

Perspectives on early gunpowder weapons, at the completion of a study of Valois Burgundian artillery

A historiography of early gunpowder weapons

The modern history of gunpowder weapons was born in the middle of the nineteenth century when the future Emperor Napoleon III, while imprisoned in Ham Castle, undertook an investigation of the origins of artillery. The result, the six-volume *Études sur le passé et l'avenir de l'artillerie*, was published in Paris between 1846 and 1871,¹ with the final volume ironically appearing in the year that the Franco-Prussian war ended Louis Napoleon-Bonaparte's reign. In fact, only the first volume was written by Napoleon; an artillery officer of some historical talent, Ildéphonse Favé, continued the work based on the emperor's outline and notes. This magisterial work, based largely on original research, not only introduced the subject to a scholarly world but also set a standard that was seldom matched over the next 150 years.

While Napoleon and Favé naturally concentrated on French sources and history, other scholars soon added works based on their own countries' archives and libraries. In England the works of Colonel Henry Brackenbury and R Coltman Clephan, in Belgium the works of Paul Henrard, and in Germany the works of Bernhard Rathgen, have all contributed significantly to our understanding of the history of gunpowder weapons in the last two centuries of the Middle Ages.² The value of these works, like those of Napoleon and Favé, was their strict adherence to contemporary documentary and narrative sources.

In the first half of the twentieth century, when politics began to infect all forms of scholarly inquiry, historical investigations into the history of gunpowder weapons were not immune and began to be strongly influenced by ideologies and nationalism. In addition, some of the operators of the artillery which played such a large role in the First and Second World Wars decided that they too should try their hand at explaining the historical background of the weapons of which they were so proud. The first set of historians manipulated the sources in an attempt to provide evidence of their nations' crucial role in the early developments of gunpowder and gunpowder technology in order to further cement the martial superiority of their armies then marching across Europe.³ The second group, in their enthusiasm for the subject, but also in their inability to use difficult-to-access historical sources and methodology, substituted secondary sources and

their own experiences to provide historical interpretations. Their use of hindsight and assumption in the place of thorough research resulted in the development of many inaccuracies and myths concerning the effectiveness and success of early gunpowder weapon technology, and their work quickly replaced the more cautious and circumspect renderings of their earlier counterparts.⁴

A complicating factor was that the two world wars, as well as smaller military conflicts following them, most notably in Korea and Vietnam, produced an environment not conducive to the study of military history, and in particular to the study of military technologies. The resulting dearth of academic interest in the history of early gunpowder weapons during this period allowed those with lesser historical abilities to dominate the interest in this field.

All of this produced by the end of the twentieth century a mixture of bad and good scholarship about the origins and development of early gunpowder weapons. To be certain, some scholars did read the earlier historians on gunpowder weapons and were influenced by their scholarly methodology and caution. These, Howard L Blackmore, M G A Vale, Philippe Contamine, John S Guilmartin, and Bert S Hall, among others, produced investigations based on primary sources, although often with conclusions mixed with the romanticism of technological determinism.⁵ Others, however, seem to have continued the errors of the less cautious writers of the past, often by repeating their conclusions and assumptions without critical focus on the original sources and their limitations.⁶ Some, too, have been influenced by the conjectures of power contained within the early gunpowder weapons, so much so that they have determined that their ownership and use in conflicts created a 'military revolution' which led to the growth of modern states and the domination of Europe throughout the early modern world.⁷

Resulting problems

One result is that historians who enter the field of early gunpowder weapons as a detail in their syntheses of history in general, and military history and the history of technology in particular, are forced to use poor modern works which, all too frequently, they use uncritically. These writers then perpetuate the myths and errors about the manufacture, use and effectiveness of gunpowder weapons, unwittingly introducing and reintroducing them to an equally uncritical and unsuspecting new generation.⁸

However problematic this might be, there has been much good work over the last two decades on the history and development of early artillery, and this has brought into question many of the long-held ideas and suppositions. For example, it is now clear that wrought iron was used for the manufacture of guns from the fourteenth until well into the seventeenth century. Far from being the inferior

material, superseded as soon as was possible by bronze or cast iron, it was evidently seen at the time as a useful and appropriate material for some types of guns. Similarly, breech-loading cannon were not inefficient, dangerous pieces, as so often stated in modern works; breech loading was used well into the seventeenth century for large pieces and for smaller pieces until the eighteenth century, a length of time which surely argues against this supposition.⁹ This recognition of the longevity of many types of gunpowder weapons and their effectiveness has also led to the redating of many existing guns, previously assumed to be fifteenth-century or earlier, to the sixteenth or even the seventeenth century.¹⁰ In addition, patterns of gunpowder-weapon acquisition and use by late medieval states have been challenged: some powerful political entities, such as France and Burgundy, moved from local to central control of their realm's gunpowder weapons during the fourteenth and fifteenth centuries, while others, particularly England, followed an opposite pattern, one of central to local control during the same period.¹¹ Gunpowder weapons have also been recognised as more effective weapons at sea at an earlier time than previously believed,¹² and less effective as siege artillery.¹³

These examples alone show that a reassessment of the earlier history of gunpowder weapons is needed and must be made essentially from the ground up. Early works, such as Napoleon and Favé, established some foundations, especially in methodology, but even these failed to establish a framework from all contemporary sources: narrative, documentary and artefactual; nor has any subsequent scholarship managed to do so. It is very apparent that in the main these works do no more than scratch the surface of what is a complicated history. This is, in part, understandable, as the subject does not yield its secrets easily. Using narrative sources alone as a guide may be confusing because those witnesses, often not trained in the art of military technology, were themselves confused by what they saw. These chroniclers and other narrative writers were also obviously influenced by patronage, audience and personal allegiances, and were only able to use those sources available to them, with their attendant biases. Documentary sources rely on a sort of notarial code, the terminological technicality of which needs to be broken before it can be used. And extant weapons generally do not have accurate provenances, with the result that their type and date are often not known, while their use and effectiveness is misunderstood. At times, it seems that the more one investigates, the more confusing the subject becomes: the very complexity of the field often leading those who specialise in its study to conclude that it is not open to analysis and understanding, and that they may never see through the opaque veil.

On the whole, previous studies have also tended either to concentrate on one particular period or event or to have been part of

larger works where the history of artillery has been treated subsidiary to the wider picture. In addition, these works have tended to concentrate on the narrative or documentary sources and have made little or no attempt at relating these to existing guns or types of guns. Some work has been done, notably by François T'Sas on fifteenth-century bombards¹⁴ and similar work on the same subject by one of the present authors,¹⁵ but little has been published as a consequence of these works.¹⁶ No studies have attempted to marry all three of the available source types – narrative, documentary and artefactual. In light of this, there is a real and pressing need to re-evaluate the whole history and development of artillery before the sixteenth century.

Some solutions

Our book on the artillery of the Valois Dukes of Burgundy¹⁷ is an attempt to put together a coherent framework for the development of gunpowder weaponry throughout the fifteenth century from a synthesis of the available evidence: contemporary narrative, documentary sources and surviving examples. The fifteenth century is particularly rich in narrative sources covering the military events of the period, especially those occurring in France, Burgundy and the Low Countries, and these provide a background against which a better understanding can be achieved. They are, however, not without their problems, both of interpretation and perspective. The largest and most comprehensive of all the surviving documentary sources on fifteenth-century gunpowder artillery, and perhaps the most important, are the accounts of the Dukes of Burgundy: Philip the Bold, John the Fearless, Philip the Good and Charles the Bold. However, despite their obvious enormous value in the understanding of artillery in the fifteenth century, they too are not without their difficulties, the primary one being the terminology used and the apparent lack of notarial standardisation during this period. For example, while several different types of gun are listed, it is not always clear to the modern reader what exactly is being referred to. Finally, and equally important, are the surviving artefactual examples, and it is here that we are particularly fortunate. In the final wars of the reign of Duke Charles the Bold, the Swiss and Lorraine Confederate forces defeated the Duke's armies at the battles of Grandson, Murten and Nancy, and captured, among other things, their artillery. Although greatly reduced in number from those recorded to have been captured, some of these pieces are still preserved in museums in Switzerland, mainly in Murten, La Neuville and Basel.¹⁸

Of special importance for this chapter are the training and skills that both authors brought to this study. As reviewed above, most previous work on late medieval gunpowder weaponry has been approached through original documentary and narrative sources,

with little use of extant gunpowder weapons. In our opinion this weakened those studies – even the impressive Napoleon and Favé multivolume work took little notice of extant weapons. One can surely be sympathetic here, in view of the problems of dating and perceived use – almost always exaggerated – which plague even the display of these early guns.¹⁹ However, in order to write a *complete* study of early gunpowder weapons, these artefacts must be included. This is where Smith's training benefited the book. Having spent more than a decade in researching early extant gunpowder weapons, Smith had traversed European and North American museums, armouries and city squares, studying, measuring, photographing and drawing any gunpowder weapons he found. In doing so, he acquired an extremely large amount of data on all sizes and sorts of extant early gunpowder weapons. These data formed the basis of his numerous writings on early gunpowder weapons, including his monograph 'Mons Meg and her sisters', written with Ruth Rhynas Brown, and a large number of articles.²⁰ DeVries' training is in drawing history from written sources, most notably from late medieval narratives, and this had directed his approach to the study of early gunpowder weapons.²¹

Interestingly, at the time that we met, both of us were seeking to supplement our separate approaches to gunpowder weapons with a study of Joseph Garnier's transcribed documents in *L'Artillerie des ducs de Bourgogne d'après les documents conservés aux archives de la Côte-d'Or*.²² Garnier, a Dijonnais archivist, brought together and published transcriptions of the Ducal archives on artillery, most notably those contained in two account books, the first covering the period from 1411 to 1445 and the second from 1446 to 1475. They include all the artillery and other munitions delivered into the *Chambre des Comptes* of the last three Valois dukes, John the Fearless, Philip the Good and Charles the Bold. Though these two registers form the nucleus of his work, Garnier includes a number of other transcriptions from the archives extending back to Philip the Bold and providing additional material from the entire period. Together, the transcriptions of these documents are an unparalleled source of information about artillery from the end of the fourteenth to the closing decades of the fifteenth century, providing not only details of the types and numbers of pieces of artillery but also about the changes with time that occur. A database compiled by us from these documents revealed the records of some 4000 Burgundian weapons, listed by various names – which we standardised as *bombard*, *canon*, *coulovrine*, *courtau*, *crapaudeau*, *hacquebus*, *mortar*, *pestereau*, *ribaudequin*, *serpentine* and *veuglaire* – together with details of their metallurgy and manufacture, surface treatment, marks, gunpowder, ammunition, carriage beds and mounts, loading and aiming, the personnel involved and, finally, ship's artillery.

By combining our respective skills with our work on Garnier's documents, we believe that we have written the most complete study

of early gunpowder weapons to date. One section is devoted to the narrative accounts of gunpowder weapon use between 1363 and 1477 by the four Valois Dukes of Burgundy; it also serves as a military history of the dukes, a framework essential for establishing the context in which these guns were made and used. A second section explores the various characteristics of the Burgundian gunpowder weapons as revealed by the documents transcribed by Garnier. The final section is a catalogue of all extant gunpowder weapons that can reasonably be attributed to the Burgundians during this period. Six appendices contain the database of gunpowder weapons and five documents, in the original language and English translations, showing particularly interesting examples of the types of records available for the historian researching late medieval gunpowder weapons: a Burgundian artillery train of 1475; a Burgundian ship's inventory of arms from 1445; the manufacture of iron guns in 1376; a Burgundian weapons dowry from 1449; and the transport of artillery in 1474. Examples from the catalogue and database are given in Tables 1 and 2 respectively; Figure 1 is a drawing of the weapon described in Table 1 and the object itself is shown in Colour plates 1 and 2. An example of the ducal archival artillery documents is given at the end of the chapter.

While we were writing these separate sections and beginning to arrive at our conclusions, it was suggested by Guy Wilson, past Master of the Royal Armouries, that we should place these conclusions before the narrative, documentary and artefactual sections, thus mimicking eighteenth- and nineteenth-century French historical works where evidence proving the purpose of the book was always placed at the end as *pièces justificatives*. This not only places the conclusions first, but also emphasises their importance to the reader.

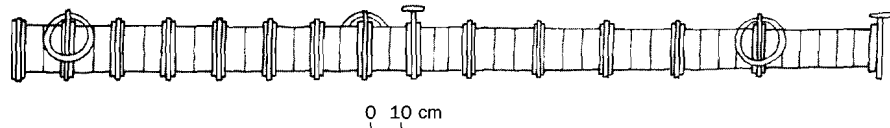
Our conclusions

In short, these conclusions are that, as gunpowder weapons began to enter into military frameworks of the fourteenth and especially fifteenth centuries, there needed to be significant changes in military thinking, and not just in the sciences of strategy and tactics – which the entry of gunpowder weapons into conflict obviously affected – but also in the sciences of military administration, logistics, planning and technology. In their essence, the traditional branches of military service – cavalry and infantry – did not change, but added to them was an entirely new branch: gunpowder artillery. This was not just a question of new military personnel, nor even a question of a new weapon. Cavalry and infantry were largely self-contained. They could, and usually did, have assistants, varlets, squires, grooms, etc., but these personnel did not need a specialist's training, nor were they really required. If necessary, a cavalry soldier could take care of himself and his horse; and an infantry soldier generally took care of his own armour and weapons. They also could supply their own victuals,

Table 1 Sample entry in catalogue

Catalogue number	16		
Collection/museum	Musée de La Neuville, La Neuville, Switzerland	Accession number	
Category	Crapaudeau?	Material	Wrought iron
Description	The barrel is made from four staves bound with hoops and bands. Very unusually, the hoops are not set at regular intervals down the length of the barrel. The muzzle consists of a double hoop, that at the front being very large in diameter, over the front face of which the staves have been hammered. Set on top of this hoop is a horizontal plate in the form of a shield beneath which is a rectangular slot. The hoops are very narrow and set in groups of three. Behind the muzzle the outer surface is smooth though it is clear that it consists of six narrow bands of similar diameter. A second group of three hoops, with lifting ring, is followed by a barrel section made from four bands. There follows a series of three triple hoops and three band structures. Behind this the next triple hoop has a flat plate set horizontally on a rectangular projection pierced with a slot, as at the muzzle. This plate has three punched 'H' marks. Behind this the hoops are again in groups of three but the bands are double. The triple-hoop structure next to the breech has a similar lifting-ring loop and lifting ring as that near the muzzle. The breech consists of a triple-hoop structure, but the very end of the barrel is completely obscured by the carriage on which it is set. The touch hole is a small hole set within a shallow rectangular depression.		
Date	Florens Deuchler dates this piece to about 1460		
Dating evidence	Dated by Burgundian booty		
Provenance/booty status	Booty from Grandson		
Bore barrel	60 mm		
Length overall	2925 mm		
Literature	Florens Deuchler, <i>Die Burgundebeute: Inventar der Beutestücke aus den Schlachten von Grandson, Murten und Nancy 1476/77</i> (Bern: 1963), No. 237		
Notes	This gun is unique in the oeuvre of wrought-iron gunpowder weapons. Its non-regular structure and the use of very wide bands are not paralleled elsewhere. Uncommonly for a muzzle-loading piece there are no trunnions. The flat shield-shaped plates are also unusual. Interestingly, the lifting ring lugs are offset to either side of the centreline of the barrel and ensure that the slots in the hoops can be used as a sighting device. Trying to date it without any parallels is impossible, but there is no reason to doubt the attribution to the Burgundian wars and date it to the period of around 1470.		

Figure 1 Drawing (side view) of a gun barrel dated to about 1470 (see Table 1). (Robert D Smith)



if necessary. On site, though, artillery personnel could do little for themselves and their weapons. While it is true that they did take care of their own personal protection and provided their own foodstuffs, their weapons – gunpowder weapons of all sizes – could not be so easily maintained. Except for the smallest of gunpowder weapons, late-medieval artillery personnel could not even carry their own artillery pieces.

Gunpowder weapons themselves were also an entirely different matter. Gunpowder artillery could rarely be constructed on site.

Table 1 Database example

Date	Artillery name		Quantity	Metal	Material	Weight	Length	Calibre	Ammunition type	Ammunition weight	No. of removable chambers	Chamber weight	Weight of gunpowder
	Standardised gunpowder weapon type	Spelling in transcribed document											
1433	Crapaudeau	Crappaudeaul	2	Copper alloy	...	...	...	...	...	...	1	...	...
1433	Crapaudeau	Crappaudeaul	1	Iron	...	...	...	...	...	...	7	...	...
1436	Crapaudeau	Crappaudeau	12	Iron	...	...	...	...	...	...	2	...	...
1436	Crapaudeau	Crappaudeau	3	...	...	...	...	...	...	...	...	...	...
1436	Crapaudeau	Crappaudeau	5	...	...	...	...	...	...	...	2	...	...
1436	Crapaudeau	Crappaudeau	2	Iron	...	...	...	...	...	...	2	...	...
1436	Crapaudeau	Petit Crappaudeau	2	...	...	...	...	...	Stone ball/ <i>plommée</i> or lead ball	...	...	...	...
1437	Crapaudeau	Crappaudeau	1	Iron	...	...	...	...	...	...	...	...	...
1437	Crapaudeau	Crappaudeau	5	Iron	...	...	...	...	...	...	4	...	...
1437	Crapaudeau	Crappaudeau	1	...	...	...	...	...	Stone ball	...	...	...	...
1437	Crapaudeau	Crappaudeau	2	...	...	...	...	...	<i>Plommée</i> or lead ball	...	2	...	...
1437	Crapaudeau	Crappaudeau	5	Iron	...	...	...	...	...	...	4	...	...
1437	Crapaudeau	Crappaudeaul	1	Iron	...	...	...	...	...	...	2	...	...
1437	Crapaudeau	Crappaudeaul	1	...	...	...	...	...	...	...	2	...	...
1440	Crapaudeau	Crappaudeau	1	Iron	...	...	...	...	...	...	...	...	...
1440	Crapaudeau	Gros Crappaudeau	36	...	...	...	...	...	...	...	2	...	...
1440	Crapaudeau	Gros Crappaudeau	4	...	...	...	...	...	...	...	2	...	...
1442	Crapaudeau	Crappaudeau	34	Iron	...	...	...	...	<i>Plommée</i> or lead ball	...	...	...	...
1442	Crapaudeau	Gros Crappaudeau	2	Copper alloy	...	...	...	...	...	...	...	...	...
1443	Crapaudeau	Crappaudeau	7	Iron	...	...	...	...	...	...	2	...	...
1443	Crapaudeau	Crappaudeau	2	...	...	...	...	...	...	...	2	...	...
1443	Crapaudeau	Crappaudeau	2	Copper alloy	...	...	...	...	...	...	2	...	...
1443	Crapaudeau	Crappaudeau	74	Iron	...	...	...	...	Stone ball	...	2	...	...
1443	Crapaudeau	Crappaudeau	29	Copper alloy	...	...	...	...	Stone ball	...	2	...	...
1443	Crapaudeau	Crappaudeau	4	...	...	...	...	...	Stone ball	...	...	...	...

Date	Artillery name		Quantity	Metal	Material	Weight	Length	Calibre	Ammunition type	Ammunition weight	No. of removable chambers	Chamber weight	Weight of gunpowder
	Standardised gunpowder weapon type	Spelling in transcribed document											
1443	Crapaudeau	Crappaudeaul	1	Copper alloy	...	...	...	...	Plommée or lead ball	...	2	...	...
1443	Crapaudeau	Crappaudeaul	1	Copper alloy	...	...	...	...	...	...	2	...	...
1443	Crapaudeau	Gran Crappaudeau	9	...	...	...	...	...	...	...	2	...	...
1443	Crapaudeau	Gros Crappaudeau	9	Copper alloy	...	...	...	...	...	...	2	...	...
1443	Crapaudeau	Pesan Crappaudau	4	...	...	...	...	...	...	...	2	...	...
1444	Crapaudeau	Crapaudine	1	Iron	...	...	...	...	...	...	...	...	...
1445	Crapaudeau	Crapaudeau	120	Iron	...	...	...	2.0	Stone ball	...	3	...	...
1445	Crapaudeau	Crapaudeau	50	...	...	...	...	...	...	...	3	...	...
1445	Crapaudeau	Crapaudeau	12	Iron	...	...	...	4.0	Stone ball	...	3	...	...
1445	Crapaudeau	Crapaudeau	115	Iron	...	...	...	...	...	...	0	...	...
1445	Crapaudeau	Crapaudeau	5	Copper alloy	...	...	...	...	...	...	0	...	...
1445	Crapaudeau	Crappaudeau	3	Iron	...	175.0	...	...	...	...	...	...	...
1445	Crapaudeau	Crapaudeau	2	Iron	...	132.0	...	...	...	...	2	...	...
1445	Crapaudeau	Crappaudeau	6	...	...	...	...	...	...	...	2	...	...
1445	Crapaudeau	Crappaudeau	120	Iron	...	191.7	...	2.0	Stone ball	...	3	...	...
1445	Crapaudeau	Crappaudeau	50	Copper alloy	...	140.0	...	...	...	...	...	...	...
1445	Crapaudeau	Crappaudeau	2	Copper alloy	...	...	...	...	...	...	2	...	...
1445	Crapaudeau	Crappaudeau	5	Iron	...	...	...	...	Plommée or lead ball	...	2	...	...
1445	Crapaudeau	Crappaudeau	2	Copper alloy	...	...	...	...	...	...	2	...	...
1445	Crapaudeau	Gros Crappaudeau	3	...	...	...	...	...	...	...	...	...	...
1445	Crapaudeau	Gros Crappaudeau	3	Copper alloy	...	...	...	...	...	...	2	...	...
1446	Crapaudeau	Crappaudeau	87	...	...	...	5.0	2.0	Stone ball	...	2	...	...
1446	Crapaudeau	Crappaudeau	15	...	...	106.7	...	2.0	Stone ball	...	2	...	...
1446	Crapaudeau	Long Crapaudeau	24	...	...	...	...	2.0	Stone ball	...	2	...	...
1449	Crapaudeau	Crappauldeau	1	Iron	...	...	4.5	1.0	Stone ball	...	2	...	...
1451	Crapaudeau	Crappaudeau	12	Iron	...	...	4.0	2.0	Stone ball	...	2	...	...

The general thus had to plan to take gunpowder weapons to a siege or battle in advance; he also had to plan what types and sizes, and how many, were needed to be gathered and transported. All of the ancillary equipment to operate these guns also had to be planned for, gathered and transported. At the least, this meant gunpowder, ammunition, loading and firing accessories, mounts and beds, but could also include defensive shields – mantlets and pavises – smiths’ forges, masons’ tools, replacement parts and fire, not to mention the extraordinarily large number of horses and carts needed to transport all of the guns and their equipment. (In 1475, for example, the whole artillery train needed over 5000 horses and in excess of 1000 carts.) Of course, these too needed their personnel: carpenters, masons, smiths, farriers, grooms, pioneers, carters, joiners, tent builders and maintainers, ammunition founders and their servants.

And this was only what was needed on site. Behind all of this were gunfounders and gunsmiths, gunpowder-makers and carpenters who constructed mounts, carriages and shields. Moreover, to bring this together there needed to be a substantial increase in the administrative mechanisms to ensure that the gunpowder weapons required on the battlefield or at siege were available. Gunpowder weapons, their powder and carriages needed to be purchased, made and stored.

Naturally, there was also the effect of gunpowder weaponry on strategy and tactics: the speed and terrain of travel, deployment of forces, order of fighting, position, timing, etc. What was the general trying to achieve and how was he trying to achieve it? What he was trying to achieve was, of course, victory at the lowest possible cost. To do this he had to make the crucial decisions about how and how quickly to arrive at a battlefield or siege and, once there, where to deploy what forces he had – cavalry, infantry and artillery – in places which he hoped would provide him with a quick and convincing victory. At Nicopolis this was done poorly with cavalry and infantry forces alone. In contrast were Crécy and Agincourt, where the English developed tactics, with only the addition of limited gunpowder weapons, against the French that led to overwhelming victories. Sometimes a general using gunpowder weapons could also fail in his tactics, such as at Beauvais in 1472, when Charles the Bold dragged a huge bombard to the town but failed to bring sufficient ammunition to achieve the conquest, or at the battle of Gavere in 1453, when a stray spark flying into an open gunpowder sack was so misunderstood that it caused the artillery operators to flee and take others with them, despite the fact that there was no real danger; the battle was lost. While elsewhere, at Odruiik in 1379 and Melun in 1420, to name just two, tactics using gunpowder weaponry seem to have been decisive in determining victory. What this all means is that gunpowder weapons alone were not the sole determining factors in victory or defeat. Victory still relied largely on the acumen and sometimes

the inventiveness of the general, in addition often to generous doses of luck. The general who could use gunpowder weapons well undoubtedly benefited from them, though not always.

We do not wish to suggest that *The Artillery of the Valois Dukes of Burgundy, 1363–1477* will serve as a history of all late-medieval gunpowder weapons. Indeed, it is but one of the chapters in this history. Similar chapters could, and should, be written on the history of English, French, Spanish, Italian, German, Scandinavian, Scottish, Ottoman Turkish, Hungarian, Russian and even Teutonic and Hospitaller gunpowder weapons. It is, however, the wealth and range of original sources that make the Valois Burgundian example so capable of presenting a vivid picture of what early gunpowder weapons were like, how they were made, how they were transported and mounted, what the ammunition and gunpowder used in them were, who the personnel were who operated these weapons, and, finally, how they were used in warfare.

Example of documentary evidence: the transport of artillery in 1474²³

When weights are given for most of the artillery pieces listed in the Burgundian archival records, they are given in *livres*. In this rather intriguing order for arms to be transported to Dijon from Luxembourg at a time when Charles the Bold was preparing his artillery train for the unsuccessful siege of Neuss, the gunpowder weapons, their equipment and the arms accompanying them are listed with the number of horses needed to transport them.

Estat de ce qui semble ester necessaire pour la fait et conduit de l'artillerie que mon très redoubté seigneur M. le duc de Bourgoingne a ordonné estre menée en Bourgoingne, de celle qui se doit prendre en son dît pays de Bourgoingne à la conduit de Estienne Ferroux par lui commis au gouvernement et exercitè de d'icelle.

State of that which seems to be necessary for the making and conducting of the artillery that our most redoubtable lord, M. the Duke of Burgundy has ordered to be taken into Burgundy, the which ought to be taken into his said land of Burgundy under the direction of Estienne Ferroux by his commission to his government and army.

Primo

First

A mondit seigneur ordonné ester mené deux courtaulx de metal estans presentement à Luxembourg et convient pour iceulx mener, 16 chevaux.

To my said lord it is ordered to be taken two copper alloy *courtaulx* presently at Luxembourg and for which it is suitable to take, 16 horses.

Item pour mener cinq moiennes serpentines et quatre petites, fault avoir assavoir aux moiennes serpentines, trois chevaux et aux petites deux; font 23 chevaux.

Item to take five medium and four small *serpentines*, that is to say that for the medium *serpentines*, three horses and for the small [ones] two, making 23 horses.

Item pour mener trente cacques de pouldre à compter sur chacun chariot cinq cacques feront six chariots qui font 24 chevaux

Item to take thirty casks of powder at the rate of five casks on each cart making six carts which makes 24 horses

Pour mener deux cent pierres de courtaux à compter 40 pierres sur chacun (charriot) à quatre chevaux font 20 chevaux

To take two hundred stones [shot] for couriaux at the rate of 40 stones on each (cart) of four horses making 20 horses.

Pour mener les plomets servans ausdites 9 serpentines ung chariot et demi, 6 chevaux.

To take the plommées for the said 9 serpentines one and a half carts, 6 horses.

Item pour mener 2,500 arcs, 2,700 douzaines de flesches, 6,000 cordes, 11 charriots qui feroient 44 chevaux.

Item to take 2,500 bows, 2,700 dozen arrows, 6,000 strings, 11 carts which make 44 horses.

Pour mener picqs, horeaux, lochets, ung chariot à 4 chevaux.

To take picks, horeaux, spades, a cart with 4 horses.

Pour mener oingt de garnison, les baghes du carrelleur et du cuvelier, ung chariot, 4 chevaux

To take grease, the bags of the saddler and of the cooper, a cart, 4 horses.

Pour mener les baghes de Estienne Ferroux et ses aides par un commis du receveur de l'artillerie, 6 chevaux.

To take the bags of Estienne Ferroux and his aides by a commission of the receiver of the artillery, 6 horses.

Prendre en Bourgogne une bombarde à Dijon et pour mener celle convient du moins avoir 24 chevaux.

To take into Burgundy a bombard to Dijon and to take which is needed no less than 24 horses

Pour mener ung manteau servant icelle, convient dix chariots qui font 40 chevaux.

To take a mantlet for this [bombard], ten cart are needed which makes 40 horses.

Pour mener ung affusts, 4 chevaux

To take one carriage, 4 horses.

Pour mener du moins cent pierres servans à ladite bombarde à dix pierres, ung chariot à quatre chevaux, font 40 chevaux.

To take no fewer than one hundred stones [shot] for the said bombard at ten stones per cart with four horses making 40 horses.

Convient mener les baghes des charpentiers leurs hostiz et harnaix, 4 chevaux.

It is necessary to take the bags of the carpenters, their baskets and equipment, 4 horses.

Pour mener les baghes des harnesqueurs et autres menues gens de ladite artillerie, 4 chevaux.

To take the bags of the carters and other men of the said artillery, 4 horses.

Pour mener les baghes des cannoniers deux chariots, 4 chevaux.

To take the bags of the cannoniers two carts, 4 horses.

Notes and references

- 1 Louis Napoleon had trained at the Swiss military academy at Thun and in 1834 was promoted to the rank of Captain of Artillery in the Berne militia. Intriguingly, his uncle, the Emperor Napoleon I, also trained as an artillery officer. Napoleon-Bonaparte, L. and Favé, I, *Études sur le passé et l'avenir de l'artillerie*, 6 vols (Paris: 1846–71).

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- 3 A prime example of this sort of scholarship is the translation of *Das Feuerwerkbuch von 1420*, which was edited by W Hassenstein and was published in Munich in 1941, while several of the articles appearing before the First World War and Second World War in the *Zeitschrift für historisches Waffenkunde* (which was later renamed *Zeitschrift für historisches Waffen- und Kostümkunde*) also fall into this category.
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 - 19 See, for example, the misdating of early gunpowder weapons in the Swedish Armémuseum in Stockholm and the Naval Historical Center Museum in Washington DC, and the mislabelling of removable chambers as bombards in the town squares of Diest and Thuin, Belgium, and the French Musée de l'Armée, to name but a few of the many examples.
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