THE TOPOGRAPHIC MAP OF SPAIN
TO SCALE OF 1:50,000 (1875-1968):
A CRITICAL SUMMARY

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From the middle of the eighteenth century until the middle of the nineteenth, various ruling authorities in Spain attempted to embark on a project to make a detailed map of Spain, following the example of countries such as France and Great Britain. However, the inefficiency of the governing bodies of the Ancien Régime, the weakness of the reforming governments, and the great political instability into which the country was plunged after the Napoleonic Wars meant that none of these plans prospered.

It was not until 1853, the year in which the Comisión Directiva de la Carta Geográfica de España (Directive Commission of the Geographical Map of Spain) was set up, that such cartographic projects started to make any real progress. This development was now possible as the liberal state had begun to secure its position, following many years of bloody political struggles. Moreover, this was to be a period of far-reaching economic transformations throughout the country, during which, for example, work was begun on building the railway network.

The Comisión Directiva de la Carta Geográfica de España, run by the military establishment, was primarily engaged in planning and surveying the Spanish geodetic network. However, as late as the middle of the nineteenth century the Spanish Government was still without a detailed geographical map of its territory, and moreover, a general cadastral survey of the country had yet to be completed. By contrast, most Western European countries had, by this date, taken large strides towards completing their national topographic maps and also had good land parcel maps of their territory. Some countries, most notably Holland and Great Britain, had even begun producing accurate land parcel maps based on topographic cartography.

In Spain, the undertaking of a cadastral survey was first discussed with-
in the Comisión de Estadística General (General Statistics Commission), a civil body set up in 1856.\(^1\) The Commission agreed, in 1857, to begin work on a series of provisional cadastral maps in the province of Madrid. However, the following year when the reforming liberals came to power, a radical change was taken in the direction of the various cartographic projects (geodetic network, cadastral plans, geological maps, etc.) then being undertaken by the State’s technical bodies. This shift was reflected by the enactment in June 1859 of the Ley de Medición del Territorio (Territory Measurement Law). This law, which was to have a major influence on the history of contemporary Spanish cartography, held that the production of the topographic map and the cadastre should be undertaken together by a civil cartographic body.

The task was adjudicated to the Comisión de Estadística General. As a result of which the Comisión Directiva de la Carta Geográfica de España was dissolved in 1860, despite the opposition of the military establishment who had had responsibility for it, and all its resources and materials were transferred to the Comisión de Estadística General. In 1861 the commission was renamed the Junta General de Estadística (General Statistics Board). In the mid-1860s, while the cartographic project designed by Francisco Coello was still being developed, a power struggle broke out between the Depósito de la Guerra (the War Office), linked to the Cuerpo de Estado Mayor del Ejército (Army General Staff), and the Junta General de Estadística for the control of the cartographic project. The dispute was won by the Junta General de Estadística, out of which the Instituto Geográfico (Geography Institute) was later created in 1870. The Institute was renamed three years later as the Instituto Geográfico y Estadístico (Geography and Statistics Institute). The mistrust felt by the reforming liberal politicians towards the Army General Staff was perhaps the crucial factor in the taking of this decision, which went against the general trend in Western Europe, where topographic cartography was the concern of a military body, while the cadastral survey was the concern of a civil body.

The idea of undertaking the topographic and the cadastral mapping together belonged to the geographer, Francisco Coello (1822-1898), who believed that by doing so the cartographic information of Spain could be modernised without having to duplicate mapping efforts. However, after a decade of costly and laborious attempts, this ambitious mapping project

\(^1\) We have studied the work done by this Commission in J.I. MURO-F. NADAL-L. URTEAGA, Geografía, estadística y catastro en España, 1856-1870, Barcelona, Ediciones del Serbal, 1996.
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was shelved in 1870 by the recently created Instituto Geográfico. In spite of this, the making of the Topographic Map continued to be linked to the cadastral survey through a number of curious work projects known as «avance catastral» (advance cadastral survey work), which involved two specific tasks: the delimitation of the municipal boundaries and the calculation of the total amount of cultivated land within a municipality. Thus, the Topographic Map of Spain was a topographic map, an official administrative map and a land-use map at the same time.

This triple character had major cartographic implications. The emphasis placed on the planimetric details and the administrative nature of the tasks to delimit the municipalities had the effect of excluding the War Ministry from the organization of large-scale topographic cartography in Spain, a situation that was to generate considerable institutional and corporate tension.

So contrary to Francisco Coello’s predictions, the merging of the topographic work with that of the avance catastral delayed topographic mapping, because of the need to delimit the municipal districts. Thus, for reasons related to the cadastre, the Instituto Geográfico adopted a municipal topographic system. The original plots were drawn at a scale of 1:25.000, municipality by municipality, which meant the measurement and drawing of around 10.000 original plots.

In addition, the Topographic Map included detailed information about land uses derived from the measurement of the total amount of cultivated land. The inclusion of this information, another feature that was unique in European cartography at this time, meant that the sheets of the Topographic Map contained valuable geographical information, but this fact also had a number of negative repercussions. The different land uses were represented with coloured symbols or shaded areas, which meant that as late as the end of the 1920s the lithographic system had to be used for map printing. Thus, while the printed sheets were of great beauty and quality, the publication of the sheets was very slow.

Once Coello’s cartographic project had been shelved, the director and founder of the Instituto Geográfico y Estadístico, the land surveyor and military engineer Carlos Ibáñez e Ibáñez de Ibero (1825-1891), designed a plan for carrying out topographical projects which sought to satisfy all parties. The plan aimed at providing the Hacienda Pública (the State Treasury) with all the statistical data and cartographic elements needed to revise the land tax, while at the same time undertaking the planimetric survey of the Topographic Map. This accounts for the unusual and quite distinct model of topographic surveying undertaken in Spain.
The surveying was carried out, in the same way as the cadastral survey, municipality by municipality, with the planimetry and altimetry being conducted in separate surveys. The way in which the topographic work proceeded highlights the influence of the cadastre on this cartographic plan: from south to north, starting in Andalucía, where the predominance of large property holdings allowed rapid results to be obtained and where tax fraud was at its greatest. Thus, until the outbreak of the Civil War the making and the printing of the Topographic Map of Spain was essentially a civil undertaking, carried out in tandem with the cadastre. Any strategic or military concerns in the making of the map of Spain were clearly absent up to this point: the topographers of the Instituto Geográfico y Estadístico did not reach the Pyrenees until the 1930s; and, as they progressed in their work, they ignored the altimetry of most of the sheets corresponding to the border zone with Portugal.

As pointed out at the beginning, the Spanish topographic map project was set in motion in the middle of the XIX century, shortly after other similar projects had got underway in the other European countries. But, this initial delay was not very great, with the exceptions of the projects begun in France and the United Kingdom. In 1875 the first sheet, a map of Madrid, of the initially projected 1.106 pages was published (Fig. 29). By 1885 only four European countries (Switzerland, Holland, Belgium and France) had completed their large-scale topographic maps. However, by the end of the XIX century it was apparent that Spain had fallen badly behind. Around 1900, in addition to the four countries already cited, the United Kingdom, Denmark, the Austro-Hungarian Empire, Serbia and Montenegro were ready to publish their topographic maps, while Italy, Germany, Portugal, Sweden and Russia (its European territories) were nearing completion. In Holland, Denmark, the Austro-Hungarian Empire and France new surveys aimed at up-dating first editions were even being undertaken in the 1890s.

By contrast, only 118 sheets of the Topographic Map of Spain had been published by 1900, a mere ten percent of the final number envisaged. Spanish mapmaking was thrown out of its lethargy by the relaunching of the cadastre, a decision that was taken in 1900 and legally ratified in 1906. One of the first steps taken in this new move to complete the topographic map and the cadastre came in 1900 with the creation of the Cuerpo de Ingenieros Geógrafos (Geographical Engineers Corps), whose job was that of making the Map of Spain. The adoption of the new techniques of photomechanical reproduction in the second decade of the XX century and the introduction of photogrammetry in surveying boosted the printing of the topographic map.
Later, in 1923, following the establishment of the Dictatorship of General Primo de Rivera, the institutional cartographic order that had been in place since the enactment of the Ley de Medición del Territorio (1859) was modified. The Depósito de la Guerra, which had felt marginalised from the making of the Map of Spain and which was greatly concerned by the lengthy delay in finishing the work, took advantage of the new political order to find a new role for itself. As a result of this new reorganization of topographic cartography, in 1923, the Directorio Militar (the Military Board) set up the Consejo Superior Geográfico (Higher Council of Geography), with powers to control and manage official cartography, and assigned the Depósito de la Guerra with the task of completing 113 sheets of the Topographic Map of Spain on a scale of 1:50,000. Two years later, in 1925, the Instituto Geográfico y Estadístico was renamed the Instituto Geográfico y Catastral (Institute of Geography and the Cadastre). Statistical services were transferred to the Ministerio de Trabajo (Ministry of Work), while the cadastral services were transferred to the Instituto Geográfico y Catastral.\(^2\)

The coming of the Second Republic in 1931 marked a return to the organizational pattern that had dominated cartography before 1923. The Depósito de la Guerra was sidelined from the survey of the Topographical Map, a task that became the sole concern of the Instituto Geográfico, which was renamed the Instituto Geográfico, Catastral y de Estadística (Institute of Geography, Cadastre and Statistics). At the end of 1935 a conservative republican government decided once more to transfer the statistical services to the Ministerio de Trabajo and the cadastre to the Ministerio de Hacienda (Treasury) whereby the Instituto Geográfico lost the words Cadastre and Statistics from its title.

In July 1936, a few months after this reorganization, the Civil War began. By this date only 564 sheets had been published, many of which were already thirty or forty years old. Both the original plots of the Topographic Map and most of the other cartographic material remained in the hands of the Republican Government, while Franco’s forces could call on the support of many of the members of the Cuerpo de Estado Mayor del Ejército and some members of the Cuerpo de Ingenieros Geógrafos. The transformation of the conflict into a large-scale modern war with major international

\(^2\) That change in the cadastral policy has been studied by J.P. Ruiz, Estado, geometría y propiedad. Los orígenes del catastro en España (1713-1941), Madrid, Centro de Gestión Catastral y Cooperación Tributaria, 1992.
repercussions led to the publication of various military editions of the Topographic Map of Spain.

At the beginning of 1937 the Instituto Geográfico, which remained on the side of the Republic, began to print a special edition of this map which, by the end of the war, amounted to 395 sheets. For the most these were published in Madrid, with some sheets being printed in Barcelona. Franco's army also printed two special editions, the most important of which was the Mapa Nacional (The National Map). The map did not cover the whole of the Spanish territory but it did account for all the zones of greatest military interest in the Peninsula, and it also included a number of sheets corresponding to the islands of Mallorca and Menorca. Another special edition was that produced by the Servicio Cartográfico del Estado Mayor del Ejército del Aire (the Cartographic Services of the Air Force), corresponding in the main to the campaign waged in Catalonia. Franco's forces were able to count on the valuable mapping support of the Italian Army's Corpo di Truppe Volontarie. This expeditionary force installed a Sezione Topocartografica in Vitoria, and in 1937 and 1938 they printed an Italian series of maps.

The increasing cartographic demands of the Civil War meant that during the three years of conflict both sides made considerable efforts to print maps. Thus, for example, we know that Franco's army printed two million copies of the special edition of the Mapa Nacional, a figure that was in all probability surpassed by the Republican Instituto Geográfico.

During the Civil War, the Topographic Map of Spain, which had previously developed in tandem with the cadastre and which bore the hallmark of a civil map, became a military map: converted in the essential military map for waging war. This military nature, which it had acquired by chance, was to become a permanent feature of the topographic map. The Civil War not only saw the militarisation of the map, but also led to its internationalization. The Italian series was the first of a set of maps produced by other countries, who ensured that the making and printing of the Topographic Map of Spain became a question of international interest.

In January 1938, Franco's Government now installed in Burgos set up

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the Servicio Nacional del Instituto Geográfico y Estadístico (National Institute of Geography and Statistics), which a few months later was renamed Instituto Geográfico y Catastral (Institute of Geography and the Cadastre). The change of name represented, to a certain extent, a return to the institutional organization of mapping that had prevailed during the Dictatorship of Primo de Rivera. However, at the end of the Civil War differences of opinion were expressed as to what the institutional organization of cartography in the new regime should be. In order to resolve them, General Franco named a commission including four members of the Cuerpo de Estado Mayor. Some of these members, favouring the Italian model of cartography, wished to bring all the cartographic bodies under one Servicio Geográfico Nacional (National Geographical Service), which would be under military control. However, one of the commission members, a lieutenant colonel in the army and a geographical engineer, Alfonso Rey Pastor (1890-1959) opposed this plan of unification which would have meant the virtual suppression of the Instituto Geográfico y Catastral.

Eventually, his arguments prevailed, and Spanish topographic cartography remained divided in two mapping centres: the Instituto Geográfico y Catastral and the Servicio Geográfico del Ejército (Army Geographical Service), established in 1939 replacing the former Depósito de la Guerra. It is not easy to account for the maintenance of the institutional division of Spanish topographical cartography. Two reason can perhaps be forwarded. First, the Instituto Geográfico y Catastral managed to survive thanks to the large number of people it employed and the sizeable resource base it could call upon. Although the technical corps had been devastated by the war and many of its members had gone into exile, the staff was still numerous at the end of the conflict. Second, the cadastre once more came to its help, since its completion was one of the aims of the regeneracionista political agenda defended by the new Franco regime.

Presiding over these two mapping centres, as it had been the case during the Dictatorship of General Primo de Rivera, was the Consejo Superior Geográfico, legally constituted on 12 July, 1940. The Counsel’s president was appointed from among the army’s generals, and he was granted powers of «management, inspection and organisation» of both cartographic centres. The creation or re-establishment of the Consejo Superior Geográfico meant the militarization of Spanish topographic cartography during the early years of the Franco regime. Indeed, between 1940 and 1953 true control over Spanish cartography lay with the Estado Mayor del Ejército as they were able to impose their wishes on the Consejo Superior Geográfico.
In 1941, Franco’s new mapping authorities were faced by a situation in which 465 sheets of the Topographic Map of Spain had still to be published. In order to have them all published within ten years, the Consejo Superior Geográfico decided that the Instituto Geográfico y Catastral should be entrusted with the making and printing of 299 sheets and the Servicio Geográfico del Ejército with the remaining 166. However, these plans had to be modified, first, by the outbreak of the Second World War and, later, by the Cold War. During the Second World War the internationalization of the Topographic Map, which had been initiated in 1937 by the Italian army, was intensified. Drawing on various sources, the military mapping services of Germany, the United Kingdom and the United States produced their own series of the Topographic Map of Spain between 1940 and 1944.

The nineteenth-century notions of sovereignty over national territory that had been brutally called into question during the Second World War, lost virtually all meaning in the Cold War. The role played by the US Army cartographic services in Spanish cartography was to be far from minor. The US airforce carried out the first complete photogrammetric survey of the Iberian Peninsula and the Balearic Islands between 1945 and 1946. At a later date, the US Coast and Geodesic Survey undertook the general revision of the Spanish geodetic grid and its link up with the triangulation stations in neighbouring countries. After 1953, using this information, the US Army Map Service produced the first modern map series of Spain compiled following photogrammetric procedures. From 1953 until 1975 the Army Map Service was the main publisher of topographical cartography in Spain, a situation that was also true of a number of West European countries.

During these years, the work of the Spanish cartographic services was also affected by the events of the Cold War. Thus, in 1947 the Consejo Superior Geográfico gave priority to the modernisation of a series of 173 sheets of the Topographic Map of Spain corresponding to the Pyrenees and the Ebro Valley. This meant that the tasks involved in the completion of the first edition of the Map of Spain were relegated to a place of secondary importance. This change in cartographic priorities coincided with a renewed vigour in US international cartography. In 1950, in the middle of the crisis caused by the Korean War, the Army Map Service was entrusted

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with revising more than 10,000 sheets of various national topographical maps. As a result the Army Map Service revised and edited more than 260 sheets of the Topographic Map of Spain corresponding to this same area of the Pyrenees and the Ebro Valley. Although the reasons why the Consejo Superior Geográfico decided to centre its Spanish mapping activities in the north-east of the Iberian Peninsula are not altogether clear, evidence seems to point to the new geographical and strategic interests that arose out of the Cold War.

In 1953, as a result of this change in the orientation of cartography, all the sheets corresponding to the Balearic Islands, most of those corresponding to the Canary Islands, as well as about thirty pages corresponding to the Peninsula had yet to be published. Indeed, the first edition of the Topographic Map of Spain was not completed until 1968. But by this time, this did not matter unduly. Since the mid-1950s, the true original series of the Map of Spain had become the M781 series produced by the Army Map Service with the collaboration of the Instituto Geográfico y Catastral and the Servicio Geográfico del Ejército, who provided the support studies and review on the ground.\(^5\)

Once the first edition of the topographic map was complete, these two Spanish mapping centres took different paths. In 1968 the Servicio Geográfico del Ejército began work on a new military map on a scale of 1:50,000, called Serie L, the first edition of which was finished in 1986. The Instituto Geográfico y Catastral, meanwhile continued up-dating the topographic map on this same scale. However, their main cartographic activity became centred principally on the Topographic Map of Spain on a scale of 1:25,000, the first sheet of which was published in 1971. In 1977, just a few years later, the Institute was renamed the Instituto Geográfico Nacional (National Geography Institute). The longstanding relationship between the map of Spain and the cadastral survey was finally broken as the Ministerio de Hacienda (Treasury) assumed full responsibility for the cadastral surveys.

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