more than half of Spain was surveyed by the forestry engineers.
HYDROLOGICAL SURVEYS
Effective management of hydrological resources for agricultural and industrial purposes and for flood management has been an important matter in Spain from the earliest times. The first moderate governments were aware of this when they ordered surveys to be carried out on several watersheds at the end of the 1840s. The hydrological studies undertaken at the General Statistics Board were pioneering in many respects, one of the most important being the gauging of the major basins. The Board claimed, somewhat pretentiously, that “determining the abundance of waters flowing through Spanish territory signifies the completion of the cosmological study entrusted to the Statistics Board.” The reality was somewhat less grand. In spite of the Board’s ambitious plans, the hydrological brigades, time and again, came up against a scarcity of people and funds to carry out their surveys.

Each hydrological survey had three parts. First was a physical description of the basin. The second part, which was the heart of the survey, included the hydrological study of the flows for the main rivers and tributaries, soundings of the lakes, volume measurement of the basins, and evaluations of the hydrological power potential of each installed dam. The cartography was the final part.

The greatest of these watershed surveys were the Memoria sobre el reconocimiento hidrológico del Valle (1864) and the Reconocimiento hidrológico del Valle del Ebro (1865), both published and signed by the civil engineer Pedro Antonio de Mesa (Figure 5). These studies each contain general basin plans on a scale of 1:1,000,000 (based on Francisco Coello’s general map of Spain). The map of the Guadalquivir Basin was chromolithographed by L. Potenciano, drafted by Pedro Peñas, and reproduced using the photolithographic facilities at the General Statistics Board. The Ebro Basin map, of better quality though in monochrome, was lithographed by Gustavo Pfeiffer at his own press. The Ebro map has a key with linear marks indicating the geological terrains, and a set of conventional symbols for the different districts, administrative boundaries, and points where the major water volume measurements were taken. However, other standard elements required for a study of hydrological basins do not appear on the maps; for example, there is no topographical levelling, though there is a series of general contours and the main affluents on separate maps. The hydrological surveys carried out by the General Statistics Board in 1865 led to the organization of the Hydrological Divisions, concerned with the planning and development of the river-basin resources.

FRANCISCO COELLO’S THEMATIC MAPS
A particular mention should be made of two special cartographic projects undertaken by Francisco Coello himself. The first, a population density map, was connected to the Censo de Población of 1860. The technical aspects of this map underwent several changes. Coello was particularly indecisive in his choice of the appropriate geographical division that would be his accounting unit—first choosing river basins, and then provinces, before finally settling on judicial divisions. Julio Donon, Gustavo Pfeiffer, and Federico Kraus were selected to prepare the map for printing, and were instructed to depict density by means of a set of standard colour contours. The chart of the Densidad de la Población de España por partidos judiciales, según el censo de 1860 was engraved and chromolithographed by José Reinoso in 1863, the year the Census was published (Figure 6). The geographical and surface data were compiled by Coello himself, and the map was produced on a scale of 1:2,500,000. The second project was Coello’s general railways plan (scale: 1:4,000,000) which formed part of the Informe sobre el plan general de ferrocarriles de España (1865) issued by a commission of members belonging to the Board.

Conclusion
From 1861 to 1869, the General Statistics Board carried out an enormous task in cartography in order to fulfill the requirements of the Territory Measurement Law. A large number of these maps were topographical and cadastral. The cadastral surveys done by the Board gathered a rich store of geographical information: municipal district maps, land-use maps, property maps, and urban parcels. As a whole, these surveys were the first steps to a map-based cadastre, which was eventually taken up by the Geographical and Statistical Institute.

The Board conducted many experiments in thematic cartography that remained mostly unpublished and therefore poorly known. In spite of this, the thematic mapping published by the Board constitutes a significant chapter in the history of Spanish thematic cartography and its place in Spanish statecraft during the nineteenth century. Unlike systems of organization in other European countries such as France, Germany, and Italy, which had independent military and cadastral mapping services, the Territory Measurement Law of 1859 established in Spain a single civil cartographic institution responsible for topographical, cadastral, and thematic cartography. Thematic mapping was detached from this institution in 1865, but topographical and cadastral cartography remained the responsibility of the General Statistics Board. In fact, the cadastral and topographic work was merged into a single cartographic project. One result was that the pace of topographic cartography in Spain was slowed significantly until the twentieth century, when the military general staff intervened and reorganized the project.

In spite of this, and of the political instability of Spain during the first three decades of the nineteenth century, the General Statistics Board succeeded in consolidating and creating the first modern topographic service in Spain. It laid the groundwork for the Geographic Institute, created in 1870, and trained the personnel who would serve in it. In this sense, the present Instituto Geográfico Nacional is the institutional legacy of the General Statistics Board.
Acknowledgements

This paper was written as part of the research project "Desarrollo científico y cambio territorial en España," sponsored by the CICYT (PB01-0247).

References


