

Part I

Theoretical Foundations



Exploration, Cartography and the Modernization of State Power

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Introduction

The absolute states which began to develop in Western Europe during the Late Middle Ages and which were consolidated during the Renaissance laid the political and institutional foundations of the different types of representative democratic states which evolved after the last quarter of the eighteenth century. On the whole, these states are distinguished by the fact that they exercised the power of political domination uniformly and on an exclusive basis throughout the territory. This led to the slow build-up of a monopoly of legitimate coercion, the concentration of tax-collecting and the bureaucratic centralization of public administration (Alliès, 1980, pp. 23–25).

Both for modern absolute states and contemporary representative democratic states the exercise of political sovereignty involves the people and property located within a given geographical area.

Although the existence of a territory is a part of both kinds of state, this does not mean that other types of territorial states do not also exist, not only in Western Europe but throughout the world. In fact, modern dynastic patrimonial states are not substantially different from other ancient or extra-European models. However, representative democratic states do differ from all the rest in one fundamental respect: they must recognize a people who delegate their sovereignty by means of a system of political representation, which, in turn, requires a clearly defined territory (Escolar, 1995, p. 5).

For this reason, the absolute states of Western Europe are the political and institutional forerunners of all contemporary states (Escolar, 1994, pp. 44–46), to the extent that the first representative democratic systems were set up in some of them or in their colonies, spreading, in the course of successive historical stages, to include almost all the states in existence today.

In this process, which lasted basically from the beginning of the fifteenth century until the present day, the modernization of the power of the state concentrated on developing methods and techniques aimed at making the bureaucratic and administrative apparatus function more efficiently, permitting more effective control of the territory and the population, but it also involved expending considerable energy developing methods of broadening and legitimizing the power of the state as

well as gathering information regarding the different aspects of the social and natural reality both inside and outside the geographical boundaries of each individual state.

Consequently, the building up of state power in the absolute states of Western Europe entailed five basic aspects: the institutional consolidation of a centralized political and administrative apparatus; the organization of the bureaucracy and infrastructure within the territory ruled by the monarch; the projection and assessment of alternative strategies for the expansion of the state; the implementation of alternative offensive and defensive tactics launched from the territorial base; and the legitimization of the political rights of the people both within and beyond the borders of the state. Although these factors were formulated during the Renaissance and generally incorporated into the organization and style of state management during the seventeenth and eighteenth centuries, they were inherited by the democratic states which were to follow, reproduced in the absolute states of Western Europe and the Near East, and transported to the colonial empires, where they become a part of the states which emerged after the nineteenth century as a result of the various historical processes of decolonization.

Gradually, intellectual and practical undertakings developed simultaneously: on the one hand, collecting, classifying and drawing up an inventory of the information and documents dealing with the discovery and, on the other, analysing and processing, describing and depicting the results of exploration activity in the geographical areas which had been discovered or surveyed. In this context, the boundaries between the reality represented and the imaginings of the specialists involved had a direct impact on the depiction of these results by the intellectual authorities of each period (Harley, 1992, p. 234) and also on the empirical exactness of the data provided by the exploration, either directly when the specialist was also an explorer or observer, or indirectly when the data provided by the survey and field notes was processed by the specialist in his study.

Cartography was never a mirror image of the reality represented but a visual schema where the mapmaker or scholar involved aimed to reflect that reality using the means available at that time within the framework of the problems involved in the use made of the maps he produced and the parameters defining his particular approach to the world as 'geography' (Jacob, 1992, p. 240).

On this basis we can define a number of different periods where a connection exists between the prevailing worldview, the most important characteristics of the process of forging states and territories and the technical means for drawing maps using the information available.

The period between the sixteenth and eighteenth centuries, when the absolute states were evolving and being consolidated in Europe, may be subdivided into two eras which are significant from the point of view of exploration and mapmaking. The first of these is the Renaissance, when the geographical view of the world inherited from antiquity was gradually abandoned and the social and cultural impact of the discoveries and the process of centralization of state power was felt. The second is the Baroque and Neo-classical periods during the zenith of European Absolutism, when the metropolitan territories were surveyed and inspected, the colonies consolidated and the world was regarded as a stage for possible territorial expansion.

The nineteenth century, when the representative democratic states developed and were consolidated, is marked by the various political and administrative transformations which occurred in the central states as a direct result of the French and American revolutions (running parallel to the rapid development of capitalism in Western Europe and the United States). This led to the promotion of descriptive statistics and the development of monographic exhibitions associated with standardized methods of land surveying and cartographic representation. The aim of both of these disciplines was to define the differences which existed in the geography of the state lands and to classify the stocks of human and natural resources in the world beyond Europe.

Although this division into periods aims to distinguish processes which are significant in the relationship between cartography, exploration and the development of the power of the state before the scientific institutionalization of geographical knowledge towards the end of the nineteenth century, many of these developments are not restricted to one particular period but overlap so that, throughout the course of this work, we shall have to draw attention to the existence of certain anachronisms in one period and of other elements which foreshadow future periods. The history of cartographic representation and the spread of knowledge of *oekoumene* cannot be regarded linearly: we must be aware of continuity, steps backwards and hiatuses in the different stages of the territorialization of state power.

The Double Discovery and the Transformation of the Worldview during the Renaissance

Associating the worldviews prevalent in a given period with the political perspectives in relation to the increase of power and the bureaucratic and administrative structure of the state involves considering the alternative relationships between the images of state power and those of the real world, regarding them both as coherent natural and geographical entities.

The discovery at the beginning of the fifteenth century of ancient authorities which described the world in a way which differed from the Western Christian view served as a kind of epistemological doorway within the framework of which it was feasible to legitimize the opening up of new paths of inquiry and concrete possibilities for empirical research.

So, in the field of geography, the appearance of the texts and letters of Ptolemy, the Alexandrian astronomer and geographer who lived during the second century BC, contributed in large measure to the development of scientific knowledge during the Renaissance (Broc, 1980, pp. 34–35). Translated initially into Latin by Jacobus Angelus in 1409 and later retranslated into various vulgar tongues, these documents, along with cartographic documentation which was added during the following 200 years, constituted the basis of the geographical view held by the Western world until it was finally rejected in 1570, when Ortelius's *Theatrum Orbis Terrarum* was published and Mercator accorded merely historical value to Ptolemy's *La Geographia* in his atlas published in 1578. In the sense that they acted as stepping-stones (O'Sullivan, 1984, pp. 3–4), in our opinion these documents

bear the intellectual responsibility for opening up the door during the whole of the fifteenth and the first half of the sixteenth centuries to exploration and the empirical discovery of the real shape of the world in an intellectual context constrained by respect for *auctoritas* and where knowledge was controlled by Judeo-Christian revelation.

As well as the Ptolemaic maps of the world and regional maps, with the technical innovation of organizing information based on the geographical co-ordinates of latitude and longitude, there were also portolan charts and hydrographic charts.¹ The latter, which had been developed initially during the fourteenth and fifteenth centuries in Italy and Catalonia for use in trade and the colonization of the Mediterranean, were subsequently used in the Portuguese schools of navigation and later by Spain in the fifteenth and sixteenth centuries as an aid in overseas exploration and expansion in the Atlantic, Indian and finally the Pacific Ocean basins.

In Portugal the early establishment of a centralized monarchy at the beginning of the fourteenth century and the existence of a clearly defined territory with stable borders which was effectively controlled during the fourteenth and fifteenth centuries created the right conditions for the development of a systematic policy of expansion associated with oceanic exploration based on technical knowledge linked to navigation and cartography (Boorstin, 1983, pp. 157–58). [...]

Against the background of the opening up of the known world as a result of Iberian expansion, the monarchs and political and administrative officials of the other absolute states of Europe began to fashion their own metropolitan geography, drafting projects of territorial expansion in geographical scenarios, both real and imaginary. Hence, a relationship was established between their institutional and political aspirations and the instruments of legitimization, control, expansion and surveying provided by the inherited worldviews and those which gradually emerged, at first in partial harmony with, and later diametrically opposed to, authorized knowledge.

Different types of academic cartographic knowledge, topographic and geodetic survey techniques and methods of representing the accumulated geographical and cadastral information were organized in line with the new requirements for the organization and consolidation of state power during the Renaissance (Alliès, 1980, p. 51).

Gradually, all the emerging absolute states required cartographic techniques in order to represent their own geography, both for the purpose of the social legitimization of their dominions and as a means of broadcasting the geographical profile of the country throughout the realm and in order to draw up an inventory of their natural, social and human resources and to set up jurisdictional institutions to facilitate government and state administration.

The pictorial maps which adorned palaces and official buildings as well as the maps of the world, globes and charts of the state territory which monarchs used to express their effective control fall into the first category. The identity of the state and its geographical profile required massive representations where, treading a fine line between pictorial representation and cartography proper, the component parts of the kingdom could be represented in a graphic manner (Jacob, 1992, p. 410).

Even in the Italian states, where the state territory as the object of public administration and the basis of sovereign power had attained the highest degree of institu-

tionalization, this kind of cartographic representation of the state territory is only to be found after the middle of the sixteenth century.² Excellent examples of this type of map are the strategic-political wall maps painted by Enzo Danti between 1563 and 1575 in the *Palazzo Vecchio* in Florence and the maps painted by Antonio Danti between 1580 and 1583 found in the Vatican map room (Marino, 1987, p. 5).

In the remaining states of Western Europe this type of map production was limited to rudimentary drawings based on medieval or Ptolemaic maps of the world, where the profile of the state territory was purely decorative or propagandistic in nature, sometimes incorporating didactic, commemorative or spiritual functions or, at the most, only partially or unsystematically completed, based on the topographic surveys commissioned by the various sovereigns. [...]

The second category comprises different types of map showing very disparate levels of technical perfection. These were mainly used for setting up primitive land registers, defining administrative and government jurisdictions and preparing inventories of the state territory (Alliès, 1980, p. 53). With each new step forward in the institutional organization of the state, advances were made superseding the merely allegorical nature of such representations (Jacob, 1992, p. 355).

By the middle of the sixteenth century the political, institutional, technical and scientific conditions were finally ripe for maps to be used as planning instruments for the bureaucratic and administrative management and territorial control of state power in the states of Western Europe.

England in late Tudor times and France under the late Valois felt the impact of early overseas colonial expansion on trade and public administration. This had a direct impact on cartography which was then more likely to attract private or mixed funding which would guarantee not only the printing and graphical publication of the maps but also the necessary topographic surveys, documentary assessment and cartographic representation.

Although initially the English Crown was unable to offer true royal patronage in the conflict with the Spanish Empire (Barber, 1987a, pp. 58–59), unlike France where Catherine de Médicis guaranteed sustained support for expansionist adventures in America (Buisseret, 1987, p. 106), after 1580 or thereabouts the policy of both monarchs emulated that of the Iberian monarchs, entering into direct competition with the latter in the fields of overseas exploration and expansion.

Following the precedent of the land registration, water control and canal works in Venice, and to a lesser extent in Milan, Florence and the Papal States (Marino, 1987, pp. 6–11), mapmaking achieved official status in England and France.

On the basis of Saxton's great *Atlas* published in 1579, where British territory is described in (hundreds of) individual (cluster) units as opposed to the diocese traditionally used up till that time (Barber, 1987a, p. 65), Burghley, minister under Elizabeth I, and the main civil servants of the state bureaucracy, began to make systematic use of information on the density of the urban population, the location of large estates and communications to organize a taxation system and to calculate the resources of the kingdom (Barber, 1987b, pp. 75–81). This attitude was finally institutionalized with the 'Great Survey' ordered by James I in 1607, the aim of which was to produce a detailed survey of the Crown lands. Although this project did not prosper, the political, administrative and taxation requirements which led to the proposal resulted in the founding of the State Paper Office in

1610 (Barber, 1987b, p. 83). This was the first office for technical control of cartographic information on royal lands.

On the other side of the English Channel the main problems were similar, the aim basically being to regulate the feudal sway of the *Bando* by setting up a centralized jurisdictional system of justice and implementing planned economic and fiscal policies (Buisseret, 1987, p. 99). In 1560, Catherine de Médicis, the figure behind most of the political decisions taken by her various sons who occupied the French throne during the second half of the sixteenth century, commissioned Nicolas de Nicolai, seigneur d'Arfeuille, to carry out a general cartographic survey of the provinces of the kingdom. Obviously, this commission was largely motivated by a desire to emulate Saxton's work in England. Even so, Nicolai's atlas was never completed, and the parts which were remained in manuscript form (Buisseret, 1987, p. 106).

Apart from the various projects carried out until the time of the death of Catherine de Médicis in 1589, there was only one firm policy aimed at officializing scientific and technical activities of a cartographic nature after Sully's collaboration during the reign of Henry IV (1589–1610). It was Henry who promoted mapmaking with a view to planning the infrastructure of the kingdom and to help plan the distribution of the defensive forts and military garrisons throughout the territory (Buisseret, 1987, p. 112). We must wait until the time of Richelieu to find true political geography, the main manifestation of which occurred in 1624 when the Cardinal commissioned the engineer and cartographer, Nicolas Sanson, to draw up a map of France comprising 30 charts (Buisseret, 1987, p. 113). For the first time in Europe this large-scale map divided the cartographic representation according to subject-matter, thus breaking with the tradition of all-embracing images where the map, apart from being a technical tool, continued to be a symbolic representation of the geographical profile of state territory (Buisseret, 1987, p. 117).

In both the cases described above the desire of the monarchs to obtain detailed, localized information concerning the estates to be found within their territories clashed head-on with the regional power of the nobles who refused to provide the necessary data or to co-operate in the surveys of their private lands (Barber, 1987b, pp. 80–81; Buisseret, 1987, p. 106). Only the Spanish monarchy, perhaps owing to the strict centralizing policies implemented after the defeat of the *comuneros* in 1520–1522,³ managed around 1577 to produce a complete map of the peninsula (part of an atlas which was started by Pedro Esquivel and later completed by Diego de Guevara at the request of Philip II). This may be regarded as the most accurate single map of this period both in geodetic terms and in terms of the amount of information included for its size and geographical coverage (Parker, 1987, pp. 130–31). After the defeat of the Spanish Armada and the onset of Spanish decadence, Spanish monarchs and their ministers only engaged the services of foreign specialists who, from that time onwards, were responsible for producing most of the administrative and political maps of the kingdom. However, as far as possible, the Iberian monarchs continued to retain the inventory and topographic survey of their colonial possessions for their own information (Parker, 1987, p. 145).

An interesting example which stands in contrast to the previous three is that of the Habsburg monarchy in Austria, for it provides the clearest illustration of the relationship which existed between the centralization of state power and the characteristics of the cartography promoted or financed directly by the state.

Unlike the other absolute states, Austria was organized on the basis of military and dynastic alliances between princes. This made the state structure very similar to the feudal grouping of subordinate dependencies. The monarchy could not centralize mapmaking activities which, therefore, remained in the hands of the regional powers, managing only to promote maps of the territory necessary for a late construction of its self-image as the object of political domination. These maps aimed to express both the desire for autonomy and the desire to belong to the bloc (Vann, 1987, pp. 153–54). Consequently, in the maps produced in Austria during the latter years of the Renaissance the geographical limits were ideological rather than jurisdictional and were always linked to the concept of the principality and not the central state (Vann, 1987, pp. 158–59).

After the middle of the sixteenth century, discovery and cartography merged in a single project which was old before it was born: ‘paradoxically, cosmography, which is being reformed as the great discoveries are being made, is developing at a time when the state of the world may render it obsolete’ (Lestringant, 1993, p. 18). Renaissance cosmography tried to superimpose its images, increasingly standardized and ever less pictorial and more committed to the art of locating places faithfully, on the image of the world where the idea of the whole was didactically transmitted through the harmonious combination of the different dimensions of that reality which, as such, could be represented on maps which had no geographical pretensions but which aimed merely to present the image of revealed truth (Lestringant, 1993, p. 35).

All the European monarchs of the sixteenth century employed ‘cosmographs’ who represented, read and described the world and the territories belonging to the state in graphic fashion: [. . .] This does not mean that the knowledge provided by oceanic exploration and the topographic survey of the districts of each European state was accumulated mainly in the works of these men. In fact, the spread and refinement of measurement, projection and map-drawing techniques were most evident in the works of Ortelius, Mercator and Gastaldi in the middle of the century, which were related to the work of cosmographers such as Sebastian Münster (Broc, 1980, pp. 75–84) and his followers (Broc, 1980, pp. 85–97). The main centres for the dissemination and technical development of printing were initially located in Northern Italy, later shifting to Southern Germany and the Rhineland and finally Flanders (Broc, 1980, pp. 121–32; Jacob, 1992, pp. 87–96).

The techniques developed to represent the spherical shape of the earth on a flat surface and the desire to produce an exhaustive geographical inventory sought epistemological guarantees and neutral yet practical methods of assessment. Therefore, they were regarded as instruments for the pragmatic implementation of state policy and administration and not as a symbolic decree of the extent of royal dominion. In this sense, the gradual separation of Renaissance cosmography from chorography and topography may be regarded as the basic contribution of the discoveries to the modernization of state power. This break signified a decisive change which led to the institutional drafting of territorial rules of administration and justice as well as the delimitation and systematic description of the Crown lands.

The surveying and instrumental representation of the territory of the state associated with administrative and scientific cartography in the seventeenth and

eighteenth centuries were made possible by the development of cartographic techniques during the Renaissance as a result of the 'double discovery', on the one hand, and, on the other, the transformation of conspicuous state power into geographical jurisdiction.

Survey, Inventory and Description: Cartographic Neutralization of State Territory in the Seventeenth and Eighteenth Centuries

During the first half of the seventeenth century, the main centre for designing, drawing and printing maps moved to the new state of the United Provinces set up as a result of the independence revolt of 1468–1569 in the northern area of Spanish Flanders (the seven secessionist provinces headed by Holland and Zeeland). For more than two centuries (the period between the Union of Utrecht in 1579 and the Batava Republic in 1795) this new state, based on the autonomy of the bourgeoisie and distinguished by a clearly liberal economic policy, enjoyed a decentralized government, from the administrative point of view, and ample political, religious and commercial freedom.

The first thirty years of existence of the United Provinces were marked by continuous military confrontations with the Habsburgs. This did not hinder the development of trade and intensive agricultural and industrial activity, with the result that by the end of the sixteenth century the new state headed the states of Europe. During a period of some seventy years, during which they held the leading position in the economy of the capitalist world, the Dutch built up an overseas empire which compounded and extended Portuguese possessions in the South Atlantic and in the Indian Ocean, as well as consolidating their privileged trading position with the Levant and Northern Europe. Although during this first period England and France also promoted a more modest expansionist policy in both East and West, they undoubtedly did so exploiting the space opened up by the Dutch maritime companies and the 'naval shield' which these provided.

The economic liberalism, religious tolerance and administrative decentralization which characterized the society and culture of the United Provinces meant that pictorial and cartographic representations of the world, the state territory and its geographical peculiarities attained a degree of popular familiarity, and that there was some connection between the visual representation and the non-authoritarian capacity to transform and control the landscape. In this they differed considerably from the tight relationship between cartography, administration and territorial management which was established in the main absolute states during modern times.

In the Dutch state of the early half of the seventeenth century, it is difficult to draw a precise dividing line between cartographic representation and descriptive painting. Both activities demanded a common view of reality which did not draw a clear distinction between the area of coded information (cartography) and the figurative illustration of local and exotic scenes (Alpers, 1983, p. 84). In Holland the most important thing was not the people but the land (Alpers, 1983, p. 88) and the importance attributed to the land as a place constructed by society brought together pictorial composition and the desire to depict the features of that landscape

(Rees, 1980, p. 62). Isomorphism of the pictorial-cartographic scene provided the most effective representational technique of approaching a visual description of the real experience, as though cartography distanced painting from the creation of imaginary landscapes. This peculiarity of style in no way detracted from the rigorous application of geometric, geodetic and topographic knowledge to cartography. Neither did it detract from the capacity for artistic communication and the aesthetic significance of pictorial works. On the contrary, it produced a realistic effect where art and science together sought to express the visualization of the world both near and far in the most complete manner possible in order to dominate and transform it.

Collective participation of the different strata of Dutch society in a framework of continuous economic growth and intellectual development meant that visual expression played a preponderant role in the transmission of experiences and knowledge systematically produced. In this respect, as has already been pointed out, the Dutch experience differed substantially from that of the other European states of the period.

On the other hand, the overseas enterprises and their impact on the nascent capitalism of the United Provinces meant that cartography was widely used, making descriptive, analytical and inventory descriptions of the world and the metropolitan regions available not only to the agents of state power but to the majority of the population (Alpers, 1983, p. 97). Highly developed techniques for the gathering of information and the visual representation of topographic and geodetic data together with a detailed and expressive pictorial technique for visualizing and interpreting reality meant that burghers, gentlemen and the people in general could approach reality and locate themselves within it.

From the great atlases of Mercator and Ortelius at the beginning of the century until Blaeu's atlases which appeared in 1636 and 1663, as well as the inventory of cities in Braun and Hogenberg's *Civitates Orbis Terrarum* between 1572 and 1617, cartography followed a course parallel and linked to the chorographic pictorial work of Goltzius, Koninck, Van Goyen and Ruisdael or the syncretic treatment of Breughel, where images of the landscape are placed in a boundless space in which the human species is one of the figurative elements. Cartography and painting finally merged in urban landscapes seen from an aerial viewpoint, such as Micker's 'View of Amsterdam' or Ruisdael's 'Panoramic View of Amsterdam, the Harbour and the Ij'.

In material terms, the modernization of Dutch state power took shape as the land mass itself came into being and, intellectually, with the socialization of the technical and aesthetic resources which allowed it to accommodate its geographical reality both scientifically and artistically and to represent it visually.

Decentralization of the state and liberalism transposed cartography to the realms of science and art without distinguishing clearly between them (Alpers, 1983, p. 78). 'Cartographic subversion', defined as the specialist's break with the utilitarian representations of political arithmetic promoted by the modern absolute states (Harley, 1988, p. 303), was not necessary, since state power was related to the political and social modernization programme promoted by civil society and not exclusively by the sovereignty of the monarch.

The situation was different in the other two powers of the period, France and England, where, in accordance with 'mercantilist' policy, the Renaissance

cartographic scheme was gradually dismantled: geography was included in the scientific sphere of enlightened thought and cartographic knowledge in the technical sphere of the administration and state government.

Mercantilism, as applied in both these states, never was a clearly defined economic doctrine nor a monolithic economic development programme. Rather, the underlying concept is to be seen in the various institutional organizations which, during the seventeenth and eighteenth centuries, left their unmistakable mark on the public treasury and government policy as tools for the accumulation of riches in the absolute states of Western Europe.

These institutional organizations sought to fashion a geographical arena in which to exercise a trade monopoly. It was therefore necessary to destroy the jurisdictional relationships of personal dependence and feudal vassalistic subordination characteristic of the medieval era. This breakdown was orchestrated in line with a variety of historical vicissitudes by a centralized political power which found expression in the bureaucratic apparatus of state.

However, two aspects must be stressed. The first is the pre-eminence of the process of unification of the geographical area under the control of the monarchy and the second the implementation of a series of administrative, judicial and economic rules with a view to standardizing the state territory and delimiting exclusive areas of responsibility subject to the central power (Alliès, 1980, pp. 29–37, 101–8).

During the Late Middle Ages, England was probably the state where political power was most centralized. From this initial situation emerged the reign of Henry VIII where power was concentrated to a high degree and the administration was centralized, although links were maintained with the highly consolidated power of the nobles of the commercial gentry and the yeomen. Within this institutional framework, a premature model of mercantilism took root under Cromwell during the first half of the sixteenth century. During the reign of Elizabeth and the Stuarts this early attempt was transformed into a kind of liberalism promoted and protected by the state which, by the middle of the seventeenth century, was competing with the Dutch state, finally ousting it in the last quarter of the century.

A relationship exists between this initial centralization of the English monarchy and the early development of rudimentary maps of the territory belonging to the feudal state. The most representative examples of this were the Gough Map of England produced in the thirteenth century and the first exhaustive cartographic inventory of the Crown lands carried out by Saxton in 1574.

Parallel to this tradition of allegorical and government uses of cartography, during the second half of the sixteenth century, England stood out on account of the proliferation of visual representations and descriptive accounts of its regions and of the world. These documents, drawn up from a patriotic and naturalistic standpoint (Cormarck, 1991) and consisting of different kinds of printed texts describing the discoveries, regional chorographic descriptions and treatises on astronomy, cosmography and navigation, appeared against an epistemological background created by the close link between science, magic and astrology which characterized the approach of authors such as John Dee, Cunningham, Blundeville and Recorde in the early days of the science of Bacon in that country (Livingstone, 1992, pp. 74–83). A foremost position must also be accorded to travel literature, the main exponents of

which were Richard Hakluyt and Walter Raleigh. These texts, whose aim was to preach a political message regarding British rights in North America, were the earliest forerunners of geographical works with patriotic aims based on an expansionist colonial philosophy (Comarck, 1994).

The moderate Protestant Reformation and the later Puritan reaction led to the development of new philosophies based on a view of the world which favoured both empirical knowledge of natural, cultural and social diversity (Livingstone, 1992, pp. 88–92) and a theological link with the doctrine of predestination. So, within the framework of the German Reformed Church, authors such as Keckermann and Varennius influenced the Briton Nathaniel Carpenter, for whom verbal and cartographic representation of empirically reconstructed geography was the expression of the harmony and perfection of the work of the Creator.

The rapid growth of a commercial bourgeoisie after the seventeenth century, the triumph of parliamentary power and, with it, the distribution of power among the different sectors of British society took constitutional form after the revolution of the 1640s. This situation made the English monarchy, whose power was effectively limited in any case, less prone to centralization. In this context, the cultivation of geography as a branch of knowledge independent of the needs of the state, in association with cartography as a scientific tool for describing the world, found fertile ground to develop. In many respects the situation was similar to Holland. However, the two approaches mentioned followed a parallel path as far as cartography for use by the public administration and as a tool for monarchical representation is concerned. In this respect they adapted to the dual powers which existed in the kingdom.

At this stage, during the second half of the seventeenth century and the whole of the eighteenth century, the development of geodetic and topographic knowledge together with cartographic techniques was easily linked to the establishment of cartography for fiscal, economic, judicial and administrative purposes without a need for the patronage or official control of the throne as had generally occurred and would continue to occur on the other side of the Channel.

In the case of France, on the other hand, the state which emerged after Richelieu and Mazzarino was markedly centralist, having evolved on the basis of direct coercion exercised during the first half of the seventeenth century on the various established territorial powers and on the formation of other new ones organized by the central power.

As a result of the gradual change undergone since the fourteenth century by the innumerable feudal and municipal prerogatives, the fiscal jurisdiction of the *intendants* and the hereditary judicial districts of the *officiers*, there was an overlap in the functions and responsibilities appropriated mainly by the bureaucracies of the monarchy and the legal profession and, to a lesser extent, by the local and regional powers. This gave the institutional and administrative map of France a polychromatic and even chaotic appearance which reflected to a large extent the difficulties being experienced by the dynastic power in the task of unifying the country around it and exercising effective control over its territories.

When this centralized state virtually devoid of legislative control was inherited by Louis XIV in 1661, it grew more radical in its more authoritarian aspects, such as the silencing of the *parlements* in 1663, the establishment of military garrisons in the

town halls of the *bonnes villes*, reducing the courts to obedience and obliging the nobility, and in many cases the provincial governors, to reside at Versailles. For all these reasons the French state soon became the model of the European absolute state during the period which was to follow.

It was in France that mercantilism attained the status of a doctrine capable of promoting the reform of the institutional and normative patrimony of the monarchy. This was absolutely essential if the funds necessary for the autonomization of sovereign power and the institutional guarantee of the eminent territorial properties were to be secured (Escolar, 1994).

The emergence of unofficial geographical knowledge, as in England during the first half of the seventeenth century, was marginal, since it was linked to the circulation of knowledge which was not updated or of a highly general nature and to knowledge of a cartographic-descriptive nature. The main exponents of this type of information were the atlases of Le Clerc (a number of editions of which appeared between 1619 and 1632), Melchior Taverner's atlas (re-edited between 1634 and 1637), and those of Tassin, Nicolas Nicolai and Guillaume Sanson, although the latter owe more to the state sponsorship of their authors. The 'love of maps', corroborated by the wide circulation of the atlases mentioned above as well as numerous regional descriptions, travel guides and itineraries (Revel, 1989, p. 151), stands in marked contrast to the 'Géographie du Roi' centred on the exaltation of the expansion of monarchic power, the naturalization of the territory and the drawing up of a systematic inventory of its natural and human resources.

The excessive reformist aims of French mercantilism, confronted with a society which had not yet found a satisfactory solution to the contradictions between a state which exercised political power implacably but which had not consolidated the social bases for administrative centralization, could scarcely do without the descriptive cartographic instruments appropriate for systematic management of the territory at different levels and which, therefore, served not only as generic tools for interpreting the geographical profile of the kingdom and its main localized attributes (Revel, 1989, p. 146) but mainly as an empirical basis for the calculation of strategies for political and administrative intervention (Revel, 1989, p. 152).

Although already following the ideas of Bacon, French science did not entirely share with contemporary English science the thrust of nascent capitalism carving out for itself an autonomous economic and political sphere within civil society. Science 'pour la Gloire du Roi' combined scientific geographical knowledge and official cartography (Broc, 1974, pp. 232–33). As a result of the appropriation by the state of scientific and technological knowledge linked to mapmaking, advances in geodetic measuring techniques, the physical conditions for recording topographic measurements and systems of graphic representation of the information obtained suffered the impact of the opportunity costs of projects which, in most cases, were strictly linked to the fashioning of the state territory and the centralized bureaucratic management of the state.

After 1670 England gradually took over from Holland as the leader of the world economy. During this period the two imperial powers in London and Paris vied with one another to win new overseas markets and extend their colonial possessions. This continued until England won the Seven Years War (1756–1763)

which culminated in the British occupation of Quebec and French possessions in India and South-West Asia.

From the middle of the eighteenth century, knowledge and exploration of the new worlds was not limited to topographic surveys and an eclectic description of their natural and human resources – as had generally been the case during the Renaissance – but centred on inventorying, classifying and interpreting scientifically the data obtained as a result of discovery. This led to the involvement of empirical science in the exploration, economic exploitation and political appropriation of the various areas of the world. The journeys of Cook between 1768 and 1780, Bougainville in 1766 and Perouse between 1785 and 1788, as well as a vast number of similar smaller enterprises which, in the course of half a century, extended the limits of the known world by approximately 25 per cent, were supported economically both by the dominant powers of the period (England and France) and, to a lesser extent, by Russia, Scotland and Spain. The distinctive characteristic of these new exploratory enterprises was the link between imperialistic and scientific aims. This meant that mastery of nature and territorial dominion went hand in hand in eighteenth century colonial policy, converting the systems for recording information (verbal, statistical and graphic) into neutral tools for gathering, inventorying and representing information (Berthon and Robinson, 1991).

Between 1713 and 1716 the administration of *Ponts et Chaussées* was established in France and in 1747 the *Ecole des Ingénieurs des Ponts et Chaussées* was founded based on the work carried out during the reign of Henry IV by the military corps of *Ingénieurs du Roi* and *Maréchaux des Logis*, one of whose foremost exponents was Sebastien le Prestre Vauban (1633–1707). From that time onwards, this institution was responsible for planning, drawing up blueprints, carrying out and supervising the construction of roads and canals, which was essential if movement throughout the kingdom was to be improved. This gave rise to a plethora of detailed topographic cartography directly related to the works being carried out. After the middle of the seventeenth century, surveys and works of statistical interpretation, such as those commissioned by Turgot in 1634 and 1664, as well as the first census were carried out as a result of the introduction of a poll tax in 1694, based on Vauban's proposal in the *Dîme Royale* (Revel, 1989, p. 125). Probably related to the information already collated, a descriptive genre of regional monographs with statistical back-up also flourished (Broc, 1974, p. 419). Both the 'regional' and the statistical aspects were ways of representing the geographical diversity of the kingdom qualitatively and quantitatively in order to provide descriptive tools of 'political arithmetic' to help the government and public administration plan their strategies (Revel, 1989, p. 125). This series of technical and intellectual activities could not have been supported without an aggressive policy of fiscal, customs, judicial and territorial regulation and standardization (Alliès, 1980, pp. 164–65) which, from the time of Henry IV, was undertaken by Sully, Richelieu, Mazzarino and later, in greater depth, by Colbert and the various ministers of the Bourbon sovereigns up to the time of Turgot.

In England, on the other hand, a more decentralized, less statist policy in the field of public works and territorial management gave rise to the concession of the Turnpike Roads, toll roads run by private trusts under the supervision of the county. Towards the middle of the seventeenth century social statistics began to develop

vigorously, based on William Petty's essays on political arithmetic published between 1676 and 1787 as well as a series of official cartographic and local supervision projects such as those of General William Roy and the Duke of Richmond, which laid the foundations during the eighteenth century for the founding of the Ordnance Survey in 1791. In fact, throughout the seventeenth century English works of statistical description were more closely linked to works of a chorographic nature or more general natural history which might easily be included in the field of natural theology and geopietism (Livingstone, 1992, pp. 105–15).

On the whole, the overseas exploration and domestic surveys carried out by the absolute states of England and France promoted scientific and technical activity and, in turn, progress in these fields led to the acceleration of overseas expansion and the consolidation of the modern territorial states.

In both England and France, institutions for the promotion of science with state patronage were set up: in England the Royal Society and in France the *Académie des Sciences*, the *Jardin du Roi*, the *Observatoire Royal* and the *Académie des Inscriptions* (Broc, 1974, pp. 15–22; Livingstone, 1992, pp. 125–26).

The most important projects for surveying, systematizing and inventorying the data obtained as a result of overseas exploration and most of the land surveys of the State territory were promoted by these institutions.

The knowledge acquired by these institutions promoted the struggle for science produced for state purposes to be separated from scientific activity carried out purely in the pursuit of knowledge *per se*. This tension between practical aims and intellectual interests was also evident in the methods of cartographic representation available at that time. Gradually a strictly neutral and abstract cartographic discipline emerged which, from the epistemological point of view, was related to the argument that knowledge of an area should be 'the result of scientific work not produced with political aims in mind' (Alliès, 1980, p. 59) and which, from the methodological point of view, was distinguished by the greatest possible theoretical and instrumental complexity in terms of the geodetic, topographic and cartographic techniques used (Harvey, 1980).

A good illustration of this state of affairs might be the laborious preparation of the map of France, which lasted almost 100 years. In 1663, Turgot, Louis XIV's Minister of Finance, commissioned the *Académie des Sciences* in Paris, with the help of the *Observatoire*, to draw up a large-scale map of the kingdom which was to be as precise and exhaustive as possible to be used to plan and manage his centralized development policy (Alliès, 1980, p. 58).

Once a methodological protocol for triangulation had been obtained in order to determine geometrically the positions of latitude and longitude, the work of calculating the astronomical co-ordinates of measured points throughout French territory began, being carried out successively by the Cassini dynasty until the Revolution. The first partial data produced scientifically gave rise in 1681 to a map showing the real shape of France which undermined the traditional map produced by the Royal Geographer, Nicolas de Sanson, in 1679. Only in 1745, seventy years after Colbert's request, did the *Description Géométrique de la France* appear, comprising eighteen charts. This was extended in 1755 with the *Carte Générale et Particulière de France* and finally completed with the publication in

1789 of the 180 sheets of the *Carte de Cassini* or *Carte de l'Académie*, where more than 3,000 triangulation points were marked on the terrain.

The main paradox of this enterprise, which was excessive for the period, was that the topographic and thematic information included in this first map of the state drawn from exact geodetic measurements was not equally precise and abundant (Revel, 1989, p. 154). This meant that the original aim of the map was completely undermined.

In Britain, on the other hand, the drafting of a map of the kingdom was mostly the result of the activities of William Roy, who undertook the task of drafting the first cartographic representations of the Highlands based on modern geodetic measuring techniques once the Scottish rebellion of 1745 had been put down. Later, with the support of the Royal Society, he prepared a complicated triangulation of England and Ireland based on 218 measuring stations. These works form the basis of the Ordnance Survey, an institution which undertook the task of preparing a map of Great Britain based on exact astronomical measurements and which enjoyed the scientific collaboration of the Cassinis. This was the first official institution in Europe which linked geodetic measurements and topographic surveying systematically and with some degree of continuity.

During the seventeenth century, Holland cleared the way for cartography and illustration, linking them to the fashioning and management of the territory from a perspective where science and art were brought together adapting to the decentralized nature and proliferation of the activities of inventory surveying and graphic representation of the metropolitan territory and the colonies. In seventeenth- and eighteenth-century France, the purposes served by cartography and the activities of drawing up inventories and producing statistical and monographic descriptions were to unify a state divided up into different pre-existing territorial units and standardize bureaucratic practices and administrative jurisdictional responsibilities. In the case of England, cartographic representation was used to organize methods of controlling and levying taxes agreed between the civil society and the dynastic state, but based on a unified territory and a much looser administrative structure.

By the end of the eighteenth century, then, the conditions were ripe for cartography to branch out as an independent discipline and for the political and institutional transformation of the territory as both the subject and the object of state sovereignty. The dichotomy which had existed between the representation of the world and the abstract representation of the geographical shape of the globe now disappeared.

Political and State Representation: Scientific Cartography and Territorial Naturalization during the Nineteenth Century

After the French and American Revolutions, the transfer of dynastic power to the state and the autonomous development of civil society invested the territory with a new symbolic, political and social significance. For this to occur, the Renaissance monarchist image of the land had to give way to the scientific representation of the map of the state during the Enlightenment and this process [...] formed the discipline of mapmaking as a survey, projection and representational tool,

distancing it from other branches of knowledge of a geographical and statistical nature conceived as descriptive tools, systematized inventorying techniques and regional interpretations.

Eighteenth-century scientific cartography, firmly neutralized in its topographic and geodetic survey techniques, became the element socially legitimized between states for the fixing of state boundaries. Moreover, this true domestication of geographical material turned cartography into the institutionalized locus of sovereign power, making the state sphere independent of the ownership rights of the monarchy. Consequently, when Revolution demolished the ideological foundations of the Divine Rights of Kings as natural law and defined the society of the state as the consequence of a constitutional contract between the members of that society, the citizens became the depositaries of political sovereignty, and the territorial norm which delimited the state in geographical terms acquired a definitive abstract status. On the one hand, then, cartographic knowledge was officially recognized as a branch of instrumental knowledge and, on the other, the cognitive and social foundations were laid for the institutionalization of geography as a discipline which was to occur towards the end of the nineteenth century.

The forging of citizenship posed serious difficulties for the social and political theorists of the Revolution who had to justify the universal nature of the new order imposed by the French bourgeoisie without accepting, implicitly or in a directly doctrinaire fashion, the territorial inheritance of the *Ancien Régime* (Escolar, 1994).

A shift from a semi-patrimonial territory of domination to a territory of representation juridically defined by the people who delegated their sovereignty in the government of the state was required (Escolar, 1995). During this period of transition from coercive and ideological uses to political and social uses of the territory, the bureaucratic structure of the state underwent substantial changes as far as its institutional role was concerned. This was due to the fact that it was no longer exclusively a centralizing apparatus, the aim of which was to consolidate the monarchy, but had become a public arena – not without contradictions and internal struggles – where the government of the people could express itself through the administration and management of the natural and human resources of the territory subject to popular sovereignty (Alliès, 1980, pp. 182–83).

The destruction of the provincial system and the introduction of departmental administrative divisions in 1789 sought explicitly to dismantle the atavistic peculiarities upon which the French monarchy had been based (Revel, 1989, p. 129) and to incorporate the principles of equality and fraternity within the sphere of the geography of the state.

The period of twelve years after the Thermidor coup was characterized by the production of departmental information organized in a decentralized fashion. This was prompted by the circular issued to the departmental administrators by the first Minister of the Interior of the Directory, Bénézech, in 1795. This intense activity of surveying and interpreting descriptive and statistical data did not generate thematic local maps. Cartographic knowledge of the territory remained within the geodetic and topographic sphere linked to the construction of the map of France, an activity which was to follow the lines laid down by the Cassini dynasty since the time of Colbert (Revel, 1989, p. 154).

The main initiative was the compilation of general and detailed statistics of France carried out, but not completed, by Chaptal between 1801 and 1804. The mass of information which emerged as a result of this work organized on a departmental basis became the seed-bed for reinventing the provincial outlines within the new departmental format (Revel, 1989, p. 131).

With the advent of the Napoleonic Empire, the situation reverted to that of the previous monarchical period, and territorial statistics were once more a state secret. Two kinds of activity prospered during the Napoleonic period: on the one hand, statistical-cartographic surveys carried out by military engineers and, on the other hand, works describing places, countries and regions produced by civilians, who can be classed more or less as 'geographers', with an interest in the resources and potential of the territories conquered by the Empire.

The result of both these activities was that, for the first time, a grand system of geographical information was institutionalized (Godleweska, 1994). The cognitive and political importance of this lay in the idea of modernization as an expression of the ascendancy of rationalism in the technical control of society and government management and, in this regard, imperialism was linked to the idea of spreading progress legitimized in the right to conquest of civilization, and of French civilization in particular (Godleweska, 1994, p. 53).

The downfall of the Napoleonic Empire plunged France into a state of introspection with regard to its universalizing aims. The Restoration and then the July Monarchy restricted reflection regarding the territory, and hence society, to the level of the tools necessary for the selection of the various models of social and political organization of the state, since there was an urgent need to identify existing inequalities in order to plan possible changes (Chartier, 1980, p. 29). Duphin, who undertook this task during the decade of the 1820s, maintained the departmental divisions although strictly for descriptive purposes (Chartier, 1978). With Angeville and Guerry, during the decade of the 1830s, surveys gave way to inventories in line with the later interpretation of a single item which was French territory. Surveys became more abstract, since the natural geographical differences which constituted methodologically independent units were eliminated from the statistical design. In order to build a neutral space for statistical research, local units for the collection and addition of information were conceived as continuous areas in accordance with conventional zoning protocols (Chartier, 1980, pp. 29–30).

The scientific profile of the territory was already guaranteed by the maps drawn up on a solid geometric foundation. Using this as a starting-point, it was feasible to reconstruct the differences within the kingdom and plan the steps which had to be taken for an orderly transformation to occur. The idea of a geographical catalogue on a neutral and homogeneous space took root then. This would serve as the basis for the codification and control of social reality, since the exercise of 'effective power requires an unobstructed area in which to operate free from the constant distractions of the baroque design of contrasts' (Chartier, 1980, p. 30).

On the other side of the Atlantic, the thirteen British colonies emancipated in 1776 formed the first modern democratic state. The French Revolution set an important precedent, although there were notable differences in the respective processes of territorial formation and the political regimes which emerged in each case.

American democracy was first organized as a confederation in 1782 to become a federal state in 1795 after a wide-ranging parliamentary and political debate, whereas, from the outset, French democracy was monolithic, even taking into consideration Girondin's federal digressions during the last decade of the eighteenth century.

The construction of the territory of France had begun long before at the time of the first Capetian kings and was consolidated in the seventeenth and eighteenth centuries. During this same period other states had developed institutionally and territorially around it so that, when the Revolution occurred, French territory had already been defined by absolutism, and the frontiers could not be altered without impinging directly upon other neighbouring states.

None of this occurred in the United States, even if we accept that the thirteen colonies were surrounded by French and British colonial dependencies. In fact, the latter were far from being organized, effectively occupied territories like the European territories and, to a point, the American and Quebec territories were mere jurisdictions, more or less defined for the exercise of British or French imperial sovereignty. Throughout the nineteenth century the coastal strip occupied by the Union on the eastern seaboard of North America served as a launching-pad for expansion towards the more extensive unknown territories lying to the west (Goetzmann, 1986, pp. 76–79) within an imaginary continental territory which was rapidly established during the decades following the end of the War of Independence.

For this reason the progressive, civilizing discourse which had fanned the imperialist experience of the *Grande Nation* of France – with its belief in the superiority of its political institutions, culture and national science – was lacking in the ideological direction of the Union, where the discourse was directed towards civilizing the territory inherited jurisdictionally and the vast neighbouring territory as yet undiscovered, unexplored and unoccupied (Goetzmann, 1986, p. 115).

The idea of freedom forged in an individualistic, democratic society was steeped in images of virgin lands which could be transformed by the industrious efforts of American citizens who would tame the wilderness. The spectacular countryside foreshadowed the future of the nation.

From the very outset, patriotic imagination was connected to territorial expansion of the state. Both aspects were based on similar features: the idea of developing American science in order satisfactory to fulfil the manifest destiny of the nation – a discourse characteristic of the work of President Jefferson and the explorers Clark and Lewis between 1779 and 1830 (Livingstone, 1992, pp. 142–49) – and the theological-natural providentialism contained within the allegory of 'the geographical grandeur which foreshadowed the greatness of the state' found in the works of Guyot and Maury (Livingstone, 1992, pp. 149–55). No European state demonstrates such a close link as existed in the United States between exploration of non-metropolitan territories, the inventorying and description of the territory of the state, and the symbols for the self-identification of the nationality of that state.

The neutralization of the territory which had taken place during the process of state modernization was not limited merely to the scientific institutionalization achieved by cartographic knowledge, but aimed to reflect the real profile of the

territory in the geodetic and topographic surveys which were carried out in Europe during the nineteenth century.

As in France, Britain undertook activities aimed at achieving a map of the state using astronomical triangulation. After 1791 the Royal Survey was charged with drawing these maps and with the general cartography of the kingdom using larger scales as the century progressed. In the other European states, similar bodies were also set up with the same aims.⁴

In the sixteenth century various topographic surveys had been carried out in order to produce national maps of different scales and varying degrees of precision with regard to the localized information used. In the Holy Empire, influenced by the German chorographic school, a wide-ranging inventory of Saxony was carried out between 1500 and 1600 on a scale of 1:26,000 and another of Bavaria between 1554 and 1563 (regarded as the best for that period) made up of 40 sheets on a scale of 1:50,000. In the following century, in 1652 Denmark produced a 36-sheet cadastral map as well as an annex containing descriptive cartographic details of a thematic and regional nature. In 1626 Sweden produced a more modest engraved six-sheet map, while Russia did not produce its first map of the European part of its Empire until 1720 and Austria carried out only partial surveys of a primitive nature between 1768 and 1790.

In general terms, a certain connection may be seen between the depth of the process of political centralization and state modernization in the various dynastic European powers and the progress made in the definition of their sovereign territories. [...]

The naturalization of the territory of the representative democratic states merits separate attention. Leaving to one side the vagaries of the officialization of cartographic representation and the institutionalization of surveying and territorial census tools in France after the Revolution, the United States stands out on account of the geometric radicalization of the practices of political-administrative division and the generalized production and use of cartographic information in the various parts of the state.

Early expansion towards the West, from the Appalachian Mountains to the Mississippi-Missouri basin, in the final decades of the eighteenth century and the first decade of the nineteenth century, provided the first proving ground for the practice of drawing linear borders which was consolidated during the second period of expansion towards the far West and the Pacific coast once the War of Secession had come to an end in the 1880s. In both cases, the territory was regarded geometrically, and state and country borders were drawn in accordance with the rectangular plots which were the norm throughout the territory of the United States.

In America there was not the same urgency as in Europe to produce cartographic representations which were geodetically precise and epistemologically legitimate in order to institutionalize and control the borders of the state, so, during the period between 1776 and 1818, most of such work was carried out sporadically, exploration going hand in hand with field surveys and the description and classification of the features of the landscape which was systematically surveyed. Some small-scale triangulation projects were carried out with a view to plotting the lines dividing the new states incorporated into the Union on the map.

Until the 1880s, geographic surveys were carried out by a variety of bodies which promoted and sponsored them sporadically. First the coastal survey carried out by the Treasury Department in 1807. This formed the basis of the stable budget granted by Congress in 1847 to keep coastal charts permanently updated using trigonometric triangulation techniques. Years later, in 1845, the United States Census Office was finally set up. This body carried out an ongoing job of producing and compiling federal statistical cartography. In 1813 the Topographer Engineers Corps was set up within the army. After 1863 this organization implemented an active policy of hydrological surveys, trigonometric triangulation and astronomical calculation of political boundaries. This office was eventually transferred to the War Department in 1879. Finally, also in 1879, the Geological Survey was set up, and one of its first tasks was territorial planning during the expansion towards the 'Far West'. It was finally charged with most of the cartographic work required by the War Department and the General Staff.

The wide variety of institutions involved in topographic surveys, geodetic measurement and cartographic representation in the United States shows the impact of a state structure directly linked to a government which represented the political will of the citizens and where the administration set up public bodies specifically charged with ensuring modernization and the material progress of the inhabitants of the state.

In the second half of the nineteenth century most of the central states, including the United States, had laid the foundations of their cartographic institutions. During this period the expansion of capitalism, until the crisis of 1880, wrought a profound transformation in the social structure of the developed countries, altering their consumer and production habits, labour relations and the relative importance of rural and urban society. Thus a climax was reached in the restructuring of the territory as well as in the administration responsible for controlling, managing and planning that territory.

But these same territories, organized socially and politically, which had already been methodically surveyed and represented, began to reproduce themselves as platforms of state with a virulence unknown since the Renaissance until a global colonial world, [coerced into] crudely [...] aping the West and covering almost the whole planet, was established.

Works classifying and interpreting descriptions of statistical series, monographs, travelogues, field reports, pictorial and cartographic representations and an endless variety of intellectual endeavours following certain standardized technical patterns achieved widespread legitimacy, which allowed them to attain independent institutional status.

In fact, exploration and representation became the two elements associated with discovery and the codification of the geographical diversity of the world on solid theoretical and experimental bases laid by positive science.

After the 1870s or thereabouts, mass education gradually began to use images of the metropolitan and overseas territories in order to form a collective identity among the citizens of the nation-states and the inhabitants of the colonial territories. Nations and empires were transformed into real mappable objects and, for the second time in 100 years (although on a larger scale), the administrative boundaries defined by Europe in the rest of the world solidified politically, until they functioned as instruments of ethnic discrimination between the numerous national entities

which appeared in the course of the successive waves of decolonization which occurred during the twentieth century (Escolar, 1996).

Geographical societies – bodies for the promotion of geography and geographers – imbued with economic, political and scientific aims, constituted the privileged locus of the socialization of geographic knowledge and its practical use and intellectual circulation (Capel, 1981). On the other hand, the school systems gradually incorporated geography into the curriculum, transmitting the images, information and arguments to aid understanding of the natural character of the state territories and the non-arbitrary logic of colonial domination. Both these aims were based on the objective data on human and physical geography current at the end of the century (Escolar, 1996).

Conclusion

When the construction of the modern states began, knowledge of the territory was linked to the monarchy's capacity of ownership over its jurisdictional and eminent possessions. The emergence of an autonomous social sector which formed the state bureaucracy and the centralization of dynastic power from the fifteenth century onwards brought in their wake the search for ways of representing the territory which would enable the administration to foresee, calculate and exercise its functions and responsibilities.

Consequently, exploration was not merely a facet of the policy of conquest implemented during the Renaissance by the Western European states bent on overseas expansion but also a part of the task of surveying their territories in Europe.

Representing, describing and interpreting the world were not unrelated actions. The geographical reality of the planet was discovered and brought under control by breaking with the images inherited from antiquity and incorporating the images which the imagination and empirical surveys provided in vast numbers. Pictography, cartographic techniques and science formed a single intellectual field linked to the systematic preparation of domestic and overseas scenarios where the central power of the monarchy could plan and exercise effective territorial sovereignty.

However, the technology of cartographic representation could never achieve the Renaissance ideal of a complete picture, an image which included all the available information and which could be used for all purposes. For this reason, maps began to diverge from the true outline and the real subject-matter. During the seventeenth and eighteenth centuries, mapping meant controlling and having the capacity to move about on the ground.

Coercive centralization in the absolute states defined a world of necessary information which could not be left to the arbitrary nature of Renaissance cartographic pictography. From that time onwards, learning about the shape of the earth was a scientific process which neutralized the explicit ideological uses and figurative practices employed in cartography.

When the revolution came, the territory had already been formed and established by the absolute state. It had achieved a degree of political autonomy as an administrative and government jurisdiction, thus paving the way for an abstract, non-personalized idea of power and the idea of the state as an entity. Representation

of the citizens became the mechanism for delegating the sovereign power of the citizens within a given territory. The national map, i.e. the neutral figure of the fatherland, then began to emerge as a tool for the formation of a national political identity among the members of that state.

When cartography and the state bureaucratic structure had become established as official institutions, the first scientific and the latter administrative in nature, surveying and exploration became ways of localizing thematic information. Consequently, from that time onwards, 'mapping' no longer meant inventing geography and producing a territory. From the latter decades of the nineteenth century onwards, neutralization of cartographic representation and naturalization of the geographic shape of the state allowed geography to take its place as an autonomous scientific discipline.

Translated from Spanish

NOTES

- 1 Charts which could be used to facilitate navigation following coastal sailing directions and geographical courses.
- 2 Of the 10,000 maps to be found in the Venice archives, only 1.5 per cent are dated around 1565 and of these only 1 per cent are pre-1560, whereas the Magistrature responsible for the control and management of the canals functioned for 300 years before maps were used for taking economic and judicial decisions (Marino, 1987, pp. 7 and 9).
- 3 Charles V put down the rebellion of the communities of Castile which rose up against the centralizing policy of the Emperor and in defence of the privileges of the Castilian boroughs.
- 4 The following data, referring to different examples in the European State and the United States, were taken from Harvey 1980.

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