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THE CONSTITUTION OF ARTILLERY PARKS AND FORTIFICATIONS FOR DEFENDING CITIES DURING THE LATE MIDDLE AGES. THE DUKES OF LORRAINE IN NANCY: A CASE STUDY

INTRODUCTION

The interest French researchers have for gunpowder weapons was born in the middle of the 19th century (Gaier 1979, p. 11), especially since the work of would-be Napoleon III was published as *Etudes sur le passé et l'avenir de l'artillerie* in Paris, between 1846 and 1871 (Bonaparte, Favé 1846–1871). But few historians have highlighted the importance of studying artillery parks during the late Middle Ages in Lorraine. In studies made on this area, especially through the chronicles of the *Société d'archéologie Lorraine*, the works concern arsenals of the late 16th and early 17th centuries, which reflects the relative abundance of later sources. Rather than using the word “arsenal” (adapted to the modern period), I will use the term “artillery park.” The word “artillery” should be taken here in its medieval accepted meaning: various war materials, cannons and other gunpowder weapons but also any other projectile weapons and ammunitions.

In the second half of the 15th century, Nancy owes its importance only to the fact of being the capital of the Duchy of Lorraine: it becomes a place of residence and is where the court and the ducal administration are located. The reputation of cities such as Metz and Toul is great and Saint-Nicolas-de-Port and Pont-à-Mousson have a greater economic weight. Nancy only plays a political role. At the beginning of the modern period, it is an average city in size and demographics (Fig. 4). Its layout has the form of an irregular quadrilateral (Fig. 2). More or less twenty towers flank the surrounding wall. Town gates such

as Saint-Nicolas and La Craffe and posterns, probably less accessible, support the defensive system (Elter 1999, p. 7). The medieval ring of fortifications was modernised several times during the 15th century by advanced buildings and ditches¹ which complete the defensive system (Elter 1999, p. 7; Duvernoy 1898, p. 202–205; Des Robert 1882, p. 82–83). The artillery park appears at that time in the heart of the city and provides weapons to the duchy.

From 1473, the Duke of Lorraine René II is at the head of a small principality. The fortifications and the new artillery park explain the duke's decision to focus most of his artillery in the capital of the duchy when troops of Charles the Bold approached in 1475 (Fig. 5). But what were the military resources of the Duchy of Lorraine? Did he receive aid Louis XI had promised and those of opponents of the House of Burgundy? Indeed, the late Middle Ages is marked by the wars against Burgundy: for Charles the Bold, Duke of Burgundy, the duchy was a corridor to travel between his possessions in the north and south of Lorraine (Fig. 1) (Marti *et al.* 2008, p. 340). The campaign of winter 1476–1477 is the most difficult one and results in Charles the Bold's death at the famous Battle of Nancy, on 5 January 1477 (Figs. 3, 6, 7) (Pfister 1902–1909, pp. 385–525). It ends the conflict between Burgundy and the Confederates after 16 months of war and three sieges that severely

¹ Regional archives, Meurthe-et-Moselle, B 1013, *Receveur Général de Lorraine*, 1509–1510.



Fig. 1. The House of Valois-Burgundy during the reign of Charles the Bold (1465–1477), adapted from Marti et al. 2008, p. 25

hit the city. This event was a crucial step for the recapture of Lorraine by René II. The incorporation of the Duchy of Bar in 1484 enables to reorganise the tax system and enhance military capabilities (Contamine 2005b, p. 234). Under Charles VIII, the duchy receives financial aids from the monarchy that allow it to be equipped with gunpowder artillery and

permanent gunners (Delcambre, 1949, pp. 280–281, quoted in Contamine 2005b, p. 234).

The principal interest of this work is to show the evolution of this artillery park during a long time. The question is the correlation between political situations and an increase in the purchase and manufacture of weapons.

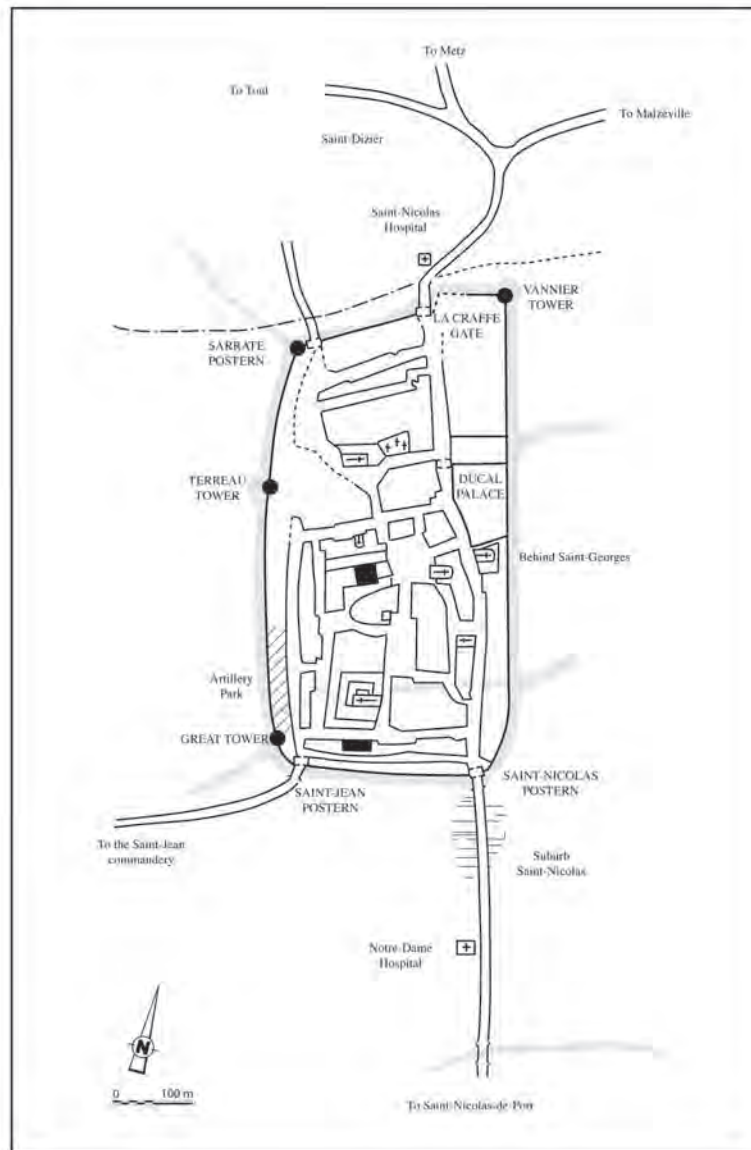


Fig. 2. Nancy at the beginning of the 15th century, adapted from Fray 1986, p. 92

SOURCES

As early as the end of the thirteenth century, the County of Bar seems to have possessed a *Chambre des Comptes* at least in an embryonic stage (Collin 1984, p. 76). The accounts of the Duchy of Lorraine come long later (Rivière 1999, pp. 151–157); indeed, the fact of centralising the administration appears only at the dawn of modern times and is a bit archaic (Collin 1984, p. 76). This study is based on archives of the ducal financial administration. For this transitional period, these kinds of sources are relatively impoverished and strewn in different types of accounts. The most valuable information from accounts are those of the *Receveur Général de Lorraine* and the *Trésorier Général des Finances* held in B Series of the Departmental Archives of Meurthe-et-Moselle.

These documents are, to a large extent, unpublished² but are less rich than those for the principality of Burgundy. This study will be completed by a study of *cellerier*'s accounts. These sources throw light on the war economy, weapons and ammunition requirements of the ducal house.

These documents help us to understand the internal organisation and the management of artillery, more than accurate data on the quality, size and calibre of each piece of artillery such as cannons. Secondly, they inform about foundry workers and craftsmen, in the artillery staff of the Dukes (artillerymen, cannons master, artillery master).

² Except some papers (Girardot 1983, pp. 67–76).

1. THE ARTILLERY PARK AND ITS INFRASTRUCTURE

Acquiring or manufacturing numerous weapons forced the dukes of Lorraine to take measures to ensure their maintenance and conservation. In Nancy, a spacious “public” building is the urban warehouse. In 1458 the Duke had a “barn for the artillery” built. A later text mentions it and is traditionally located near the “Big Tower” (Fray 1986, p. 255).³ Was this tower part of the park, as it frequently happens in the Middle Ages? Its construction and maintenance are undertaken by craftsmen from Nancy: builders, carpenters in particular to raise the walls and build the barn where gunpowder and saltpetre are stored, but also to manufacture carts and barrels (Fray 1986, p. 256).⁴

There will be regular work in the arsenal, which demonstrates how important the park gradually becomes at that time. More than buildings, which are never described, accounts provide information on the management and rationalisation of space. In particular, attics and shelves are mentioned for storing sulphur and saltpetre in 1463, but also strings of bows and crossbows and related ammunitions. In the same year, construction work is done on the main barn of the artillery park. These accounts also give indications on the location of this park, which historians know badly, in any case before the Regent

Christine of Denmark built a new arsenal, a pride of the ducal court in 1550 (Marot 1993, p. 256).⁵ A builder is responsible for rendering a barn’s wall in front of the ditch outside the tower of the artillery. In the same year crossbow bolts in the tower of the artillery are mentioned: is it one of the park’s towers between the Great Tower and the Terreau Tower? In 1487, there are new significant works in masonry and carpentry. Indeed, few buildings were spared during the various city sieges during the war against Burgundy.

In the early 16th century (1521), it is mentioned that a forge was installed. The lodge is moved very quickly because of the risk of fire and its proximity to a gunpowder store. In 1525, beams and hooks for hanging hacquebutes (harquebus) are arranged to protect weapons repaired by Claude the Locksmith. The founders had to work outdoors and furnaces to melt bronze were built near the pit receiving mould and cast metal. No archaeological remains of this park are known. However, in 1976, destroying the building at Gustave Simon street helped to uncover the tower’s circular base which can be identified with the Great Tower mentioned by sources in the late Middle Ages.

2. PARTS PURCHASED OR REPAIRED: TYPOLOGY AND VOCABULARY PROBLEMS

Artillery is the most important work done in the park, but the *Receveur Général* records little evidence on items stored or used in the arsenal. Few references to weapons are made when going on military campaigns, about repairs or when wheels or carriages are made to move them. Details are given on the purchase and manufacture but they are relative to their price, not to their sizes, calibres or materials. The reasons are both lacunas in the sources and also technical incompetence of the *Receveur Général* and *Trésorier Général*: it seems that they do not use the same word in a single register for the same thing. This situation is well-known in European inventories because frequently, the author was not necessary a military expert. That is why it is impossible to draw up a typology of the weapons used. We have to make up with vague adjectives like “great” or “small” to indicate sizes. I will suggest a few remarks, however.

THE LARGE BOMBARD

A large bombard is mentioned several times in the account books dating from 1471 and 1472. In the first year, it was prepared for use in the field. A cart is made for transport and wheels are rimmed with steel (by a locksmith). It is also cited in the following year during the siege of Chatel-sur-Moselle during which it is damaged: carts and carriages are repaired by a cart maker who brings wood. The quality of the repairs is tested: the labour force is important because it means moving a heavy and bulky bombard with a carriage and then unload it in the artillery park. To dig a pit, repair it and then put it on a carriage takes at least seven people including a carpenter. Some people work on it for two days. The same year in August, we pay a builder for doing “bombard stones,” apparently he cut stone balls for this weapon. After

³ Meurthe-et-Moselle, Regional archives, B 821 n° 54 et B 969, fol 601 v° (1462).

⁴ Meurthe-et-Moselle, Regional archives, B 969, fol 516 v°.

⁵ At the Saint Jean-Baptiste de la Salle school current location.

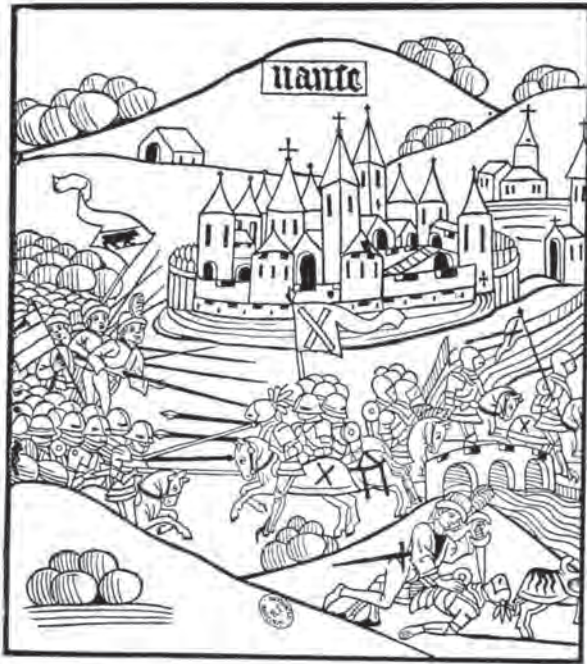


Fig. 3. Battle of Nancy, woodcut, Erhardt Fusch, Strasbourg, 1477



Fig. 4. Nancy (details), Liber Nanceidos, print in Saint-Nicolas, 1518

that date, there is no mention of the large bombard anymore nor of any other bombards except for their destruction and the use of metal from them for other fabrications (a bombard was destroyed in 1478 to make a large serpentine).

THE SIX COURTAULX OF MASTER GEORGES DE STRASBOURG

In 1514, 6 courtaulx are ordered from master Georges de Strasbourg who comes to the artillery park with his servants. All that is necessary for their

¶ prima Nanceie vrbis per Carolum obsidio.



Fig. 5. The first siege of Nancy by Charles the Bold, winter 1475, *Idem*

¶ Secunda per Carolum Nanceig
Vrbis obfidio.



Fig. 6. The second siege of Nancy by Charles the Bold, winter 1477, *Idem*

construction is provided (including using the foundry worker if necessary).

Guns are made of bronze with coat of arms on the barrel (those of the Duke had an inscription probably). The courtaulx are paid two *florins* per hundred pounds. They weigh 20 484 pounds and this will therefore bring to founder Georges 409 *florins* of gold, nine and a half *gros*. Each piece weighed 3 414 pounds if we presume them to be substantially identical. These big pieces are equivalent to medium *couleuvrines* of the French artillery in 1530–1540. The size is the reason why they recruited an external skilled founder while three local founders were paid by the artillery park that year.

In addition, manufacturing these parts required the intervention of a lot of workers engaged in the park. Working days are paid in large numbers. Add to this the cost of raw materials, their delivery and pay of the master and founder, and that of his servants as well as board and lodging. For other supplies (clay), for the manufacture of moulds and the furnace in the arsenal, 120 *pounds*, nine *sous* and six *deniers* were paid. For the six weapons 1 045 pounds of tin and 5 700 pounds of copper are used. The founder was paid less than expected because he spoiled the coat of arms appearing on the barrel. These guns are not named but their names and those of the master

founder would be on them, as it is commonly practised. Subsequently Courtaulx are no more mentioned (manufactured or stored in the barn). They may have been transported in another fortified town of the duchy and have stayed there. Another problem is to establish a typology because the *Receveur* uses the generic term “baton” to any pieces.

OTHER CANNONS IN THE ARTILLERY PARK

There is frequent mention of cannons, *serpentine* or other weapons identified by their names; however, it is difficult to establish a typology.

In 1471, 400 bombard stones were ordered to a craftsman in Nancy. They are specifically devoted to 4 weapons named Thélod and Liverdun (two victories of the Duke) and the two others are called Xevellequin. In the following year, mantles for these last two cannons are ordered and require six days of work. In the following years they are cited on various occasions. These guns are known by another written source, a narrative one, the Chronicle of Lorraine. In 1472, proper names disappear in the inventories.

Jehan Lambeau or Lambert manufactures two large *serpentes* in 1480. In the same time 2 *couleuvrines* were built in the park but we do not know anything about the craftsman. Workers are paid for this job, as well as for raw materials. In 1505, days

are paid for the cleaning of “four new *couleuvrines*.” Extra money is provided to Cristien Alleman who manufactures new *couleuvrines* and wheels. In 1506, outside people are recruited as craftsmen and two foundry workers from Longwy are asked to produce moulds to make cast iron cannons. Then, local founders are trained in this technique and many cannons are manufactured: this corresponds to the increase in the orders. In 1507, three new cannons called “bastons cannons” are made. In 1508, six cannons and twelve carriages are made (a high sum is spent to manufacture moulds and transport necessary materials such as tin, iron, ropes, wood, clay, flock, wax, carts, windlass ...

The lodge built at the beginning of the 16th century shows the need for cannon: there is a definite need for space and high production.

THE GUNS OF MASTER FRANCIS DROWOT

In 1525 he manufactures two new “batons.” Thirteen carts of dry wood to melt new “batons” are required. For metal, workers use a big *couleuvrine* to melt it. Both cannons weighed 2 753 pounds each (smaller than courtaulx eleven years earlier). They are tested in the field to check how operational they are. In the following year, a blacksmith farrier makes wheels and metal bands. In January 1526, Erratle the potter makes five stone moulds to melt lead for the projectiles used in the big serpentine.

RAW MATERIALS / MANUFACTURING

Iron was widely used as well as non-ferrous metals such as copper and alloy. Copper alloys are less susceptible to oxidize and thus they are good salvage materials. The most important feature is the use of many mineral and plant materials (wood and stone) characteristic of preindustrial societies. Wood, as Claude Gaier writes (Gaier 1973, p. 175–176), plays an important role because it is a strategic material for weaponry (artillery carriage and carts in particular). Pyrotechnics are also mentioned (saltpetre, sulphur).

The construction techniques used are relatively simple: longitudinal strips of iron were welded together with iron hoops driven over them from end to end. The carriage of these guns requires a large number of metal bands to keep the weapons on the frame. This work requires a lot of workers, which is frequently mentioned in these accounts. Once



Fig. 7. Artillery of Burgundy storming, battle of Nancy, Deutsches Historisches Museum, Berlin

Apart from big artillery, the park has small weapons or even hand-guns or *couleuvrines* made. All are stored in the barn. *Arquebuses* were usually semi-portable. The sizes of the specimens are difficult to determine: the material used in manufacturing them is mostly wrought iron but there are few copies in copper. The first orders are from 1514 (orders over 300 pieces of wrought iron of which 126 were made by master Bernart Verton). In 1515, wood-handles and hooks are made by blacksmith farriers and locksmiths. In 1526, a locksmith is again paid for maintaining nearly 300 pieces, cleaning and varnishing them.

forged, the pieces received a coat of protective lacquer in the form of a varnished colour coat. They were sometimes dotted with motives and emblems. Moulding clay is most frequently used: in addition to bronze, cast iron cannons for small and medium calibres or ammunitions are mentioned. Manufacture of projectiles has to be adapted to each weapon, not yet standardised: it did not require any particular skill, nor expensive equipment or special installation. References to the maintenance and repair of military equipment were sometimes as many as to the manufacture itself. In addition, for obvious security reasons this product was subject to strict quality controls: the weapons were taken outside the city walls to be tested several times. It was difficult to transport heavy raw materials or complete products: that is why the masters moved closer to the customer, in this case the dukes of Lorraine.

TRADES

It is important to highlight the dispersing of weapon workers in a wide range of trades and to pinpoint their high flexibility and numerous abilities. Local blacksmiths or carpenters are employed except for more technical works with high added value. We particularly note the prestige of some masters in the context of empirical knowledge (Benoît 1991, p. 289). For example, Jehan Lambeau or Lambert is largely paid by the Duke of Lorraine, though he never stopped making bells (Girardot 1983, p. 68). A master could be both a designer and director and a master-worker who showed special skills beyond the simple level of executing.

Gunners and master bombardiers are the most represented in accounts (50 people out of 74 employees): their specific function is to handle artillery. Many other workers are also qualified as gunners in addition to their main craft: these two statuses cover the same activity for nearly 10 years. Status corresponds to another generation of cannons, which were lighter and easier to use.

There is an increase in the number of gunners employed in the early 16th century (1501–1505) and again in 1525 (8–10 pensioners). This is an elite often of foreign origin, mostly Germanic, almost called master and well paid (Jaiquet Ay de Strasbourg). The foundry workers are among the most important people and well paid, which proves their role as wanted specialists. 6 foundry workers work in Nancy

between 1463 and 1526 and four of them are also gunners. They make weapons, especially hand-guns and moulds for casting. Master Jehan Lambeau seems to have been the most active. The foundry workers' payroll is among the best in the artillery park but vary widely from one individual to another: Nicolas de Charmes only receives 20 francs whereas Francis Drowot 100 francs when he was hired in 1524. Their origin is generally not specified, they are more engaged out of their reputation. The question of corporation is important, but not easy to answer. Indeed, the payment records for masters' work performance are common, but the nature of the contract with their assistants and valets are rare.

Advances in artillery are constant during this period, not yet standardised, and it is necessary to look for novelties and experience of foreign workers to share their knowledge. It begins with the recruitment of many Germans. To inquire about new developments, the Duke sends the canonier Didier le Fossier to Italy (Milan) in 1508. In the following years, he will be responsible for inspecting weapons in fortified towns of the duchy without having to manufacture them himself (he provides maintenance and servicing). Presumably, people inquired about innovations by sharing foreign workers who show their expertise in Nancy (for example, "Jehan Ytalien" in 1525)

CONCLUSION

During this transitional period, Lorraine suffers from conflicts because it lies at the centre of European ambitions. It was almost to be encompassed in the Burgundian States but came out of this ordeal with increased stature after the victory of the Battle of Nancy and the death of Charles the Bold, one of the most powerful lords of the West. The real beginning of artillery powder is not known because of the lack of archives, but the few data we have on staff are instructive. However, technical details on weapons are missing and archaeologists are always a little bit disappointed. There is no possibility for classification with accounts studied, and it will be necessary to study other written sources such as the Dukes' *Lettres patentes* and *Registre de passage* of Nancy.

These documents are particularly interesting because they highlight the numbers and wages of permanent staff appointed on a regular basis (in wartime as well as in peacetime). These wages are

indeed a proof of skills and technical responsibilities. In addition to manufacturing, maintenance was necessary all the time, fixing or recasting had to be done after one or two campaigns (Contamine 2005a, p. 83): these delicate operations required a real technical know-how. Similarly, management was a task that would need energy: management of the artillery park in peacetime, conservation of the powder, ammunition supply.

These weapons were not only intended to defend the city, although it is known what role the powder artillery played in the siege warfare in the late Middle Ages: there are numerous witnesses of the use of weapons manufactured in the park to go on a campaign. Still very modest in the 15th century, the artillery of the Dukes of Lorraine expands greatly in the 16th century and corresponds to the willing of princes eager to insure means of action matching their ambitions, hence, the high rewards given to some

masters. Moreover, this border zone promotes mixing and technological progress, some foreign experts who were recruited settled in this region, which was a significant exporter of metals and finished products. The brewing of techniques added to the professional versatility. The history of the steel industry in the

15th–16th centuries coincides with that of artillery park. The term “blast furnace” for example appears for the first time in a forge tenancy agreement in Sexey-aux-Forges in the basin of Nancy, close to the Duke’s arsenal.

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