Journal of the Korean Geographical Society, Vol. 41, No. 5, 2006(545~560)

Development of Cartography and State-building in France from the Sixteenth Century to the Eighteenth Century

In-Chul Jung*

프랑스 지도학의 발달과 국가 형성 - 16세기에서 18세기까지 -

정인철*

Abstract : The purpose of this study is to investigate the relationship between the development of French state and the development of cartography from the sixteenth century to the seventeenth century. For this, firstly, the development of military maps as a means for the defense and expansion of territory was examined. Secondly, the development of overseas maps as an aid for colonial expansion was considered. Thirdly, the development of national maps as a representation of the state was examined. Fourthly, the development of atlas mapping as a means for establishing national consciousness was considered. And finally, the role of maps in state building was discussed.
Key Words : state-building, cartography, territory, representation, France

요약 : 본 연구의 목적은 16세기에서 18세기에 이르기까지의 프랑스의 국가 형성과 지도학 발달의 관계를 고찰하는 것이다. 이를 위하여 먼저 영토의 방어와 확장을 목적으로 하는 군사지도의 발달을 살펴보았다. 둘째, 식민지 확장의 수단으로 사용되는 해외 지도의 발달과정을 고찰하였다. 세 번째로 국가 표상으로서의 국가 기본 지도의 발달과정을 살펴보았다. 네 번째로, 국민의식 함양을 목적으로 한 아틀라스의 발달과정을 고찰하였으며, 마지막으로 지도가 프랑스의 국가형성에 미친 영향에 대해 종합적으로 논의하였다.
주요어 : 국가 형성, 지도학, 영토, 지도표현, 프랑스

1. Introduction

A history of cartography is a part of wider political and cultural history of an area and related to the history of techniques, sciences, state administration, and international relations.

Maps portray state authority in many ways. Boundaries with other countries are provided and administrative subdivisions delineated. Maps imply political power over territory. Map and power are mutually implicated in each other.

A state entails a territory, a people, and sovereignty. Each state is characterized by these three features; each state claims sovereign power over its people and territory. This sovereign power over territory is exercised with the help of maps.

* Associate professor, Department of geography education, College of Education, Pusan National University, icjung@pusan.ac.kr

The state is represented as a map and the boundaries of the state are delineated by the map.

In this respect, maps are an important instruments for state building. According to Anderson (1991), maps are of the three institutions of power along with census and museum.

In spite of their importance, the use of maps as a representation of the state and territory is a relatively recent phenomena in European history since Medieval Christendom was essentially a mapless world (Harvey, 1980). Medieval Europe was in fact a society that knew little of maps. In the middle ages, the normal way of delineating and recording geographical relationships was in written descriptions.

As absolute states began to develop in Western Europe during the Late Middle Ages and were consolidated during the Renaissance, maps became an important instrument for developing state power. Maps were used for military purposes and colonial expansion, for implementing public works, for strengthening national consciousness, and other civil uses.

With the development of science and geographic discovery, maps became increasingly scientific. The development of scientific maps provides an accurate representation of territory and corresponds with the modernization of state power. In this respect, cartography is closely related to the formation of the state. France is a particularly good example of a state where absolutism was triumphant, and cartography developed rapidly from the advent of the absolute state.

This study investigates the relationship between the formation of France and the development of cartography from the sixteenth century to the eighteenth century.

This research is structured as follows. In section 2, this article reviews the history of military maps as a mean for defending and expanding territory. This is followed, in section 3, by a review of overseas maps to assist with colonial expansion. Cartography has a long tradition in imperialist power. This perception led Harley (1988) to focus on the morality of maps and the ethics of cartography (Black, 2002). However, the theoretical stance of Harley on the relationship between knowledge and power is beyond the limits of this research. The article simply describe the historical development of French overseas maps. Section 4 concerns the maps of France as a mean for territory control. In particular, the article argues that the Cassini map played an important role in reshaping the state. In section 5, the article explores the development of atlases as a means for influencing national consciousness. Finally, in section 6, the article discusses the relationship of the development of cartography and the state in France, and some conclusions are drawn.

2. Military Maps for Defending and Expanding Territory

The development of the military mapping dates to the Romans. The advance of the Roman armies and the installation of their camps and the elaboration of the plans of battle assume a knowledge of cartography. In France a map was commissioned by the government of Charles Ⅷ (ruled 1483-98). He was interested in maps for developing military strategies. He asked Jacques Signot to explore the Alpine passes through which to invade Italy, and Jacques Signot himself accompanied Charles Ⅷ to Naples in 1494-5

(Coolidge, 1915).

Through this Italian campaign, French military engineers had been influenced by the way the Italians were already using maps for military purposes.

At that time, cities were threatened by artillery, which the ancients had not possessed. Consequently, fortifying a city to protect it from an enemy's artillery became a great military issue, and the need for large scale maps was keenly felt by military architects. Large scale maps were commissioned by the king to construct artillery-resistant cities. For example Francois I (ruled 1515-47) gave commission to Girolamo Bellarmato to fortify Le Havre in 1541.

During the reign of Henri Ⅳ (ruled 1589-1610), military mapping was largely advanced by the work of two branches of the army: the corps of royal engineers and the services of the lodging-masters. Royal engineers were responsible for the fortification of the frontier provinces and had some cartographers under their command. The services of the lodging-masters generated maps to inform lodging-officers of the number of hearths in the villages along a given line of march (Buissert, 1992).

In 1607, Jean de Beins became the Royal geographer and a great builder of fortifications in the former province Dauphiné. He travelled through all the valleys of the Dauphiné compiling information for Henri Ⅳ, preparing a special map of each, and making drawings of the towns of military importance: Grenoble, Valence, and Romans. These maps were drawn to a large scale and which made it possible for him to compile more general maps later (La Roncière, 1969).

The most famous French fortifications engineer is Sébastien Le Prestre de Vauban. He supervised the reconstruction of about 160 fortresses (Pollack, 1991). His plans served as a guide for the design of fortifications to be constructed or improved or as an aid to their administration, inspection and maintenance (fig. 1). He advised Louis XIV on how to consolidate France's borders, to make them more defensible, and earned the rank of marshal.

Another important function of military map was to protect the ports and coasts. *La coste maritime de Prouvence* (Maritime coast of Provence) was a map published at 1:120,000 scale by Jacques Maretz in 1633, and it was dedicated to Cardinal Richelieu. The survey for the coasts was done precisely; it differentiated the rocky coasts and the low coasts and corrects the degrees of longitude of previous maps. It also provided an accurate recreation of the coastal fringe, but the accuracy worsened as they move away from the coast.

Henry de Séguiran performed a detailed examination of the French coasts on order of Cardinal Richelieu[1] in 1633. The military maps of this period were reprinted in Christophe Tassin's *Carte de toutes les costes de France* (1634). Since the rule of Louis XIV (1643-1715), the accuracy of military cartography has made considerable progress. Plans at 1:600 scale for certain points were realized by the army.[2]

3. Overseas Maps as an Aid for Colonial Expansion

In 1533, after François I had managed to convince Pope Clement Ⅱ to amend the 1494 Treaty of Tordesillas,[3] the French were once again permitted to explore the New World. The amendment granted ownership of newly

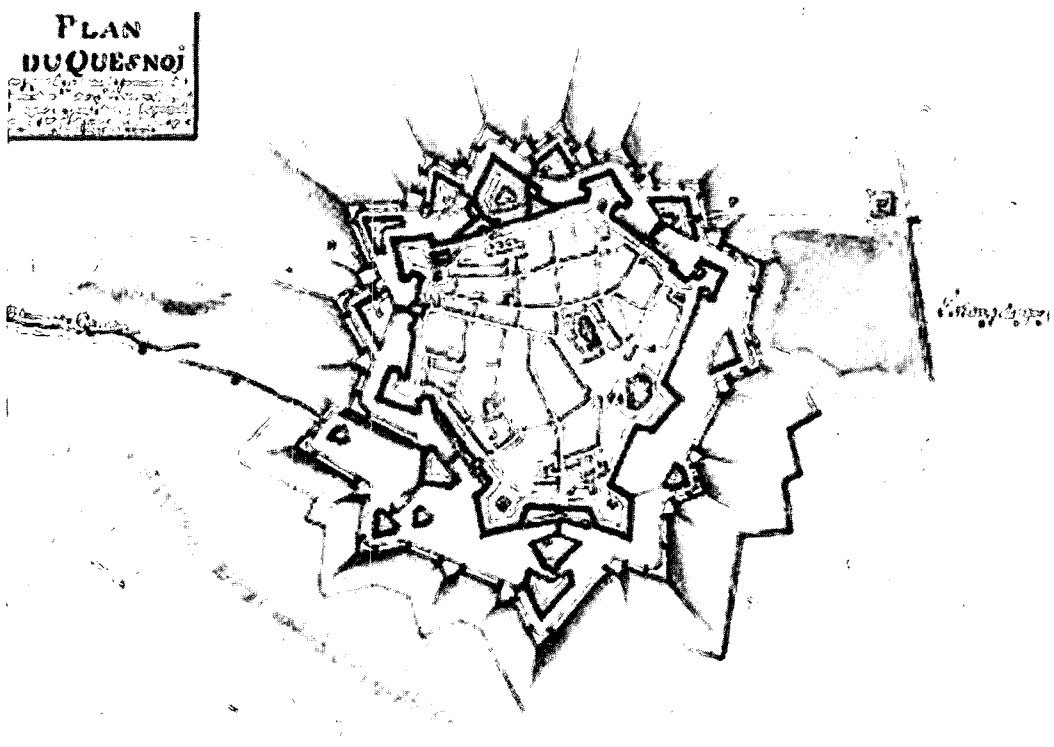

Figure 1. Fortification plan of Quesnoy by Vaubin

Source: http://www.villesfortifiees.org/fr/villes-fortifiees/le-quesnoy/les-fortifications-de-vauban/

discovered land to whichever nation reached and claimed it first (Wigal, 2000).

François I and Henri II (ruled 1574-89) were well aware of the use of maps by overseas expeditions and they promoted chart making. In 1534, Jacques Cartier set out on the first of his three voyages. He discovered and named the Bay of St. Lawrence.

In the middle of the sixteenth-century French chart making was concentrated in Normandy and particularly in Dieppe. Jacques Cartier's information stimulated the Dieppe school. Nicholas Deslien's world map of 1541 was among the earliest productions of the Dieppe school.

In 1546 Pierre Desceliers of the Dieppe school published a map of Newfoundland. This map is very decorative with numerous illustrations indicating the fishing and the hunting of whales and other animals. Guillaume Le Testu was also a member of the cartographic school of Dieppe. He made *Cosmographie Universelle* based on a collection of charts from French, Spanish, and Portuguese sources in 1555. His familiarity with the world of maritime fisheries is also manifest in his work. In 1566, he drew a world map using the Bonne projection.

In 1554, Royal Geographer Nicolas de Nicolai drew a map of the Atlantic Ocean. This map is one of the earliest maps of the American east coastline and accurately displays a number of the earliest discoveries. This map shows knowledge of Jacques Cartier's voyages up the St. Lawrence and many more islands in the Gulf.

Still after death of Henri Ⅱ, his widow Catherine de Medici guaranteed sustained support for expansionist adventures in the New World and encouraged mapping in France. Henri Ⅳ also supported overseas expansion and encouraged marine cartography. From 1603, Samuel de Champlain explored Canada and mapped much of northeastern North America. His maps played an important role in establishing and administering the French colonies in the New World. For example, his map of the east coast of America between Nova Scotia and Boston gave a detailed image of about 700km of coastline. This map marks a total break from the tradition of the Dieppe school maps, which had been strongly influenced by the Middle Ages and included both the portolan chart style and decorative borders (Buissert, 2002). Henri Ⅳ also supported the cartographic works of Pierre de Vaulx and Jacques de Vaulx in mapping America and Atlantic Ocean with the ambition of Colonization.

Jean Guérard was a pilot and hydrographer at Dieppe. He travelled from Dieppe to Brazil in 1634, he drew a world map, *Carte Universelle Hydrographique*, which Richelieu used as a tool for planning colonial expansion. This map shows French settlements and English ventures, but the coasts of the Pacific Oceans remain largely unknown.

The most important cartographer of this period was Nicolas Sanson. He published *Amérique Septentrionale* in 1650. *Amérique Septentrionale* was considered one of the most important maps of North America during the seventeenth century. For this map, Sanson relied primarily on reports from missionaries and explorers to gather the information. All five Great Lakes are depicted, and lakes Ontario and Superior are named for the first time.

Figure 2. Florida and New Mexico on the Map published by Guillaume Delisle in 1703

Source: http://www.sochistdisc.org/2002_ articles/pelletier/pelletier05.JPG

Overseas exploration 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.

Expeditions to the Cayenne and Canary Islands and to South America were organized by the *Académie Royale des Sciences* (hereafter the Academy) to collect information on astronomically determined positions. The distinctive characteristic of these new exploratory enterprises was the link between imperialistic and scientific aims (Escolar, 1997).

In 1700, a world map which referenced to tales

of ancient voyages such as that of the Spanish Panfilo de Narvaez or to the more recent explorations of Cavelier de La Salle was published by Guillaume Delisle (fig. 2). Delisle's work, *Carte de la Louisiana et du cours du Mississippi* (1718), became the precursor to all succeeding maps of the Mississippi because of its accurate depiction of the lower Mississippi River and the surrounding areas. Delisle's map of the Louisiana territory generated a boundary dispute that lasted for at least 15 years. The map extended the areas under French control, in direct opposition to English claims, by pushing the British colonial border further east than the Appalachian frontier (Petto, 2005). Delisle's map of the Louisiana territory and many of his other maps bear no cartouche and no dedication.

It is in 1761 that Jean-Baptiste Bourguignon d'Anville published a map of the world using two hemispheres with which he could use twice the number of astronomic positions that Delisle had. D'Anville greatly improved the standards of map-making. Since 1746, he undertook the construction of the map of continents: North America, Meridian America, Africa, Asia in three parts, and Europe in three parts.

Besides these maps, there are innumerable maps used in colonization. These maps were constructed for their own purposes. For example, maps of Martitique and Guadeloupe after the Seven Years War (1756-63) recorded the sugar and coffee plantation system and provided information in the event of future hostilities with Britain (Black, 2002).

In short, overseas maps were published in conjunction with the expansion of France's empire in the New World and other regions. Map making was therefore consonant with the projection of state power.

4. Mapping National Territory for Territory Control

National maps were rare in medieval Europe. Loyalties were more local and regional than national (Short, 2003). Under the feudal system of rule, boundaries overlapped and multiple authorities existed within any particular region. The representation of the state was done in a literary mode, through journeys and lists of places instead of a map. For example, Gilles le Bouvier, herald of Charles VII (ruled 1422-1461), defined French territory as follows (Revel, 1989):

> "The kingdom has a long twelve days of travel from l'Escluse de Flandre to Saint Jehan de Pié de Port which is in the entrance of kingdom of Navarre, and it has a sixteen days of travel from Saint-Mahieu of Britany to Lyon on the Rosne."

In the sixteenth century, the functions and exactions of the modern state developed and sovereignty began to take shape and form (Pounds, 1951). France had undertaken a steady and consistent expansion to reach the Atlantic, Rhine, Alps, and Pyrenees. This idea of "the limits that Nature has traced" had been a guiding principle of foreign policy and central term in the definition of French unity (Sahlins, 1990).

François I and Henri Ⅱ wanted a complete representation of the kingdom on a map. In 1525, Oronce Finé who lectured in mathematics at the Royal College (the present Collège de France) which Francois I had founded published a woodcut map of France, *Nova totius Galliae Descriptio* (1525) in four sheets at 1:1,700,000 scale, indicating that the Rhine formed the frontier of France (Pounds, 1951).

This map is the first map of France published in France, and was reprinted in five editions between 1525 and 1557. Certain traits link this map to the remaining maps of the Geography of Ptolemy, but he distinctively ameliorated the outlines. However, the shores of the Mediterranean and Atlantic Oceans were badly drawn, and the information concerning several provinces was erroneous.

In 1560, Jean Jolivet completed a map of the whole of France entitled "*Nouvelle Description des Gaules*" at 1:2,300,000 scale (fig. 3). He improved Finé's map. Rivers and mountains were more accurately placed. Jolivet's map served directly or indirectly as a model for several maps of France (Dainville, 1964).

In 1560, Catherine de Medicis commissioned Nicolas do Nicolai to carry out a general cartographic survey of the provinces of the 1kingdom. However, the religious and political disturbances did not allow the national map to be completed. He merely completed a map of Berry and a map of Bourbonnais.

Henri Ⅳ, at the beginning of the seventeenth century, had sought to extend the French Kingdom to the shores of the Rhine and in the south to the Alps. François de La Guillotière's *Charte de la France* was published in 1613. In this map there were more than 30,000 toponyms. He corrected the coast line of Brittany.

Maps of France were often called maps of Gaul. These maps embraced not only large parts of Italy but also of Germany and Holland. In 1627, Richelieu commissioned Nicolas Sanson to draw up a map of Gaul that portrayed the extension of ancient Gaul to the Rhine river.

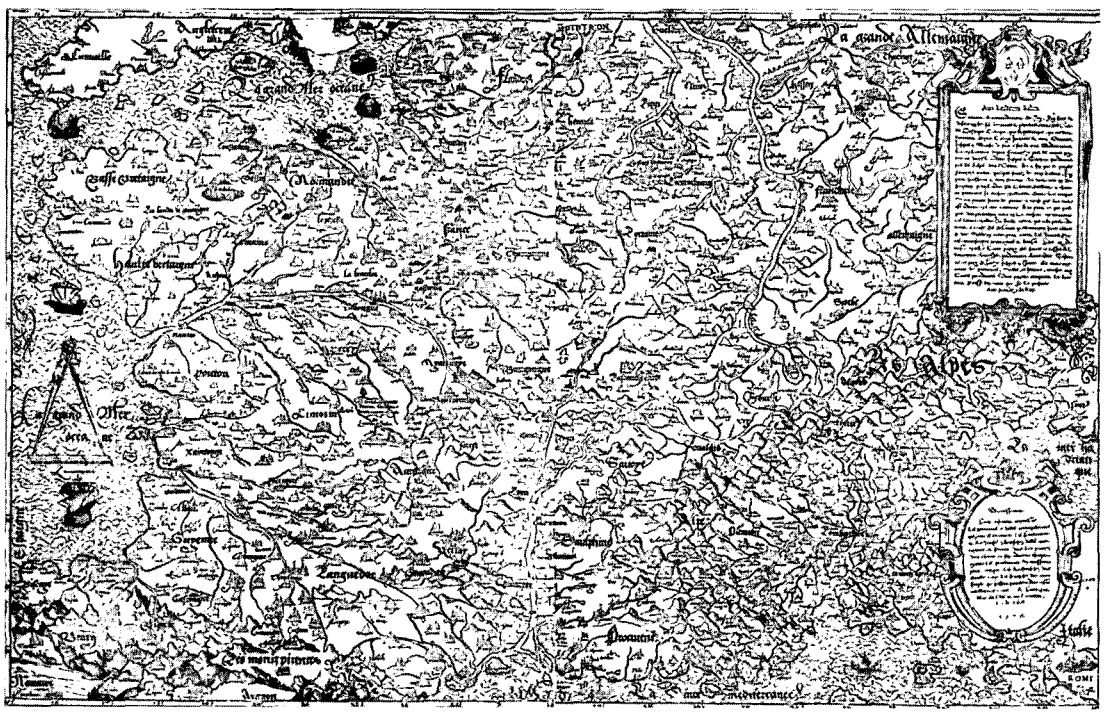

Figure 3. Jean Jolivet's "*Nouvelle(Vraie) Description des Gaules*"

Source: Dainville, 1964.

Many such maps were produced in the 1630s, and they were matched by the description that equated France and Gaul -in contrast to middle ages, when Gaul and Francia remained distinct ideas (Sahlins. 1990).

Histories of cartography generally consider the reign of Louis XIV to mark the beginning of scientific cartography. The traditional maps proved to be less than adequate for the need of the state in the seventeenth century. Colbert, general controller of Louis XIV, realized that existing cartographic methods were inadequate for the reforms he was undertaking: naval reform and economic reforms. Existing maps were compiled with differing levels of precision and they did not cover all the provinces. Consequently, to accurately assess the kingdom's income and resources, accurate large scale maps were needed.

Even if Sanson's mapping techniques were advanced in comparison with other European countries, his maps were drawn at too small a scale to be useful in executing public policy, such as canal and road construction. To make a highly accurate map, geodetic triangulation and calculations of longitude were needed.

This began after Jean-Dominique Cassini accepted an invitation to the Academy. This scientific society was found in 1666 by Colbert and concerned itself with a wide variety of scientific problems, including mapping and charting.

Cassini's arrival in France in 1669 initiated the topographic survey of that country. Longitude was calculated with considerable accuracy by using Cassini's method of observation of the ellipses of Jupiter's satellites, and chains of triangles covering an entire kingdom were laid out. Cartography and science began to fully integrate.

The Academy attempted to make a detailed and accurate map of France with uniform standards. The first step was to measure the arc of the meridian of Paris to ascertain the length of a degree of latitude. By extending this meridian, triangulation became the basis of topographic maps of an entire country that were more accurate than had ever been produced before.

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 coordinates of measured points throughout French territory was carried out successively by four generations of the Cassini family over a period of more than 100 years ending with the Revolution. The Cassini map - 180 sheets at 1:86,400 scale was eventually completed in 1793 (fig. 4). At that point, the relationship between science and policy began to assume a form characteristic of the modern state and of modern science (Gillispie, 1980).

Triangulation allowed the state to undertake many useful programs dedicated to improving trade by constructing roads and canals that could facilitate the regular supply and transport of goods. Triangulation unified the entire country in a web of triangles stretching from hilltop to hilltop (Biggs, 1999). It divided France on the basis of an arbitrary grid disregarding traditional jurisdictions. The Cassini map represented the conquest of space through measurement.

In 1793, the ownership of the Cassini map was transferred to the army. This expropriation is explained by the growing interest of the state in map-making and collecting maps of cartographers from various bureaucratic units(Konvitz, 1987).

The surveying and instrumental representation

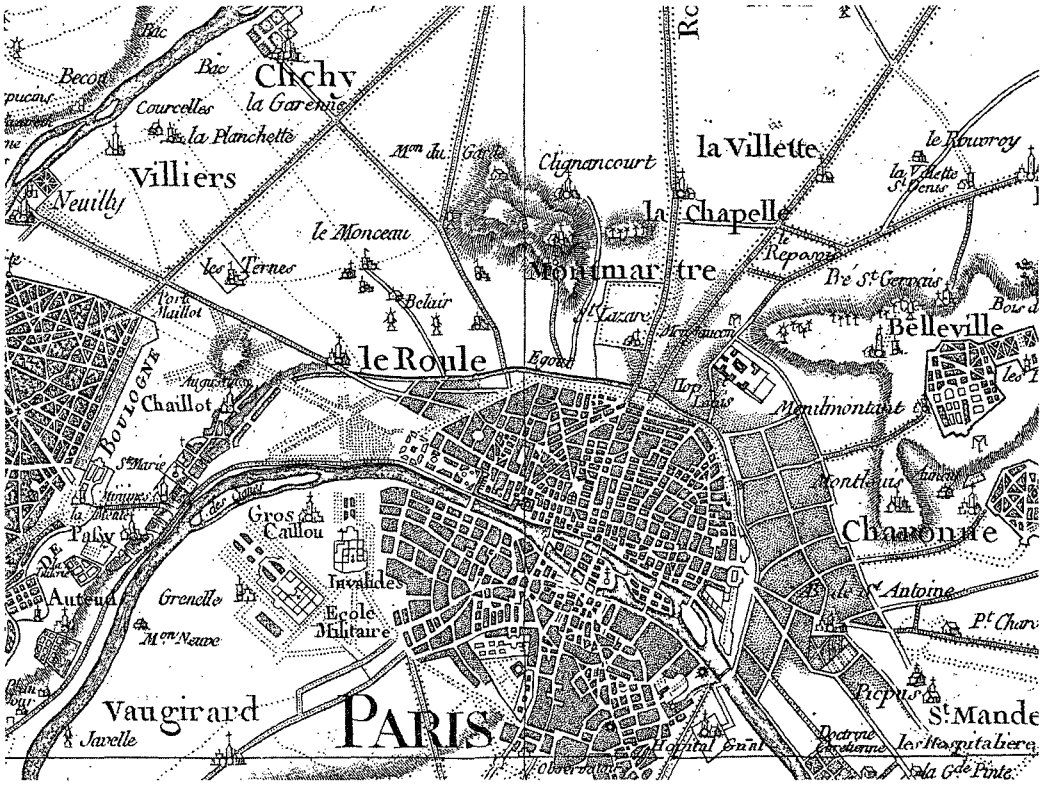

Figure 4. Section of the Cassini map

Source: Digital version of Carte géométrique de la France owned by the author.

of the territory of the state associated with administrative and scientific cartography in the seventeenth and eighteenth centuries made possible the reform of administrative division system.

The geometrical mind fostered by triangulation inspired Robert de Hesseln to publish *La Nouvelle topographie de la France* in 1780, which was a new map of France based on a uniform grid. He proposed that France be divided into nine regions each in the shape of a square; each region would in turn be divided into nine subunits, each of which would be further subdivided into nine small squares. He represented his idea on a version of the Cassinis' summary map of their national survey (Konvitz, 1990; Jung, 2006).

With revolution, the homogeneous space of the map became the basis of political authority. The Revolution replaced jurisdictional-territorial criteria when radically redrawing frontiers within and outside France. For a society that created a new calendar and a new unit of measurement,[9] such a spatial reinterpretation was not a surprising event (Black, 1997).

In 1789 after the Revolution, Abbe Sieyès tried to unify France by dividing French territory into regular, rectangular administrative divisions according to Hessel's proposal. He traced an ideal map of squares on the Cassini map. The ideal squares became irregular forms as they were modified by historical and geographical

circumstances (Margadant, 1992).

The divisions, however, adopted in 1790 relied more practically on the far more irregular ancient provincial boundaries because it seemed hazardous to change the structure of local life and habitual spatial patterns so drastically. However the administrative reorganization dismantled the peculiarities upon which the French monarchy had been based and reshaped the state (Escolar, 1997).

5. Atlas as a tool for National Consciousness

An atlas is a collection of maps, traditionally bound into book form. It represents diverse geographic features such as political boundaries, social and economic statistics, and so on. What is important in creating an atlas is to make sense of maps through the logic of the book. Most atlases illustrate and argue geographical ideas. French atlases from the sixteenth century to the eighteenth century have some characteristics of political order. They were concerned with the image of the state and gave form to political territoriality.

The Théâtre François which is the first French national Atlas was produced in 1594 by Maurice Bouguereau. This atlas was a symbol of national unity under the leadership of Henri Ⅳ. This atlas gathered maps of different parts of the country made in earlier years and maps already produced by Ortelius and Mercator in their own atlases. This atlas became the model of the French national atlas. One can see in the following national atlases the progress of the French nation through the strengthening of its borders and the progress of administrative structure.

Jean Leclerc added new plates to Bouguereau's atlas, and re-titled the work *Théâtre géographique du Royaume de France* in 1631. The identification of France with the whole world had been made on the title page of this atlas (Pelletier, 1998).

Atlases made by military engineers carried preoccupation of the government to the public thanks to their widespread dispersal: for example, the defence of the coasts in the atlas of Tassin. These atlases gave an account of military events, and were used as propaganda, such as displaying the battlefield plans and the results of peace treaties.

Pierre Duval published *Les acquisitions de la France par la paix* (The acquisitions of France by peace) three times, in 1660, 1669, and 1679, after the treaties of the Pyrenees, Aix-la-Chapelle, and Nijmegen.

Atlases were also the instruments of administrative reorganization by instilling the division of the country in the public's mind, in government bureaucracies, in parliaments, and in other public entities (Pastoureau, 1980). Ancient maps were included as well as those of the modern kingdom in the atlases. There was a strong interest in mapping the past, partly because this was of direct relevance to Bourbon attempts to use historical claims to justify French expansionism, and partly because of a long-term interest in French history that reflected an increase in national consciousness among the elite (Black, 1997). Nicolas Sanson's *Cartes generales de toutes les parties du monde* was published in 1654, and his other atlas *Géographie universelle*, was dedicated to the son of Louis XIV in 1655.

The first French atlas to use the word "atlas" in its title was Alexis-Hubert Jaillot's *Atlas Nouveau*

published in 1681 as a tribute to the glorious arms of France. His second atlas, *Atlas francais*, was published in 1695. This map continued to champion the dominance of the state of Louis XIV. Jaillot intended the French to dominate over other European countries in the presentation of cartographic knowledge.

But from the eighteenth century, atlases were less concerned with the "cult of image" and more scientifically directed. Because of the gradual desacralization of the crown and the rise of the impersonal state, the Bourbons were looking for a new source of legitimacy, and the crown came to root its power in internal territorial state and its external acquisitions (Petto, 2005).

The accuracy of the atlas was strongly improved by application of triangulation and accurate longitudinal values. The first example of this improved atlas is the atlas by Nicolas de Fer. His masterpiece has a very long title "*Atlas curieux ou le monde represente dans les cartes...*" and was published in six volumes between 1700 and 1705. This atlas was based on the new measurement data of the Academy.

Guillaume Delisle who was both a geographer and an astronomer focused on the scientific method of cartography rather than commerce. He did not set out to create an atlas with a specific agenda or objective in mind (Pedley, 1993). With Delisle, Philippe Buache, and Jean Baptiste Bourguignon d'Anville, France's cartographic interests shifted from the commercial to the intellectual. Delisle published *Atlas Nouveau* in 1738, and D'Anville published *Atlas General* in 1780.

Gilles and Didier Robert de Vaugondy's Atlas Universal (1757) was one of the most important eighteenth century atlases and one of the greatest achievements of the French Enlightenment. Vaugondy employed strict standards for including maps in this atlas and in many cases subjected them to astronomically derived readings for latitude and longitude (fig. 5). Their atlases were impersonal and they increasingly served this impersonal state, but sovereignty was not omitted.

Over the course of the sixteenth, seventeenth, and eighteenth centuries, atlases became increasingly sensitive to political territory (Ackerman, 1995), and they played an important role in building the state by creating a national consciousness and vision.

6. Discussion and Conclusions

This research investigated the role that cartography played in the development of the French state. In the medieval period, boundaries were poorly defined and territorial divisions were not clearly represented on maps. Sovereignty was divided and jurisdiction was overlapped over frontier zones.

Since the sixteenth century, cartography developed in France as a means for government. Map making in this period was limited to assembling local knowledge. However, cities could be fortified more effectively with detailed and accurate maps. With the influence of Italian cartographers, map-making developed rapidly. Cartographers and engineers occupied themselves with the design of military architecture and the depiction of battles and sieges. Cartography was thus indispensible as a means for the accretion of power.

The development of cartographic techniques of this period made possible the surveying and instrumental representation of the territory of the

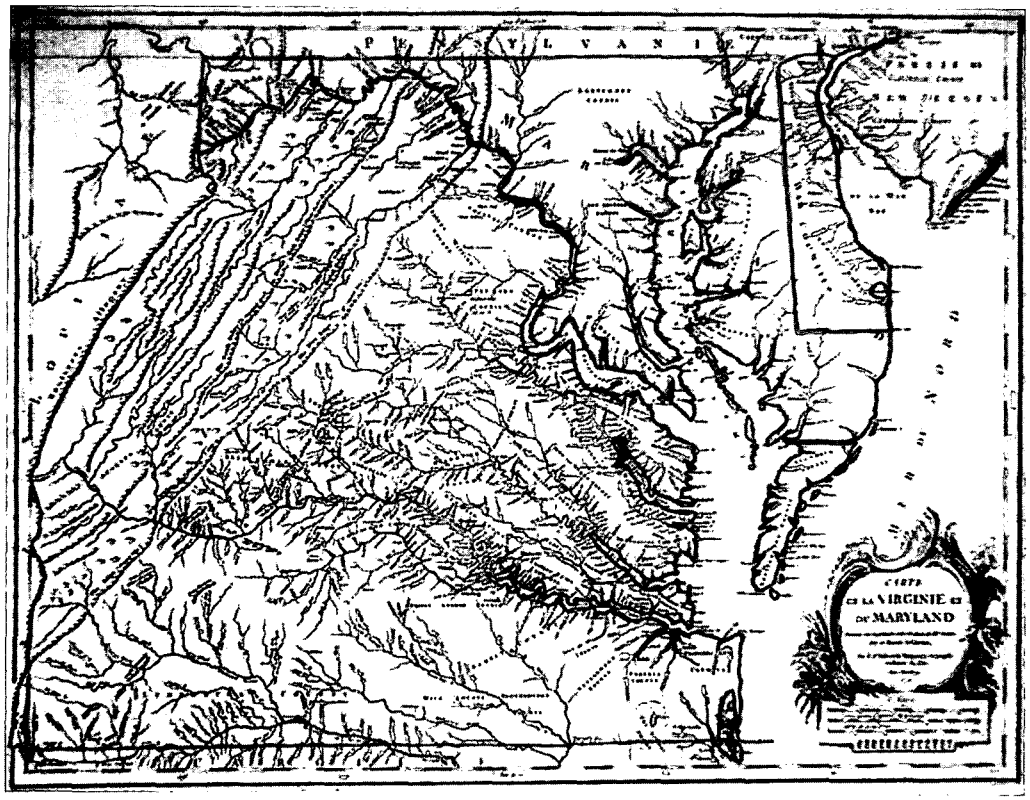

Figure 5. Map of Virginia and Maryland from Vaugondy's *Atlas Universal*

Source: http://www.marshall.edu/library/speccoll/virtual_museum/weaver/map9.asp

state in the seventeenth and eighteenth centuries.

From François I's reign, overseas exploration promoted scientific activity, which in turn led to the acceleration of colonial expansion. Overseas mapping was developed by commissions from the state.

Triangulation and the Cassini map served to consolidate the modern French territorial state. The triangulation methods developed by the Academy contributed the accuracy of the measurements of the country. The nobles did not refuse to cooperate in the surveys of their private lands any longer. The Cassini map undermined the dynastic principle by objectifying political authority, implying that it was located in an impersonal state and not descended from a royal lineage (Biggs, 1999).

The role of the Academy in the development of French cartography is undeniable. The Academy, admired and imitated throughout Europe as a model scientific institution in the service of an absolute state not only developed mapping methods but also cultivated the scientific mind. Scientific cartography began to separate from map making as a "cult of image." Mapping was used to solve practical problems relevant to such questions as building canals and assessing forest resources.

The Cassini map also served to reshape the state by restructuring administrative divisions. Well defined boundary lines made the territory more rational. Scientific cartography came to

serve the personal state of the monarchs less and the territorial state more.

One important factor in the development of scientific cartography is the standardization of cartographic education. Louis XV (ruled 1715-1774) had found two scientific colleges - the Ecole des Ponts et Chaussées in 1747 and the Ecole du Génie de Mézières in 1748 (Picon, 2004). Technical innovations were conducted by the education provided by these institutions.

Thanks to the scientific method, French map making had begun to receive international acclaim by the middle of the seventeenth century. In the seventeenth and eighteenth centuries, Nicolas Sanson, Guillaume Delisle, and other cartographers took a new approach to map making with the practice of scientific mapping. They published maps and atlases of magnificent quality, but their maps did not serve the image of the monarch but that of the state. They placed emphasis on national identity and territoriality.

Because of the progress of map making methods, accurate and detailed maps were made. These maps performed a greater role in consolidating territorial sovereignty by establishing the limits between states. The implementation of firm frontiers was bound up with the existence of more assertive states and growing state bureaucracies, which sought to know where exactly they could impose their demands for resources and where they needed to create their first line of defense (Black, 1997).

These maps also made possible the political and economic reform of the state. Precise information about land apportionment made taxes fairer. In the time of Louis XIV, participation in the representative assemblies was open to property owners in proportion to their property. The allocation of taxes was carried out with the allocation of votes. The details of tax assessment thus had to be accurate (Baker, 1990).

After the Revolution, the creation of the state was strengthened by the political and economic reform policy. Maps were fundamental instruments for planning and implementing these reform policies. Cadastral maps with greater accuracy were crucial in judicial disputes. Such mapping was seen as a necessary complement to land registers and thus as the basis of financial reform.

Maps also performed a leading role in defining the boundaries between states. For instance, detailed maps were used to set the limits between France and Savoy in 1760 (Nora, 1986). Increased precision in the mapping of frontiers was as important as the related consolidation of territorial sovereignty because the implementation of firm frontiers was bound up with the existence of more assertive state.

To map a state is to assert its territorial expression. The state building was strengthened by the progress made in mapping territory. National mapping surveys and national atlas projects still exist and contribute to the state. Nowadays national geographic information systems are another form of state mapping. Even if we now live in a world where sovereignty and states are less important than before, states are always at the center of politics and current affairs. Likewise, the role of maps in the building and functioning of state is still crucial.

Notes

1) Cardinal Richelieu (1585-1642) belonged to a generation that had largely been schooled by the Jesuit, whose academic syllabus laid heavy emphasis

on cartographic knowledge (Dainville, 1978). So he was well aware of the value of maps for colonial and missionary purposes.

2) The most significant impulse for the development of the French military cartography came from Napoleon. Very early on he understood the importance of knowing the ground well to prepare these battles. He needed a precise map for his military campaign and he appointed Bacler d'Albe as geography officier, and then as general. Albi drew a number of battle plans. His principal masterpiece is the 'Carte de l'Empereur' (the Map of the Emperor) - a collection of maps of Europe at 1:100.000 scale in 420 sheets published between 1809 and 1812. These maps were drawn on the battlefield and the mapmakers were exposed to the dangers of war. The quality of these maps are excellent; maps from different countries were redrawn to maintain homogeneity; hachure and hill-shading were used to represent the terrain.

3) Just months after Christopher Columbus returned to Europe from his maiden voyage to the New World, the Pope Alexander VI decreed that all lands discovered west of a meridian 100 leagues (one league is 4.8 km) west of the Cape Verde Islands should belong to Spain while new lands discovered east of that line would belong to Portugal. However, in 1494, Spain and Portugal met at Tordesillas and signed a treaty moved the line to 370 leagues west of Cape Verde.

4) The revolution brought two significant elements which had with the will of standardization. In 1791 Delambre and Mechain defined the meter (1 meter = 0,51307 toises) and level 0 for altitudes. It was in 1802 that they were adopted.

References

Akerman, J. R., 1995, The Structuring of Political Territory in Early Printed Atlases, *Imago Mundi*, 47, 138-154.

Apostolides, J. M., 1981, *Le roi-machine*, Les Edition de Mimuit. Paris.

Baker, K. M., 1990, *Inventing the French revolution*, Cambridge University Press, Cambridge.

Biggs, M., 1999, Putting the state on the map: Cartography, territory, and european state formation, *Comparative studies in society and history*, 41, 374-405.

Black, J., 1997, *Maps and history*, Yale University Press, London.

Black, J., 2002, *Maps and politics*, University of Chicago Press, Chicago.

Broc, N., 1974, *La géographie des philosophes*, Ophrys, Paris.

Brown, L. A., 1977, *The story of maps*, Dover, New York,

Buissert, D., 1987, Monarchs, Monisters, and Maps in France before the Assession of Louis X IV, in Buissert, D. (*eds.*), *Monarchs, Monisters, and Maps : The Emergence of Cartography as a tool of Government in Early Modern Europe*, University of Chicago Press, Chicago.

Buissert, D., 2002, *The mapmakers'* quest, Oxford University Press, Oxford.

Coolidge, W. A. B., 1915, The Passages of the Alps in 1518, *English Historical Review*, 30(120), 681-691.

Collins, J. B., 1995, *The state in early modern France*, Cambridge University Press, Cambridge.

Dainville, F., 1964, Jean Jolivet's "Description des Gaules", *Imago Mundi*, 18, 45-52.

Dainville, F., 1977, *L'éducation des jéuites(16-18 siecles)*, Les Edition de Minuit, Paris.

Davis-Allen, L. and Reinhartz, D., 1990, A Sanson-Jaillot Copperplate of 1674 of the Eastern Half of South America for the "Atlas Nouveau:" What Might Have Been, *Imago Mundi*, 42, 94-98.

Edney, M. H., 1999, Reconsidering Enlightenment Geography and Map Making: Reconnaissance, Mapping, Archive, in Livingstone D. N. and Withers, C. W. J.(*eds.*), *Geography and Enlightenment*, University of Chicago Press, Chicago.

Escolar, M., 1997, Exploration, Cartography and the Modernization of State Power, Exploration, cartography and the modernization of state power, *International Social Science Journal*, 49(1), 55-75.

Gillispie, C. C., 1980, *Science and policy in france: the end of the old regime*, Princeton University Press.

Harley, J. B., 1988, Maps, knowledge, and power, in Cosgrove D. and Daniels, S.(*eds.*), *The Iconography of Landscape*, Cambridge University Press, Cambridge.

Harvey, P. D. A., 1980, *The History of Topographical Maps*, Thames and Hudson, London.

Jung, I. C., 2006, Cartographic Characteristics of the 'Carte de Cassini' and its place in the Development of Cartography, *Journal of the Korean Geographical Society*, 41(4), 375-390. (in Korean)

Kish, G., 1976, Early Thematic Mapping: The Work of Philippe Buache, *Imago Mundi*, 28, 129-136.

Konvitz, J., 1987, *Cartography in France 1660-1848*, University of Chicago Press, Chicago.

Konvitz, J., 1990, The nation-state, Paris and cartography in eighteenth- and nineteenth-century France, *Journal of Historical Geography*, 16(1), 3-16.

La Ronciere, M., 1969, Review on Dauphine et ses confins vus par l'Ingenieur d'enri IV Jean de Beins by F. de Dainville. *Imago Mundi*, 23, 113.

Margadant, T. W., 1992, *Urban rivalries in the french revolution*, Princeton University Press.

Neocleous, M., 2003, Off the Map: On Violence and Cartography. *European Journal of Social Theory*, 6(4), 409-425.

Nora, P., 1986, *Les lieux de memoire: La nation*, Gallimard, Paris.

Pastoureau, M., 1980, Les Atlas imprimés en France avant 1700, *Imago Mundi*, 32, 45-72.

Pedley, M. S., 1993. 'Commode, complet, uniforme,et suivie': problems in atlas editing in enlightment France, in Winearls, J. (*ed.*), *Editing Early and Historical Atlases*, University of Toronto press, Toronto.

Pelletier, M., 1998, Cartography and power in France during the seventeenth and eighteenth centuries, *Cartographica*, 35(3-4), 41-53.

Pelletier, M., 2002, *Les cartes des Cassini*, CTHS, Paris.

Petto, C. M., 2005, From L'tat, C'est Moi to L'Etat, C'est L'Etat: Mapping in Early Modern France, *Cartographica*, 40(3), 53-78.

Picon, A., 2004, *Architectes et ingénieurs au Siécle des lumiéres*, Parentheses, Paris.

Pollack, M. D., 1991, *Military Architecture, Cartography and the Representation of the Early Modern European Cities*, The Newberry Library, Chicago.

Pounds, N. J. G., 1951, The origin of the idea of natural frontiers in France, *Annals of the Association of American Geographers*, 41(2), 146-157.

Revel, J., 1989, Conaissance du territoire, Production du territoire, in Burguiére, A. and Revel, J.(*eds.*), *Histoire de la France : L'espace francais*, Seuil, Paris.

Sahlins, P., 1988, The Nation in the Village: State-Building and Communal Struggles in the Catalan Borderland during the Eighteenth and Nineteenth Centuries, *Journal of Modern History*, 60(2), 234-263.

Sahlins, P., 1989, *Boundaries The making of France and Spain in the Pyrenees*, University of California Press, Berkley.

Sahlins, P., 1990, Natural Frontiers Revisited: France's Boundaries since the Seventeenth Century, *The American Historical Review*, 95(5), 1423-1451.

Short, J. R., 2003, *The World through Maps: A History of Cartography*, Firefly Books, Peruana,

Thrower, N. J. W., 1999, *Maps & Civilization*, University of Chicago Press, Chicago.

Tooley, R. V., 1978, *Maps and map-makers*, Crown Publishers, New York.

Turnbull, D., 1996, Cartography and science in early modern Europe: mapping the construction of knowledge spaces, *Imago Mundi*, 48, 5-24.

Verin, H., 1993, *La gloire des ingénieurs*, Albin Michel,

Paris.

Wigal, D., 2000, *Historic maritime maps*, Parkstone press, New York.

Wilford, J. N., 1981, *The Mapmakers*, Vintage Books, New York.

http://www.villesfortifiees.org/fr/villes-fortifiees/le-quesnoy/les-fortifications-de-vauban/

http://alabamamaps.ua.edu/historicalmaps/westhem/index2.html

http://www.marshall.edu/library/speccoll/virtual_museum/weaver/map9.asp

Correspondence : In-Chul Jung, Dept. of Geography Education, College of Education, Pusan National University, Busan 609-735, Korea (e-mail : icjung @pusan.ac.kr, phone: 82-51-510-2667, fax : 82-51-582-8658)

교신 : 정인철, 부산광역시 금정구 장전동 부산대학교 사범대학 사회교육학부 지리교육전공(이메일: icjung@pusan.ac.kr. 전화: 051-510-2667, 팩스: 051-582-8658)

Received November 28, 2006
Accepted December 20, 2006