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# WARFARE TRANSFORMED IN THE 17TH CENTURY

An Interactive Qualifying Project Report

submitted to the Faculty

of the

WORCESTER POLYTECHNIC INSTITUTE

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Degree of Bachelor of Science

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## Abstract

This project discusses the transformation of warfare in 17th-century Europe. At the beginning of the century armor was prevalent on the battlefield and medieval tactics were still in place, but by the end of the century armor had been almost entirely displaced by firearms, and modern linear tactics were predominant. In addition, the project designed and implemented an arms and armor exhibit on the topic at the John Woodman Higgins Armory Museum.

## Acknowledgements

This project was made possible by the Worcester Polytechnic Institute in conjunction with the John Woodman Higgins Armory Museum. We would like to extend our deepest gratitude to all those involved in our endeavor along with those mentioned below.

First, we would like to thank Professor Jeffrey Singman for introducing us to this exciting Interactive Qualifying Project. Without his guidance and constant support this project would not have been possible. The contributions from him were countless and he is an asset to the community of WPI and the Higgins Armory.

Second, we extend our thanks to William MacMillan. He guided us through the construction of the various pieces of our exhibit. Through his help we were able to implement three terms of ideas into an actual exhibit at the museum.

We would like to thank Phyllis Slattery for helping us locate books in the library at the Higgins Armory. In addition she introduced us to the word "willy-nilly," which would not escape our minds for the rest of the project.

We would also like to thank Walter Karcheski for revising our ideas into museum quality material. He also pointed us in the right direction by giving us a list of artifacts and books to research at the beginning of the project.

The entire staff at the Higgins Armory deserves our thanks for all their help.

Finally, we would like to thank each other for making this project such a memorable experience. Through the three terms of our involvement we each gained three new friends.

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# I. Introduction

The project entitled "Warfare Transformed in the Seventeenth Century" is a study of how warfare evolved during the seventeenth century. The project focuses predominantly upon the weapons, armor and tactics of the period. The main troop types of the seventeenth century consisted of the Cavalry, the Pikemen, and the Musketeers. The evolution and adaptation of each type on the seventeenth-century battlefield is explored in detail in a section devoted to the particular troop type. A chapter is dedicated to the tactics of the period. The report also has separate sections illustrating the major events of the seventeenth century. In particular there are two chapters describing the Thirty Years War, which lasted from 1618 to 1648 and the English Civil Wars raging between 1642 and 1651. Part of this project consisted of the design and construction of an exhibit for the Higgins Armory. The exhibit proposal outlined the changes to an existing seventeenth-century exhibit at the Higgins Armory Museum.

The seventeenth century marked the transition in warfare from the Middle Ages to the modern era. At the beginning of the period, the musket and pike held an equal role upon the battlefield. The basic battle formations, which were large squares, remained relatively unchanged since the time of the Ancient Greeks. The armored cavalry still believed that they could influence the outcome of the battle. By the close of the seventeenth century things had changed a great deal. The pike had almost disappeared from the battlefield. Infantry began to fight with linear tactics similar to ones used in modern warfare. Gunpowder had all but destroyed the image of the invincible knight on horseback.

## II. The Thirty Years' War

The Thirty Years War, which ran from 1618 to 1648, was one of the major conflicts of the 17th century. This war marked the transition in warfare from the Middle At the end of the 16th century, the Holy Roman Empire, which consisted of Germany, Austrian and Bohemia along with a number of its surrounding states, was in serious decline. There was a fallout of patriotism as its citizens had lost faith in their leadership, which left the empire in a state of unrest and decay. The general population of the Empire had lost faith in their leaders and there was a great deal of friction between the empires princes and lords and the sovereign power. Other European countries, such as Spain and the Netherlands, used this opportunity to steal territory from the Lower Rhine and influence the troubled Empire. When Philip II came to power in Spain, religious tensions quickly began to rise between the Catholics and Protestants. Since the Emperor of the German States was a member of the Christian family Habsburgs, Philip II attempted to convince the Emperor to aide him against France. The Protestant countries too wanted to influence Germany. Most of the northern sections of the Empire were Protestant, and they saw the potential for growth in the disheartened state. It was this political and religious pressure that eventually drove the continent to war.

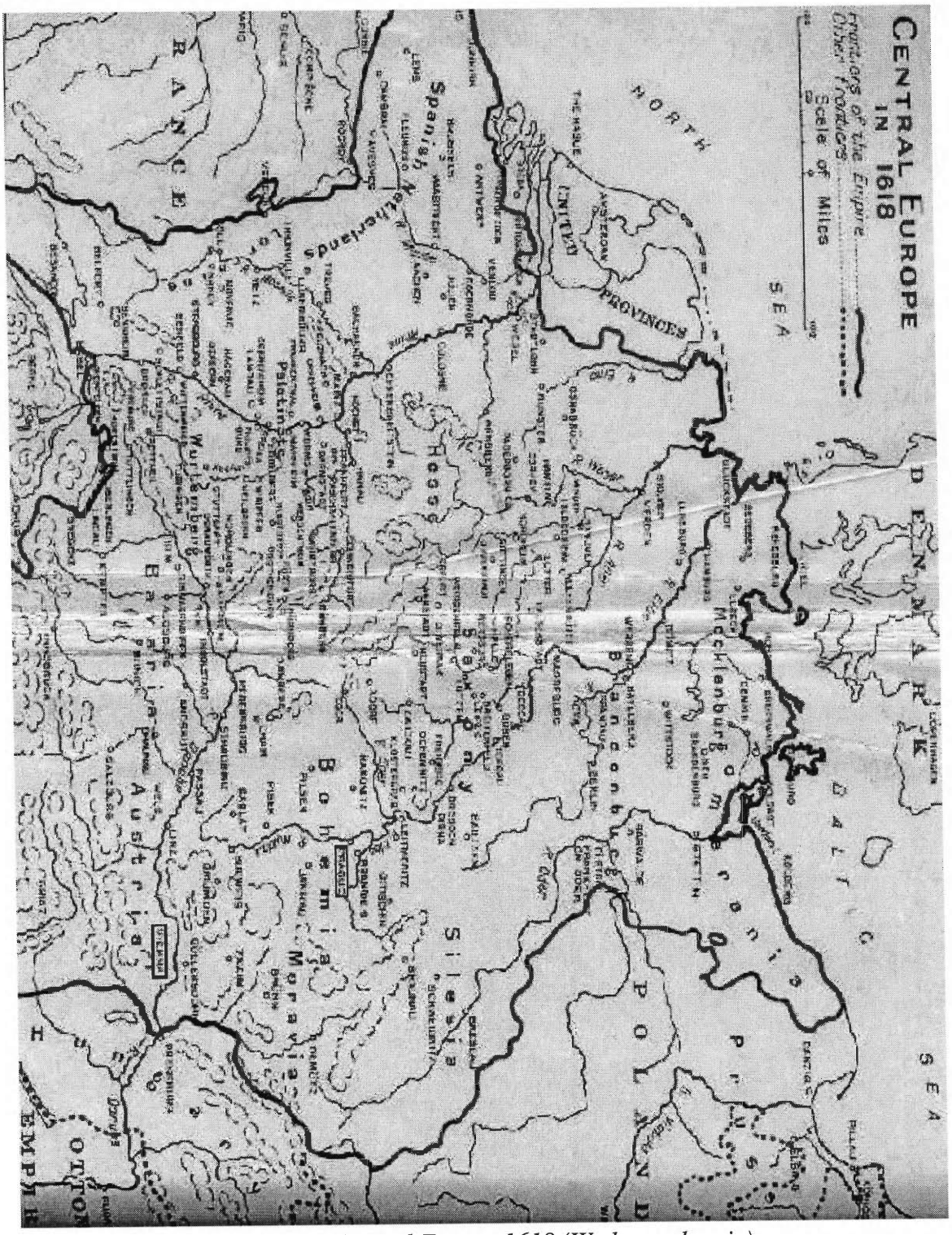



*Figure 2.1 Central Europe 1618 (Wedgwood, p. iv)*

**Bohemian Revolt**

The point at which these pressures broke out into violence was in May of 1618 in Bohemia. A number of the territories in Bohemia were run by Protestant nobles who disliked the Empire and were always pushing for religious freedom. While at the turn of the 17th century the Empire was not willing to grant them that right, the Empire was slowly changing its mind. Since the Emperor was more than willing to keep open relations with the Protestant powers inside the Empire, the king of Bohemia, Rudolph II, had convinced the Emperor to allow him to sign an Imperial Charter which gave religious liberty not only to the nobles and their dependents in Bohemia but also to those living in the crown lands. This changed when Spain entered the picture. When Rudolph II died there was strong political pressure to replace him with some one who was more pro-Catholic. The choice was Ferdinand, the head of the Styrian branch of the Habsburgs, who had restored Catholicism in Styria.[1] In 1617 the Empire persuaded the Bohemians to accept Ferdinand as their future king, and in 1618 they prevailed upon the Hungarians to elect him king. Once in power, Ferdinand was quick to replace all the Protestant officials with Catholic ones. This outraged the Bohemian nobles who saw Ferdinand's policies as an infringement on the charter previously granted unto them by Rudolph II.

Thus in May of 1618 a revolt was organized to protest against the rule of Ferdinand. On the 23 of May several Bohemian rebels raided the palace and took two royal governors and their secretary. The rebels demanded the return of the Protestant officials or they would throw the three out a seven-story window. Upon receiving no reply, the rebels pushed the two governors and the secretary out the window. Unfortunately, as legend has it, the three survived by landing in a dung heap.[2] While this

was an embarrassing failure, the Bohemians elected Frederick of the Palatinate as rival King of Bohemia. While support for the revolt was growing as the Hungarians and the Moravians had joined the revolt, when the rebels attempted to gain support from the Austrians, they declined. This gave Ferdinand the chance to call upon his family for support. Realizing that the revolt was serious, Lower Austria and Transylvania both formed alliances with the Bohemian Rebels. With an army assembled, the Rebels were threatening to sack the major city of Vienna in 1619. With success on the horizon the Protestant contingent in Europe began plans to back the revolt. However, by now Ferdinand had received support from Spain and Maximilian of Bavaria, who had the largest army in the Empire. Maximilian scared the Protestant party so much that when they received word of his aid to Ferdinand they withdrew their plans to back the revolt entirely. As for the rebel army, it was beginning to fall apart. The leaders had begun to fight amongst themselves, and the discipline in the rebel army had all but disappeared. Maximilian then advanced into Bohemia supported by Austrian troops which lead to the Battle of the White Mountain that took place in November 1620. During the battle Maximilian's Catholic army, led by an Imperial soldier Johann Tserclaes, routed the Bohemians in a single sided conflict.[3] Frederick, who was nicknamed the "Winter King" due to his short time in power, was forced to flee, allowing Ferdinand to retake his place as king of Bohemia.

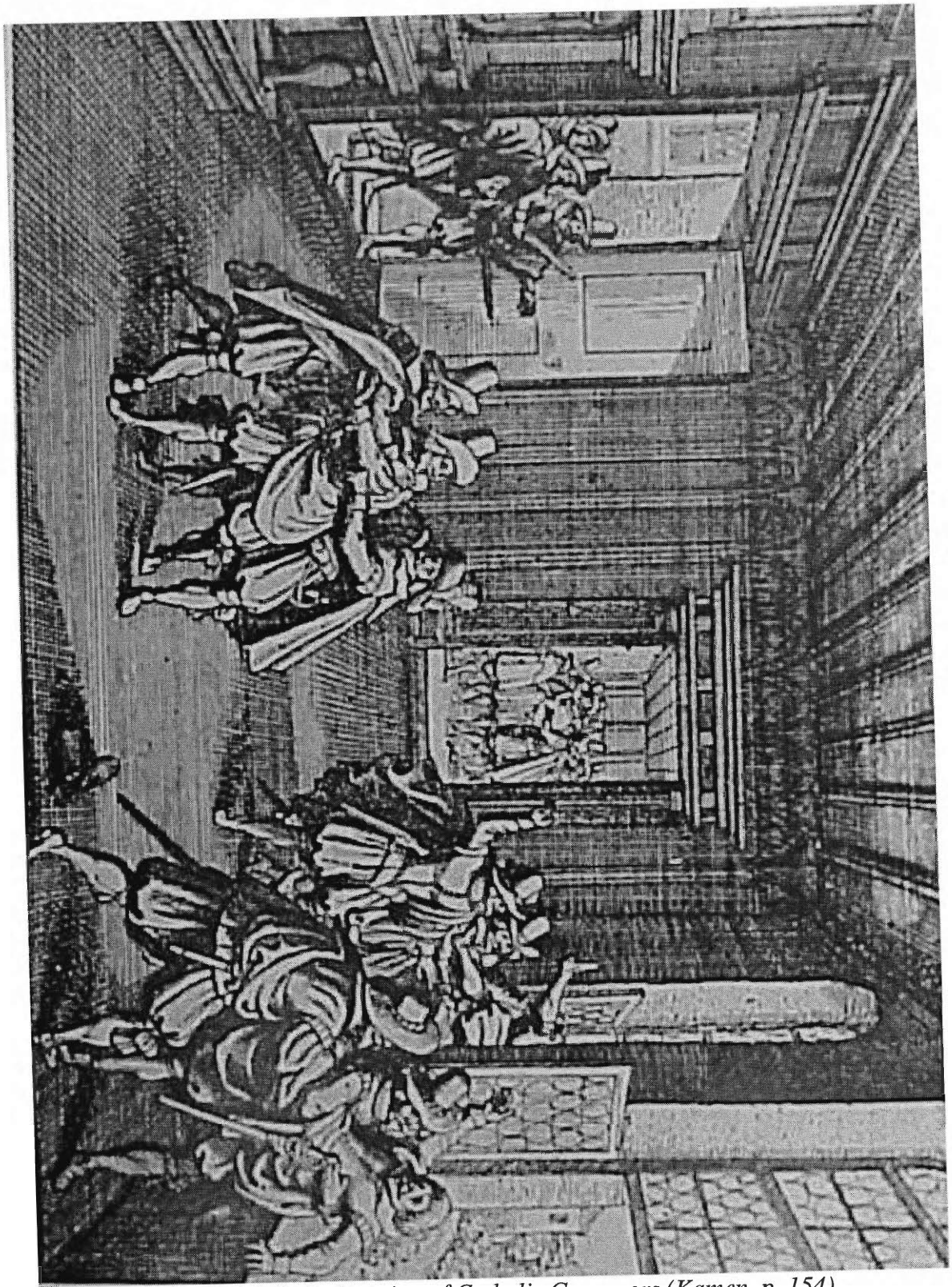


*Figure 2.2 Defenistration of Catholic Governors (Kamen, p. 154)*

**The Palatinate War**

After the victory at the battle of the White Mountain, Spain wanted to continue the war, and did so in the Palatinate. The Spaniards had established themselves there as early as 1620, and aimed at obtaining possession of the territory in order to establish it as a communications route between the Italian possessions of Spain and its territories in Burgundy and the Netherlands. Spain was interested in expansion and saw the war as a way to obtain more land. Unfortunately for Spain, none of the other victors had any desire to continue the war. The emperor was attempting to restore his power and hereditary possessions. He was also preoccupied with the continuing war with Transylvania. While Maximilian also desired to obtain territory from his conquests, the Spaniards had only a small military force in the region, and he found it very difficult to bear the burdens of war, as no outside aid of any importance was received.

Meanwhile the Count of The Palatine had received no active help either from the Protestant estates of the empire or from abroad. Internally however this was not the case for at the beginning of 1622 several adventurous partisans of the Count's, Ernest of Mansfeld, Christian of Brunswick, and Margrave George Frederick of Baden, had together collected a force of nearly 50,000 mercenaries and professional soldiers, an army of unusual size. It was hoped that this force would be easily able to oppose the army of Maximilian and the Spaniards. That unfortunately was not the case. After several engagements the Palatine army had suffered numerous defeats. With the army facing total annihilation the Netherlands, a major foe of Spain, allowed the remnants to enter their territory.

A Catholic movement was now gradually making itself felt. In 1624 Maximilian began to make the Upper Palatinate Catholic once more and in several other places Protestant land was being disputed before the courts of the Empire. The Protestants were taking notice, and several foreign countries began to give increasing attention to the war. France sought especially to separate Maximilian from the emperor; the Netherlands granted subsidies; England and Holland negotiated both with King Christian IV of Denmark and with Gustavus Adolphus to induce these rulers to take part in the war.[4] It was not long before an agreement was reached with England and Holland and an army was raised. The struggle now threatened to engage all Europe. In response to the new army, Wallenstein, a Bohemian noble, and the ablest of all the leaders of mercenaries, offered to collect and maintain in the same way as the enemy a force larger and better equipped than that of the Protestants.

It did not take long for widespread hostilities to break out. The remnants of Mansfeld's army that had retreated to Netherlands decided to make an attempt to reached Transylvania to enlist their aid. During the journey Mansfeld was attacked by Wallenstein at the bridge over the Elbe at Dessau in 1626 and was defeated. While the defeat did no stop Mansfeld from reaching Transylvania, once there he discovered that Transylvania had decided to sue for peace. Meanwhile Wallenstein had increased his army to 70,000 men and in the summer of 1627 he defeated Mansfeld's troops completely.[5] In the meantime the Spanish had pushed the Danish into the war by defeating their King Christian in August 1626, in a ferocious battle.

*Figure 2.3 Maximilian of Bavaria (Kamen, p. 158)*

**The Danish Period**

The success of the imperial and Bavarian armies had enabled the Catholics to reclaim the lands of the Church. Several Catholics were placed into high positions in the Christian church that had been occupied by Protestants before. In Southern Germany Maximilian undertook in 1627 to make the Electoral Palatinate Catholic again. Catholic demands were being sent to the emperor from all sides. The Emperor decided to appoint a council to deal with the disputes. Shortly thereafter the Edict of Restitution was drafted. This forced several Protestant nobles to give up their positions and land.[6]

For the most part, the Protestant estates within the empire had decided to stick with the emperor. The Edict of Restitution, however, alienated all the Protestant rulers and nobles from the emperor. Unfortunately the estates lacked any strength and desired only peace, so they took no steps against him. It was not until the Catholic estates also became estranged from the emperor that a crisis arose in the internal affairs of the empire which largely influenced the continuance of the war.[7] In order to maintain his enormous army, Wallenstein had to establish a system in which he assigned districts where the collection of recruits and supplies would take place. At first these districts were in the domains of the rulers and nobles hostile to the emperor. Gradually, however the assigned territories were located in the territory of those allied to the Emperor. These estates resisted, complaining that their land was being used as recruiting depots without their consent.

The friendly estates knew instinctively that their territorial sovereignty, which had existed as a fact since 1555, depended solely on the passivity of the Empire in foreign affairs, and the likelihood of that looked worse from year to year. This thought troubled

them greatly for their freedom as princes was endangered.[8] Thus these estates decided to unite themselves with the Protestants to oppose the emperor. The princes then held several meetings during 1627 and 1628. During these meetings the princes demanded that Wallenstein's system of organization be changed and called for Wallenstein's dismissal. The emperor wanted to appease the estates for his son was up for election as the King of the Romans, and the princes of the estates that had allied against him compose the electors. Thus in 1628 the emperor forced Wallenstein to reduce the size of his army a little, and then later in the year he forced Wallenstein to reduce the size of his army by a great deal more.

Meanwhile the Spanish troops were taking advantage of the weakened Protestant armies. In 1626 the Spanish had mounted an impressive campaign against the Netherlands in which they cut off the Netherlands from its main source of commercial revenue, the Baltic. In 1627 the Dukes of Mecklenburg were deprived of their possessions for aiding the King of Denmark, and Wismar was confiscated as a good port on the Baltic. Later in 1628 Wallenstein made an attempt to sack the city of Stralsund but was unsuccessful, as Danish and Swedish troops came to its aid. Wallenstein did however manage a small victory over a Danish army that was headed for the city as reinforcements. Finally however Denmark decided to sign a the Peace of Lubeck in 1629, on condition that all conquered territories should be restored. But this brought Gustavus Adolphus on the scene of war.

**The Swedish War**

In the autumn of 1629, Gustavus Adolphus informed the Swedish King that the emperor wanted to conquer Sweden and the Baltic, and that he should be prevented from doing so. As persuasion Gustavus told the king that if Sweden were victorious on Imperial soil the land would become the booty of Sweden. Up to this time, notwithstanding many offered inducements, the king had limited himself to wars with weaker opponents. He had, however, always carried on war, not only from love of it, but also from the necessity of supporting his army in foreign countries, as Sweden being a poor country, could not otherwise maintain it.[9]

Since the country was so poor, the king of Sweden did everything possible to increase its wealth. In this case if the Baltic was cut off, Sweden's copper exports would be cut off as well, which was Sweden's greatest source of income. The king of Sweden decided to oppose the emperor in self-defense and in the spirit of adventure. So in the summer of 1630 a force led by Gustavus labded on the coast Pomerania in the Empire. Except for a few persons of importance Gustavus was not welcome by the Pomerians and had to take the coast by force.

At first he was wary of proceeding inland fearing that Wallenstein's army would easily crush him. Unfortunately it did not take long before Gustavus had spent all his money and was forced to move. As Gustavus moved inland Wallenstein was unable to engage him because when ordered by the emperor to disband some his army, Wallenstein had done so in the districts that Gustavus was moving though. With no army in the region Wallenstein was forced to allow Gustavus free passage.[10] Left alone by Wallenstein, Gustavus was able to clear the entire lower course of the Elbe of imperial

troops, which were disbanding and had no commander. Finally in 1631 an imperial force tried to force Gustavus to a battle, but Gustavus chose not to be drawn into one and no decisive action took place. The imperial forces were lead by an overzealous leader, and when he could not get Gustavus into a confrontation he decided to assault a city that even Wallenstein would not touch. Thus in the spring of 1631 he stormed the city. The defending force was not as strong as once thought, but when they saw that the imperial troops were going to sack the city they set it on fire, leaving for the emperor nothing but ashes.

Gustavus took advantage of the withdrawal and seized several small provinces and a large fortress. After several victories Gustavus started attempting to secure absolute Swedish control over the Protestant estates and to secularize the dioceses that had remained Catholic. He also carried out his schemes for using German money to increase the prosperity of Sweden.[11] Maximilian's fear of Sweden constantly increased, and he eventually decided to begin negotiations for a truce in 1632. For the emperor, this was a dangerous moment of the war and he decided that Wallenstein should increase the size of his army once again.

While occupied with raising more troops, Gustavus was able to sack Munich, permitting the Swedes to plunder the Bavarian lowlands. With a fresh army Wallenstein finally conquered Bohemia. In response Gustavus tried to draw Wallenstein into a battle, and when he attempted to storm Wallenstein's position he was defeated easily. Wallenstein then decided to cut Gustavus off from the Baltic. Gustavus followed and decided to force a battle at Lützen in the winter of 1632. The Swedes were victorious, but

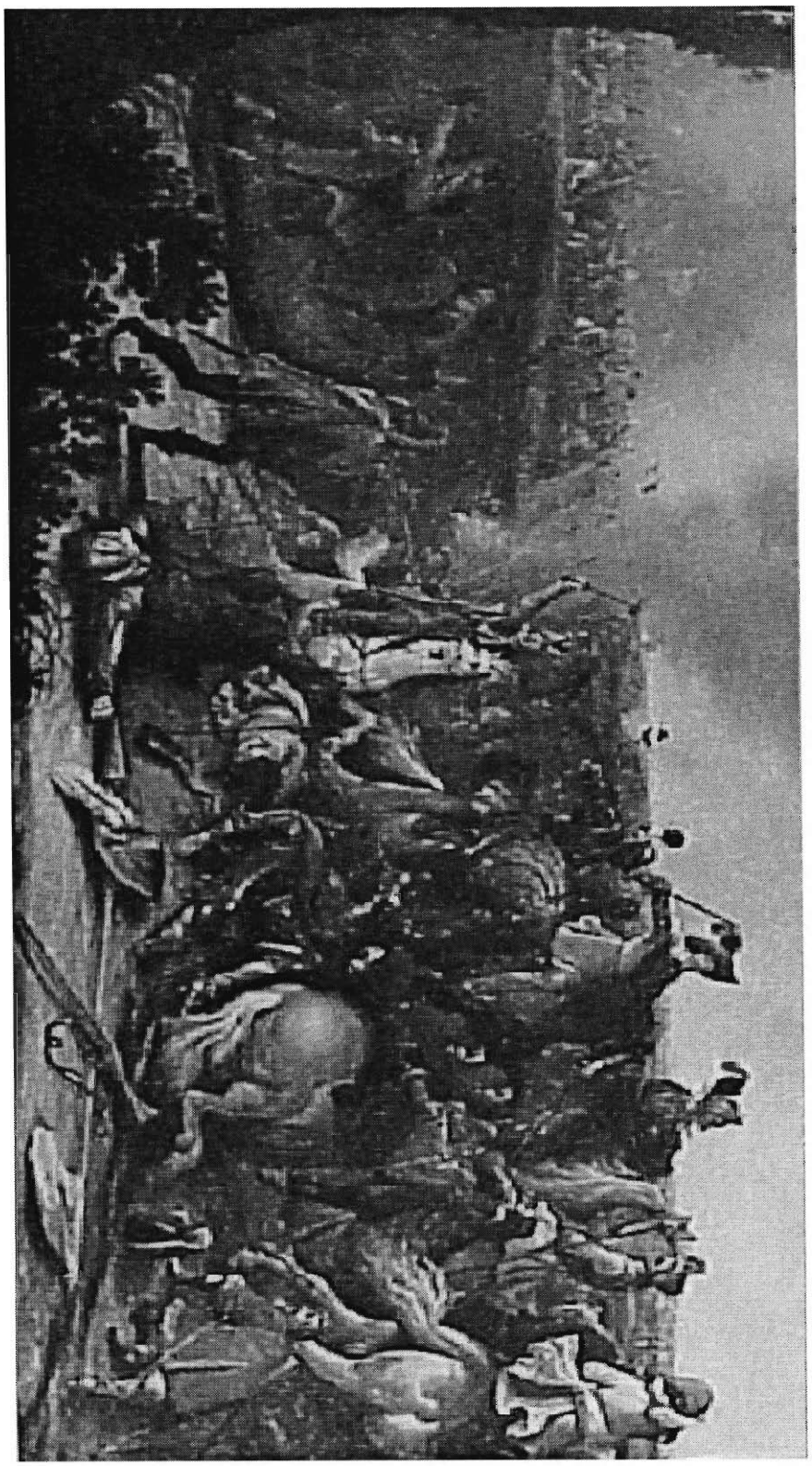


*Figure 2.4 Battle of Lützen (Kamen, page 156)*

they paid for it with the life of Gustavus Adolphus. On the imperial side Pappenheim, the emperor's most daring and capable cavalry general, was killed.[12] The death of Gustavus did not hamper the Swedish army as it found a suitable replacement in Duke Bernhard of Saxe-Weimar, who had been trained under Gustavus Adolphus and who was the ablest of the younger commanders among the German Protestants.[13]

Following the battle of Lützen the Swedish army had several successes in 1633 capturing provinces in the southern sections of the empire. Wallenstein was the only person with an army that could stop the Swedes, but when ordered to join up with the Spanish he was reluctant. The emperor decided to investigate the reason for Wallenstein's disobedience, and his spies found out that Wallenstein was conspiring with the enemy. Thus in early 1634 Wallenstein was stripped of his command and assassinated.[14]

In order to confront the Swedish army, in September of 1634 the imperial and Bavarian armies united and completely destroyed the Swedish army which contained the remainder of the finely-disciplined troops to which Gustavus Adolphus had owed his successes. After this the men who fought under the Swedish flag were only mercenaries, greedy for plunder, like those of the other armies of the time.

**The French and Spanish War**

France, who had not sat idle during the war, was busy strengthening its influence on the war. France pushed for treaties in the hope of bring troops into the northwestern sections of the Empire to flank of the imperial forces there. From there France would be

able to exercise a strong influence on the war between Spain and the Netherlands. Thus in 1635 the French formed an alliance with the Swedish and entered the war.

The prospect of France entering the war led the estranged estates in the Empire to make peace with the emperor. Both desired by the Treaty of Prague in 1636 to readjust the constitutional relations between the emperor and the estates and make the empire an organic whole. The emperor, Bavaria, and Spain, quickly decided to begin offensive operations against France. The Imperial and Bavarian armies had a difficult time against the French, but the Spanish had destroyed two armies of French and Dutch that had entered the Spanish Netherlands.

In 1636 Spanish and Imperial forces had made their way into France, and were besieging a small fortress when in response the French had brought together 50,000 men. This army forced the Spaniards to withdraw hastily. While fighting along side the Spanish against the French, Swedish forces still threatened the Empire. A campaign was put together by the Empire to drive the remains of the Swedish army out. Unfortunately it ended with a severe defeat by the Swedish in the autumn of 1636. The Spanish intended to revenge the defeat, but their fleet was defeated in 1639 by the Dutch in the English Channel. The Empire maintained a superiority in numbers, while France and Sweden conducted the war with greater skill. Consequently neither side was able to obtain a decisive victory. Thus Maximilian started negotiations with France in 1637, although as usual they went without result.

In 1639 Duke Bernhard died unexpectedly allowing France to enlist his troops so that France now had an experienced army of its own on Imperial soil. With this army France was able to force its way into the interior of the empire in 1640 with the intention

of uniting with the Swedish forces already there. The French forces were quick to realize that they could not maintain themselves for very long in so advanced a position and were forced to retreat. In the spring of 1641 the emperor prepared to repeat against Sweden the offensive operations which had failed in 1636. This second attempt failed as well as the emperor was unable to get an army together. This gave the Swedes time to place their troops under new command.

In the meantime the war had taken a decisive turn in favor of the French, in an unexpected place. The inhabitants of Barcelona, oppressed by the Spanish soldiers quartered upon them, revolted in 1640. France expediently sent aid to the rebels. The revolt tied up the Spanish for several years. Thus in 1643 the French commander Condé completely destroyed the finest and most celebrated troops of the Spanish army at Rocroi in the Netherlands. In 1644, Holland seized the mouth of the Scheldt and France Grevelingen, and in 1645 France occupied the greater part of Flanders and in 1646 Dunkirk. Henceforth, the Spaniards held only a few of the large cities in the Spanish Netherlands.

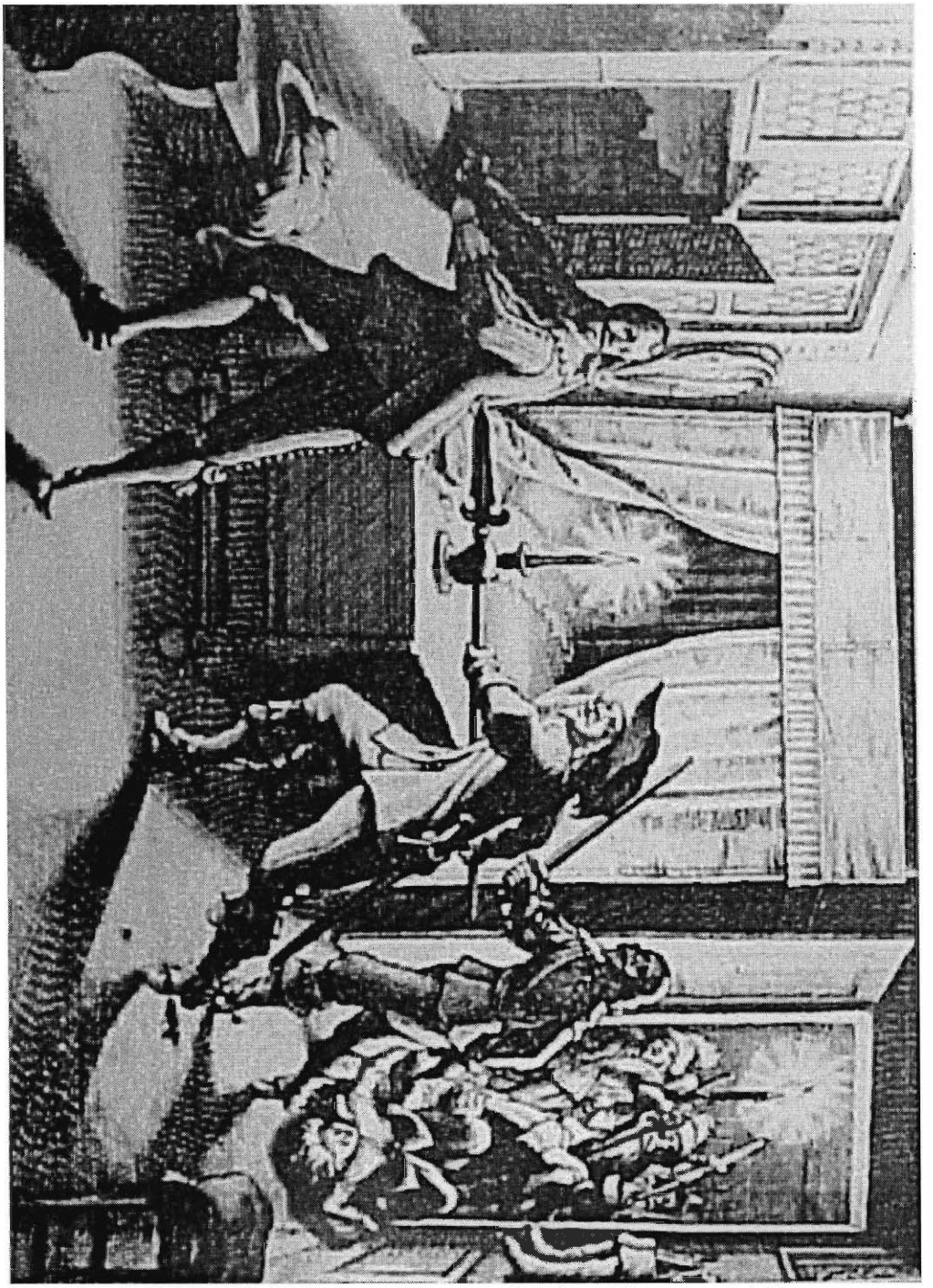


*Figure 2.5 Wallenstein's Assassination (Kamen, p. 155)*

**Results of the War**

From then on the Empire was forced to take the defensive. Their main force had to be used to prevent the occupation of the southern estates by the French. While the Imperial forces tried to defend the Empire during the years 1643-45, but were continually obliged to fall back. However no matter how well the French did the imperial and Bavarian troops were always at least strong enough to save Bavaria. In the meantime, however, the imperial forces had not been able to bring a sufficiently large army against the Swedes. The Swedish formed an alliance with the prince of Transylvania. This allowed the Swedes to permanently take much of the northwestern sections of the Empire.

During the years 1642-45 the Imperial estates unceasingly pushed for peace. In 1641 at the suggestion of the electors the first Diet held since 1613. The estates showed very plainly that they believed the emperor was over-considerate of Spain and if Austria did not break off its connection with Spain the estates would once more abandon the emperor. Once separate the estates would form a union among themselves and make a treaty of peace for the empire with France and Sweden.

Under these circumstances the emperor expressed his readiness to negotiate a peace early in 1643. The negotiations were to be carried on with France at Münster, with Sweden at Osnabrück, where the Swedish embassy had been since the spring of 1643. The imperial delegates appeared at both designated places, and the French delegates followed in the spring of 1644. At the close of 1644, the imperial delegates presented their first proposition, to which the French did not reply until late in 1645.[15]

The course of the negotiations was influenced by the results of the last events of the war, and it was decided by the military conditions of 1646. In this year the Swedes were finally able to occupy Bavaria. This led Maximilian to make a treaty of neutrality with Sweden in March of 1647. The armies of France and Sweden now occupied the entire empire, but the emperor retained undisputed possession of his hereditary lands. Thus the outbreaks of the years 1647-48 were directed against the emperor.

The French, while marching back to France in 1647 seized Prague, but was expelled by the emperor and Maximilian, who did so against his agreement with Sweden. In 1648 another French commander, Turenne, defeated the imperial and Bavarian forces at Zusmarhausen and cruelly ravaged Bavaria. The attack on Prague was renewed by the Swedes alone in 1648 when they took part of the city, but the Austrians brought together a larger army and forced them to withdraw.

To secure peace for the empire, Austria consented in 1648 to give up its hereditary lands in Alsace and the city of Breisach to France; it also finally recognized the incorporation of the territories of Metz, Toul, and Verdun into France. Sweden, in addition to land, was also given money to pay its mercenaries. The next problem for the peace process was how the empire would be reconstructed, but that was left to the decision of a future Diet in 1648. All the rulers, even the petty ones in the southern and western sections of the Empire, were declared sovereign in the internal government of their territories with certain exceptions. Moreover, the right to have diplomatic relations with foreign countries and to make treaties with them was granted to every estate.

The chief results of the Thirty Years War were: the foundation of a unified Austria under the Habsburgs; the revival of the Holy Roman Empire; the establishment of Sweden on

Imperial soil; the permanent weakening of Denmark; an enormous increase of the power of France. The question whether Spain would be able to maintain itself as a great power alongside of France led to eleven more years of war between the two states, and was decided, in favor of France, by the Treaty of the Pyrenees. This treaty and that of Westphalia were the basis of the preeminent position of France during the second half of the seventeenth century.[16]


*Figure 2.6 Central Europe 1648 (Kamen, p. 167)*

## III. The English Civil Wars.

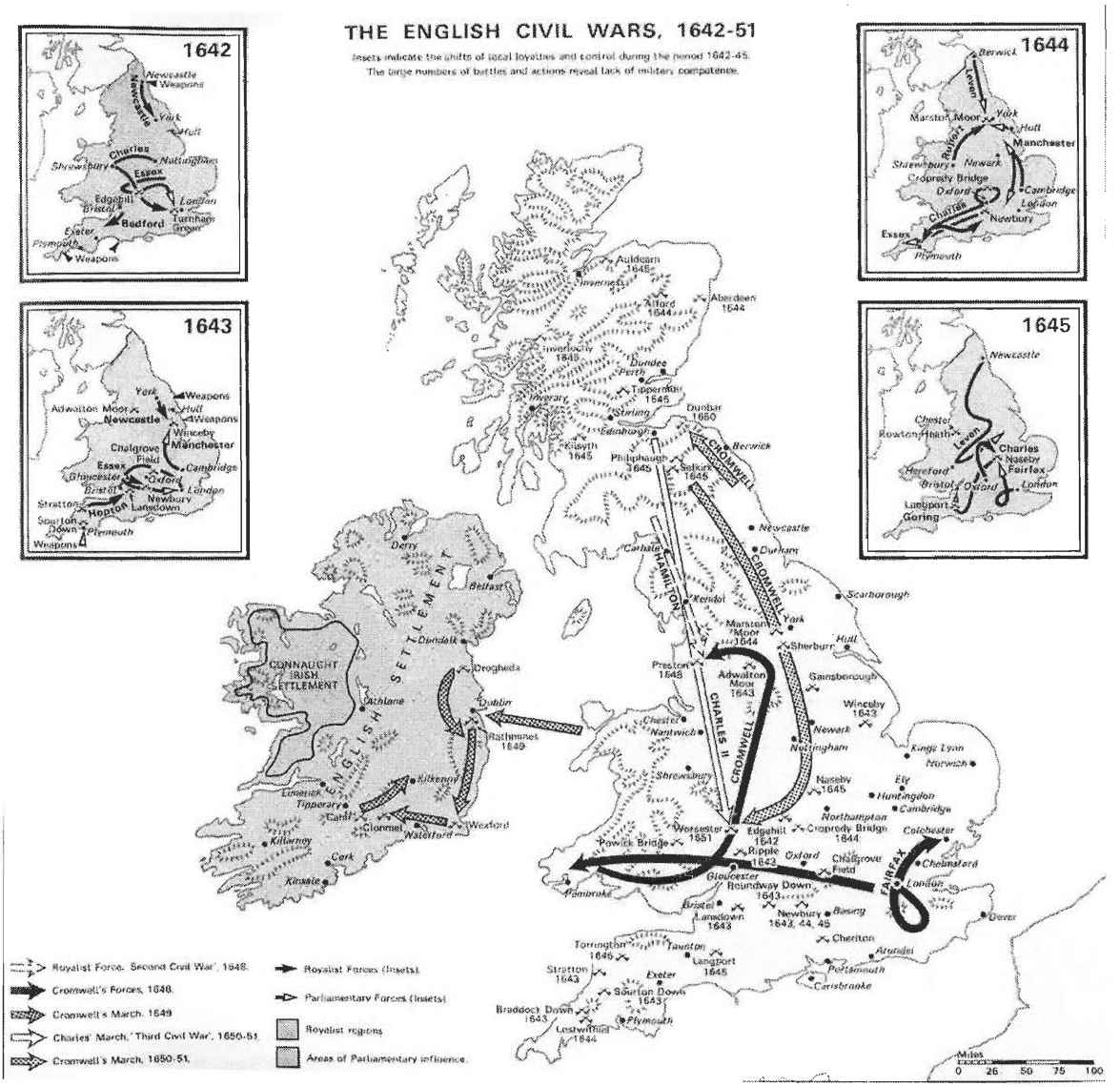



*Figure 3.1 English Civil Wars (Chandler, p31)*

**The First Civil War**

The First Civil War took place between 1642 and 1648. There was more than one cause of the first war. First there were a number of increasingly unpopular taxes, which had been sanctioned without Parliament's approval. These taxes included taxes on exports and imports as well as the infamous 'ship money'. This was originally levied on the coastal counties to pay for the Royal Navy, but was then extended to include inland counties as well. Another cause was animosity between the Puritans and the leaders of the Church of England. "Believing that the individual could establish direct contact with the Almighty without intercession of Church or minister, the Puritans considered preaching more important than established prayers, that in some cases predestination (the belief that salvation was preordained, irrespective of conduct on earth) was fact, and that resemblances to Roman Catholic ritual should be eliminated from services."[17] Lastly were the conflicts between the Royalist and Parliament parties. There were broad assertions that the nobility and gentry were Royalist and the merchants and yeomanry Parliamentarian; it seems however that support was as much if not more dependent upon geography rather than a matter of birth or finance. Thus the major contributing factors to the first Civil War was the issue of royal vs. parliamentary power, involving control of the army, power of taxation and the power to set church policy. Secondary contributions involved grievances over taxation and church organization.

*Figure 3.2 John Hampden (Haythornthwaite-ECW, p.9)*

Three to four months prior to the beginning of the war, Sir John Hotham with Parliamentary and naval support denied King Charles I access to munitions at Hull. The loss of armaments there and in London, as well as the loss of the Navy's support cost the King and Royalists dearly. However, The Royal army received significant reinforcements late in August when Princes Rupert and Maurice and other military experts managed to slip past the Parliamentary navy and deliver the much-needed munitions. Prince Rupert's significant military expertise enabled Royal forces to overcome the governor of Hull who had refused King Charles I admission. This victory allowed the Royal standard to rise above Nottingham shortly after his arrival, and so the war officially began.

*1. Baron Thomas Fairfax (1612-71)—the creator, with Oliver Cromwell, of the New Model Army which accomplished the defeat of Charles I in the Great Civil War. 'Black Tom' was widely regarded as a model soldier and commander. (DAG)*
*2. Oliver Cromwell, Lord Protector (1599-1658), a country-gentleman who in middle life emerged as a great soldier and statesman. Adopting Swedish practices, he remodelled the Parliamentarian cavalry, and later led armies to victories over the Scots and Irish. (DAG)*
*3. Rupert, Prince Palatine of the Rhine (1619-82) was a nephew of Charles I. A dashing cavalry commander, he played a leading role in the Great Civil War, and after the Restoration commanded Charles II's fleet in several actions. He is seen here as a young man. (DAG)*
*4. Charles I, King of England (1600-49), whose conduct of the Great Civil War—despite occasional flashes of talent—ended in total defeat for his cause and ultimately led him to the scaffold. Well-intentioned but stubborn and crafty, he was outmanoeuvred by his foes.*

*Figure 3.3 Key figures in the English Civil Wars (Chandler, p.32)*

Robert Devereux, the third earl of Essex and previously the King's lieutenant-general against the Scots, commanded the army raised by Parliament. His opinions were the same as those of many Parliamentary supporters at the time: their fight was not against the King but rather the 'malignants' and Papists who sought to separate him from his Parliament.

The first three years of the war many battles were fought but neither army dominated over the other. Incompetent leaders hampered the Parliamentarian army at times, whereas the Royalist army tended to have insufficient soldiers. The Royalists came to be known as the 'Cavaliers' and the Parliamentarians as the Roundheads. These names were meant

to be derogatory, though the Royalists actually liked the name and adopted it as the name for their soldiers on horseback.

The fourth year of the war, 1645, was a time of change. King Charles I decided to replace the Earl of Forth with Rupert as his senior general even though his advisors felt it was unwise. That change was relatively small in comparison to the changes made by the Parliamentarian Army. It had become obvious that, in order to be victorious, drastic reorganization of the forces and military leadership was necessary. The predominant necessity was to create a 'general service' army free of local loyalties and commanded by those who were prepared to prosecute the war to the utmost. The more extreme members of Parliament felt blame for failures lay with the Presbyterian 'aristocracy' of Essex, Manchester and Waller, who felt that without the King the social order would dissolve into anarchy. Such aristocrats sought not so much to defeat the King as to end the war with him remaining as the figurehead of the country. This blame eventually led to both Essex and Manchester resigning their commissions. This led to Sir Thomas Fairfax, the only senior Parliamentarian officer not affected by the aforementioned unpleasant events, becoming commander of Parliament's revised 'New Model Army'. The New Model Army brought about many new standards and reform involving supplies and equipment practices, meaning standard issue equipment and supplies for each soldier. It also brought about the first implementation of a 'national' uniform.

The New Model Army was comprised of 22,000 men in 11 regiments of horse, 12 of foot and one of dragoons. This army had great success eventually leading to Parliament gaining control of almost all of Wales by October of that same year. This left the royalist in a hopeless position at the beginning of the campaigning season of 1646.

Again the New Model army had great success and eventually seized the king in early June of 1647. This led to negotiations with the King, which ended with no settlement being reached, leading to the second Civil War.

**The Second Civil War**

Perhaps the most concise and succinct account of the Second Civil War was that given by Sir Winston Churchill: 'The story of the Second Civil War is short and simple. King, Lords and Commons, landlords and merchants, the City and the countryside, bishops and presbyters, the Scottish army, the Welsh people, and the English Fleet, all now turned against the New Model Army. The Army beat the lot'.[18]

The first military actions of the new war took place in Wales, but it did not end there. There were many minor uprisings and finally an invasion by the Scots. This war left the king in a weakened position, as few parliamentary and military leaders were prepared to trust him after the resumption of hostilities. Negotiations were set to reopen, but recognizing the danger of reopening the negotiations, Charles I agreed Parliament should control the armed forces for 20 years, yet still refused to accept permanent Presbyterianism for the English church.

The reopening of negotiations gave rise to a republican movement, which fell upon Fairfax's deaf ear, but was received sympathetically by Henry Ireton. Ireton composed a 'remonstrance' demanding constitutional reform, which meant putting Charles I on trial.

*Figure 3.4 Henry Ireton (Haythornthwaite-ECW, p.107)*

The House of Commons found that the negotiations with the King were 'highly dishonorable and destructive of the peace of the kingdom' and established a committee to bring the King to justice. On January 1, 1649 an ordinance was passed establishing a court to try him; on January 27 he was condemned to death as a tyrant and traitor responsible for the bloodshed of his own people. On January 30 King Charles I was beheaded at Whitehall.

**The Third Civil War**

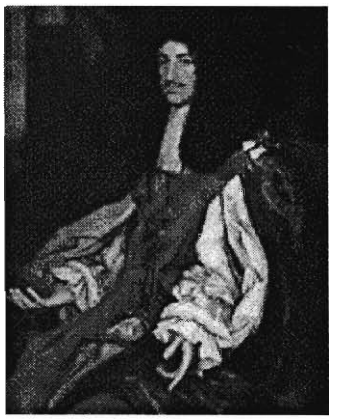


*Figure 3.5 King Charles II (www.britannia.com)*

Upon the death of Charles I, his son Charles II became the new King. He had three possible courses of action open to him in an attempt to regain his throne. These possibilities included foreign assistance, invasion from Ireland, or from Scotland. Scotland was a more fertile ground for Charles' hopes, and on February 5, 1649 a proclamation was issued acknowledging his succession as Charles II. In order to accomplish his goal Charles was forced into negotiations with the Scottish Commissioners at Breda. Though the terms of the agreement were strict Charles was encouraged to agree, and on May 1, 1650 he signed the Treaty of Breda. In doing so he under took to impose Presbyterianism upon England, to outlaw Roman Catholicism, and to acknowledge the Scottish Parliament, in return for an invitation to be crowned in Scotland

Ironically, the Third Civil War was not initiated by the Scots, but rather the Council of State in London, which decided that an expedition to Scotland was required to prevent any Scottish offensive. The Council's Army led by Cromwell was met by the Scottish forces led by Leslie, leading to the retirement of Cromwell and his forces to Dunbar. With Leslie in a strong position on the Lammermuir Hills, Cromwell's army was in some discomfort, which can be seen in a letter written by Cromwell asking for reinforcements: 'We are upon an Engagement very difficult. The enemy hath blocked our way without great difficulty; and our lying here daily consumeth our men, who fall sick beyond imagination'.[19] Unintentionally interfering on Cromwell's behalf, the ministers of the Scottish Kirk persuaded Leslie to move down from his position and scatter the enemy, as the God of the Covenant would ensure victory. It was one of the most complete defeats of the Civil Wars. About an hour after the battle began it was over, with

estimates of 3000 to 6000 Scottish casualties and 10,000 prisoners, while Cromwell claimed to have lost a mere 20 to 40 men.

Leslie had however held in reserve some 4000 men in reasonable order, which kept Cromwell from completely mopping up. Charles II was then able to press on with his intention of uniting his supporters in England and Scotland. A new army was then raised from his united supporters and eventually marched to Worcester in August of 1651. Cromwell's forces meet Charles' army, outnumbering them more than two to one. Charles' forces under Middleton's command bravely resisted until Middleton was wounded, but elsewhere the Royalist army disintegrated. Charles avoided capture for 45 days after his escape from Worcester and was able to slip away to France.

The consequences of the Civil Wars were profound; Anglicans and Roman Catholics were permitted to worship privately in London, Jews were permitted to return to England and their sects were not interfere with provided they did not infringe on the law. Furthermore the Civil Wars as a whole destroyed forever the feudal powers of the crown and the King's right to levy taxes without the consent of Parliament which, as it emerged victorious, became the cornerstone of the British Constitution. And the supremely professional army and navy of the Commonwealth set the pattern for British military supremacy in the following centuries.

This commonwealth ended in 1660 as the monarchy was restored under the leadership of Charles II, this time with backing from at least part of the army.

## IV. The Seventeenth-Century Army

*Figure 4.1 Seventeenth-Century Troops (Wagner, p. 12)*

**Discipline and Punishment**

At the beginning of the 17th century there were basically two types of armies in Europe: land reserves and professionals. One was poorly trained and not well disciplined and the other was even worse. The kings and emperors of the times had to rely on these two types of armies to stay in power.

The soldiers that made up the land reserves were mostly ordinary citizens who were made into soldiers whenever there was a need for them. When a ruler needed an army he would order the estates, large property owners, to raise one from their subjects. These estates would then have to take their valuable workers and raise an army with them. The estates were responsible for all the payments associated with raising and maintaining an army. The wages, clothing, food, and arms all had to be provided at the expense of the towns and estates. These soldiers were not professionals and they did not want to fight, especially for long periods of time and far from home. As a result morale was low and discipline lacking. Many times the soldiers were so slow that the battle was over by the time they reached the battlefield. When they did arrive on time they were quick to lose interest and abandon their ranks to return home.

The more prevalent armies of the 17th century were made up mostly of mercenaries and other professionals. These professional soldiers were better trained and organized than the land reserves. The ruler would only need to hire a proprietor who would raise the army himself. The money to pay for these armies would still come from the towns and estates but they did not object much because they were able to keep all their workers. All they had to worry about was coming up with the money. The rulers

also preferred professional armies because they were not always comfortable with giving arms to the general populace, which could use them to revolt.[20]

Once the money for the army was raised the ruler granted a proprietor the right to raise a military unit. The proprietor was told how large a unit to raise and had another officer do the actual recruiting. This officer then traveled throughout the district letting everyone know that a certain person was raising an army or regiment to fight in a certain campaign. The pay was also announced and varied depending on the experience of the recruit. The recruits usually signed up for 6 months' work or for one military season, the latter being the more common.

Anyone who was caught giving false information could be given the death penalty. The soldiers were then informed of their duties and the punishments for disobeying rules. All of the soldiers had access to these rules at all times and they were usually kept with the commander or someone appointed by him. The proprietor had supreme command over the troops at all times.

A sample set of rules and regulations from an early 17th-century code[21] read as follows:

> A soldier who should accept monies upon recruitment and then defect shall be punished by death.
>
> In a castle, town or any such fort captured, the proprietor of the unit or the supreme commander of the forces that had taken the fort is entitled to all artillery pieces, gunpowder and captured victuals. All other things belong to that who seized them first. Anybody who should attempt to take another's war booty shall be punished.

Taking revenge on another either for foul words or debt is forbidden under pain of death.

No malice shall be borne among soldiers, especially between infantry and cavalry, or the offender shall be severely chastised.

Death shall be the lot of those who kill others or incite mutiny. Should anybody be assaulted and should the felon continue in his deed in defiance to warning, the attacked party may kill the assailant and go free.

No one shall incite riot or provoke panic among the troops.

Anyone intending to commit treason shall be immediately reported.

Under pain of death no one shall leave his encampment. No one shall converse with the enemy without consent of the high command of his troop.

It is expressly forbidden to fire arms willfully, especially in villages or at night. The offender shall be punished by death.

He who should kill anybody intending to desert from battle shall go unpunished and will be rewarded.

When marching through own territory no one shall wantonly appropriate anything from the local folk and everybody is bound to pay for all victuals furnished and services rendered.

After a battle won no one shall plunder before issued permission.

When alarm is sounded everyone must hurry to his company or he shall be punished.

Despite these rules and regulations many soldiers committed crimes anyway. The armies were often disbanded for the winter and the soldiers turned to looting to sustain themselves as most had not been workers but rather unemployed and in many cases criminals and other unwanted members of society. Also, many soldiers in the mercenary armies were foreigners fighting in areas which they did not know or care much about, and

as a result they lacked discipline. The pay was also very irregular and it was not uncommon for a mercenary to change sides during a war or campaign if the other side promised to pay better.

**Organization and Leadership**

The main military unit during the 17th century was the regiment, sometimes called a brigade, which was commanded by a colonel. A regiment was made up of several smaller units called battalions. A battalion was usually made up of about 500 men and was commanded by a lieutenant colonel. The battalions were made up of smaller units known as companies or platoons, which were led by captains.[22] The colonel's staff usually consisted of the lieutenant colonel, sergeant major, quartermaster, purveyor, drum major, provost, judge advocate, chaplain, and the executioner.[23] The term general was becoming more common in the 17th-century and referred to the leader of a group of regiments. The supreme commander of a large army was called a generalissimo.

At the beginning of the century the colonels or proprietors had control over their regiments. They were the ones who had assembled their regiments and were given authority by the monarchs. Several regiments were grouped together to form an army. As the century progressed and the armies became more national the monarchs began to want greater control of the armies. They felt that if they were supporting the armies they should have direct control over them. The actual control still remained with the colonels and generals but they had to follow the wishes of their rulers. In some cases the ruler and commander were one, as was the case with Gustavus Adolphus.

**Provisions**

The armies fighting in the 17th century required many provisions. Among them were food, both for the soldiers and for the horses, weapons, armor, and lodging. As a result most campaigns were fought in areas which could provide the armies with these provisions. The armies consisted not only of the soldiers but of women and children as well. The women and children followed the soldiers and performed many of the chores such as cooking and cleaning. Not only did they slow the armies down but they also required food themselves.

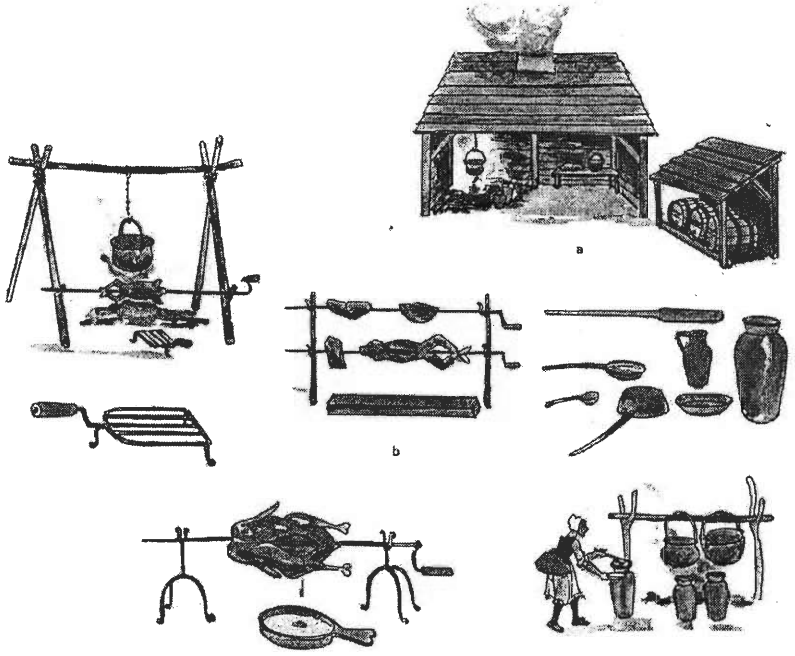


*Figure 4.2 Methods of food preparation (Wagner, p.284)*

Looting was generally practiced by the soldiers as a means of supplementing their incomes. This was done in both enemy and friendly territory and the populace was terrorized by the soldiers. In addition to stealing food and other necessary items the

soldiers would often commit other crimes as well, such as rape and murder. The commanders in many cases had no choice but to look the other way as they had no way of paying the soldiers themselves. In other cases they themselves turned to looting as well. They were very interested in obtaining booty from captured territory.

The commanders knew that armies depended heavily on the territories that they occupied and so they would destroy areas which they could not control and which they knew would fall into the enemy's hands.[24] Thus when enemy troops moved into the territory they would either have to move on or find alternative means of supporting themselves. Continued fighting in one area destroyed crops and livestock and prevented food from being produced.

Gustavus Adolphus introduced reforms that sought to limit this looting and destruction by building supply bases in key areas. This became the model for later armies of establishing supply bases at various places in occupied territories.[25] This not only protected the general populace but raised the morale of troops as they would not have to worry about getting food and supplies.

**Tactics**

Military tactics underwent a great change during the 17th century. The pike and musket were equals at the beginning of the century but by the end of the century the musket had assumed its superiority on the battlefield and the bayonet remained as a reminder of the once important pike. The pike was in decline during the century save for a brief moment when it regained importance in Gustavus Adolphus's tactical system. The large square battle formations were outperformed by the new linear formations, which made more efficient use of the available soldiers. Gone was the heavy cavalryman; the

dragoon and arquebusier had taken his place on the battlefield. War ceased being the privilege of the nobility and became the "livelihood of the masses."[26]

***The Spanish Square***

For hundreds of years armies had fought in dense formations that made them vulnerable to firearms and artillery. During the 16th century the Spanish Square was the most successful battle formation being used in Western European armies. The Spanish Square, also know as a tercio, consisted of a dense block of pikemen with musketeers in the front and on the flanks. The main role of the musketeers was that of offense. The pikemen were the main defensive units in the army.

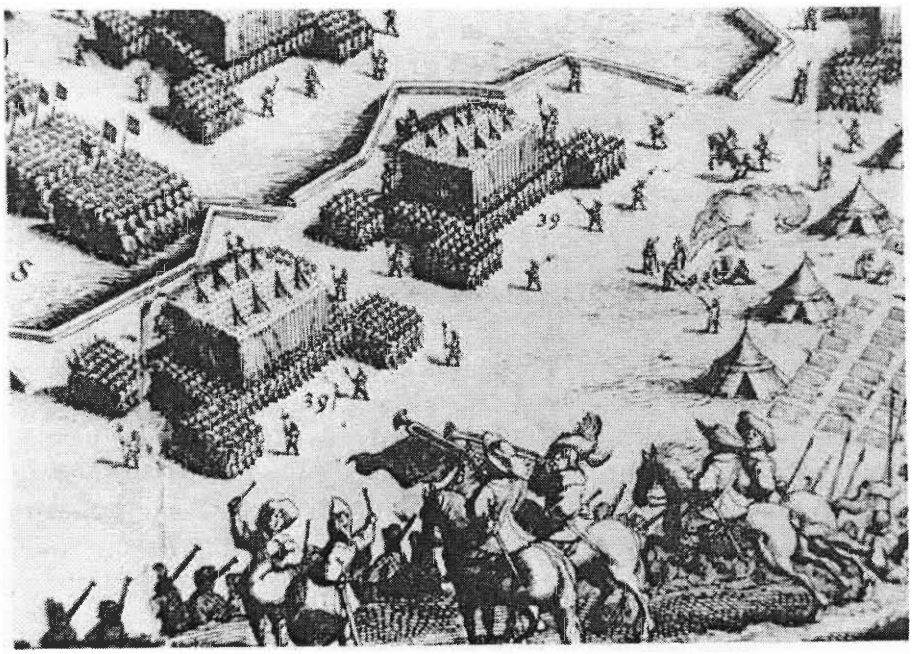


*Figure 4.3 Spanish Square (Haythornthwaite - Invincible Generals, p.21)*

One of the biggest drawbacks of the Spanish Square was that it relied on the troops in the front to bear most of the actual fighting as those in the middle and back were

left out of the action. They could not fight themselves, as they were blocked by those in front. The square therefore was not a very efficient way of using available manpower. Furthermore, because of its large size it was difficult to maneuver and if an enemy was able to create a gap it could take advantage of the confusion that would result.

The cavalry relied heavily on their firearms rather than swords. Several rows of cavalry were grouped together into a block and the first row fired their firearms at the enemy and moved to the rear of the block. The next row would proceed to do the same and so on. This tactic was known as the "caracole."[27] This was used in the hope of forming a gap in the enemy's formation so that the rest of the troops could make a successful attack. The gun not being a very reliable weapon made this an ineffective style of fighting. It was difficult for a soldier on horseback to hit anything. Towards the end of the 16th century some military strategists began to use the sword more as a shock weapon following the gun discharge, but it would not be until the first half of the 17th century that Gustavus Adolphus would fully implement this tactic.

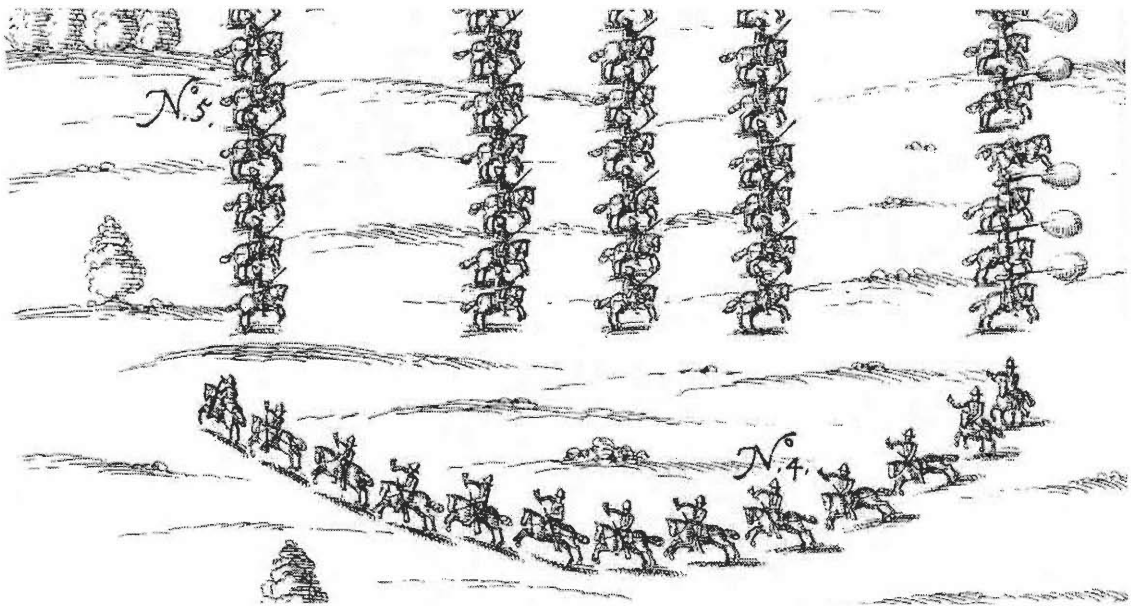
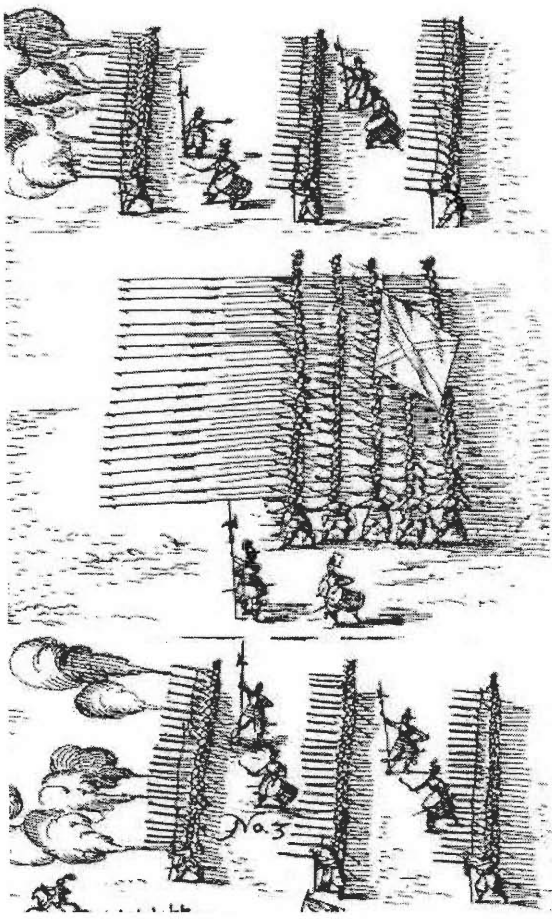



*Figure 4.4 Caracole (Wallhausen – Kriegskunst zu Pferdt, figure 20)*

***Dutch Methods***



Maurice of Nassau, the Prince of Orange, began to make some major reforms in battle tactics at the end of the 16th and early 17th centuries. He realized that the Spanish Square was too large to fight effectively and sought to reduce its size. He reduced the number of rows of pikemen to 5 and flanked them with musketeers.[28] This allowed all the soldiers to be able to fight.

*Figure 4.5 Dutch Formations (modified from Wallhausen - Kriegskunst zu Pferdt, figure 37)*

Overall Maurice increased the number of units in his army while decreasing their size. He also created one of the first modern standing armies as one would think of them today. The soldiers that made up his army were almost exclusively Dutchmen. He introduced many improvements in training and administration but was not able to fully implement them. His reforms were inspired by ancient Roman methods.[29] Protestant commanders began to copy his methods and Gustavus Adolphus finally perfected them.

## V. Gustavus Adolphus

*Figure 5.1 Gustavus Adolphus by Albert Cuyp c.1630 (Haythornthwaite - Invincible Generals, p.6)*

Gustavus Adolphus studied the reforms of Maurice and was able to perfect them. He is widely regarded as the first modern commander. Gustavus transformed the Swedish military from a virtual nobody into one of the most powerful in Europe.

Born in late 1594, Gustavus ascended to the throne in 1611 at the young age of seventeen. He was already very experienced in many areas of government and leadership because all his life he had been taught with the goal of preparing him for his days as king. He wasted little time in reforming many areas of Swedish government. The following pages focus on his military reforms.

Gustavus created a national army, much like Maurice, which was comprised of Swedish soldiers, and he himself was their commander. This resulted in much higher morale, as the soldiers were able to take an example from the commander, who always got involved in the battles personally, a fact that would ultimately lead to Gustavus' death. When he was forced to use mercenaries, especially in later years when his army grew in size, Gustavus employed only the best soldiers, chiefly Scottish and English.[30]

The soldiers came from all classes of citizens and Gustavus preferred those who were small property owners because he viewed them as very responsible and reliable. In order to create a stronger bond between the soldiers he created units with soldiers from the same or neighboring provinces. The soldiers were paid much better than those of other European armies and this resulted in less looting and discord. The soldiers were paid in cash as well as being given land in return for their service. In addition, Gustavus tried hard to keep his soldiers well fed and clothed. He was one of the first to introduce a uniform into the army. The supply bases that he established allowed his army to have provisions available to them nearby.

Commanders during the 16th century and before had fought wars in such a way as to minimize actual fighting. They believed that being forced into battle was a loss in itself. Historian Michael Roberts states that "Contemporary theorists, rationalizing their own impotence, extolled the superior science of the war of manoeuvre, and condemned battle as the last resort of the inept or unfortunate commander."[31] Their goal was to maneuver in such a way as to avoid actual engagement. Gustavus sought to end this indecisiveness and achieve actual victory on the battlefield.

Gustavus put firepower into better use and reintroduced shock action into the battle. He made his musketeers into more offensive units and gave offensive capability to the pikemen as well. All this was done at the same time that mobility was increased.

**Infantry**

To make battle formations more mobile Gustavus adopted the linear tactics of Maurice. He organized the pikemen in 6 rows of 36 pikemen flanked on both sides by 6 rows of 16 musketeers. These 216 pikemen and 192 musketeers formed a squadron. Each squadron also included several commissioned and non-commissioned officers. Having such shallow formations allowed all of the pikemen and musketeers to be used more effectively as all could now participate in the fighting. This formation is illustrated in the figure below.

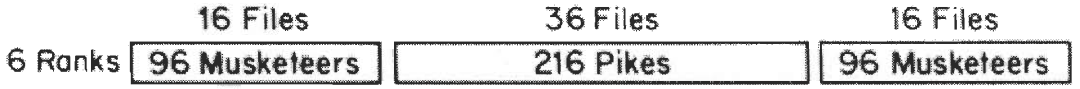



*Figure 5.2 Swedish infantry formation (Haythornthwaite-Invincible Generals, p.18)*

The musketeers continued the Spanish tactics of firing and moving to the rear. At first the two front rows would fire and move to the rear to reload. This was soon increased to three rows. The musketeers were able to reload quickly with the introduction of the paper cartridge. That, combined with improvements in firearms, allowed half of the musketeers to fire at a time instead of the previous one-third while still keeping up the continuous fire. After the musketeers had fired their guns they were vulnerable to attack and so the pikemen were used to protect them. Gustavus expanded the role of the pikemen to that of offense as well. They now charged the enemy, in effect creating a shock tactic. The musketeers were used to create chaos in enemy ranks, which would be followed by a charge of pikemen. This was very effective against the tercios as they were difficult to maneuver because of their large size.

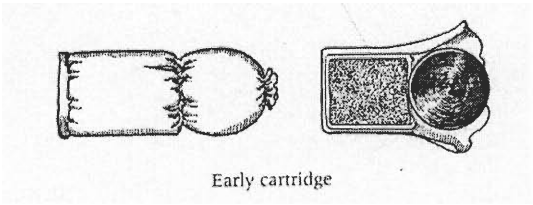



*Figure 5.3 Paper gun cartridge (Harper's Military Encyclopedia, p.572)*

**Cavalry**

The cavalry underwent an equally important transformation under Gustavus. Since the early 16th century, when the use of firearms had become widespread, commanders rushed to equip their cavalry with these weapons and minimized the importance of the sword. Firearms were not very accurate and were much more difficult to fire from horseback. As a result the cavalry had become an ineffective fighting force. Gustavus turned the cavalry into a shock force by giving priority to the sword over the

firearm. The cavalry would now fire the firearms once they got close enough to the enemy and would then charge with the sword.[32] Therefore, the firearm became only a prelude to the main attack. The cavalry now too possessed a very valuable shock ability. The first objective of cavalry was to defeat the enemy's cavalry and then to attack the flank and rear of the enemy infantry.

At first a cavalry regiment consisted of 974 men but it was later reduced to about 570.[33] These regiments consisted of squadrons of 75 men arranged in 4 and later 3 rows. The cavalry was positioned on the flanks of the infantry. Musketeers were also placed throughout the cavalry formations to add protection and firepower.[34] This sometimes slowed down the cavalry but increased its strength.

The Swedish army would fight in two shallow lines, usually 300 paces apart, with infantry in the middle and cavalry on the flanks. Behind each line were reserve forces. Artillery was placed along the front lines. This can be seen in figure 8.4. The one drawback of using shallow lines was that it left the rear vulnerable. If the enemy was able to attack from behind it would not have a very difficult time in breaking through the ranks. This weakness was offset by the fact that the enemy would have a hard time getting around the long lines of soldiers. Also, the linear formations were very maneuverable and could quickly reverse positions.

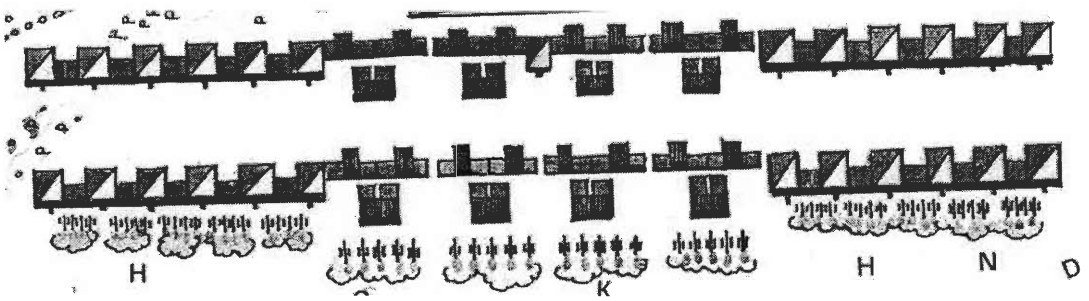



*Figure 5.4 Swedish Battle Formation (Wagner, p.118)*

**Artillery**

The Swedish army also vastly improved artillery and was able to use it very effectively during battle. Gustavus reduced the number of types of cannons in service from sixteen to just three. This made re-supplying a much easier task. The guns that he chose to use were the 3-pounder, 12-pounder, and the 24-pounder. Previously guns as large as 48-pounders were used. These guns were very heavy and difficult to transport. In 1626 over 1000 horses were needed to transport the Swedish army's 36 guns while in 1630 those same horses could now transport 80 guns.[35]

**Leading by Example**

Gustavus was very concerned about the welfare of his army and he also wanted everything to go just as he had planned. In order to accomplish this he was very involved in scouting missions and in actual fighting. This not only gave him a clear idea of what was going on around him but greatly inspired his men to fight to the best of their abilities. No longer was the common soldier just an expendable weapon of his commander, the commander now became a soldier. A contemporary of Gustavus wrote:

> He did animate his soldiers rather by fighting, than exhorting; nor did he challenge to himself any advantage above the meanest of them…He well understood that faith and loyalty are not to be expected where we impose thraldom and servitude, and therefore at times he would be familiar, as well with the common soldier as the commander…he never persuaded any man to an enterprise, in which he would not himself make one. He taught them as well by hand, as tongue.[36]

**Battle of Breitenfeld**

The Battle of Breitenfeld was the first major battle in which Gustavus was involved in during the Thirty Years War. The battle was fought on September 17, 1631 near the town of Leipzig in what is today central Germany. Facing Gustavus was the Imperial General Tilly and his subordinate Pappenheim. The result affirmed the Swedish army as one of the best in Europe.

Tilly had about 36,000 to 40,000 men under his command.[37] He set up his army in the old Spanish square formations on a relatively even ground. His thirty or so artillery pieces were placed on raised ground in front of the troops. The infantry was arranged in 17 tercios, each numbering 1500 to 2000 men. Cavalry was positioned on both flanks of the infantry and consisted of about 11,0000 men.[38]

Gustavus' army consisted of about 42,000 men, including 16,000 Saxons. There were also several thousand Scottish mercenaries fighting in the Swedish army. He positioned his troops in linear formations with cavalry on the flanks and reserves between the lines. Not only did his army have more guns, 54 to Tilly's 30, he had better engineers and gunners, who could fire the artillery more precisely. Musketeers were also placed between the cavalry regiments.

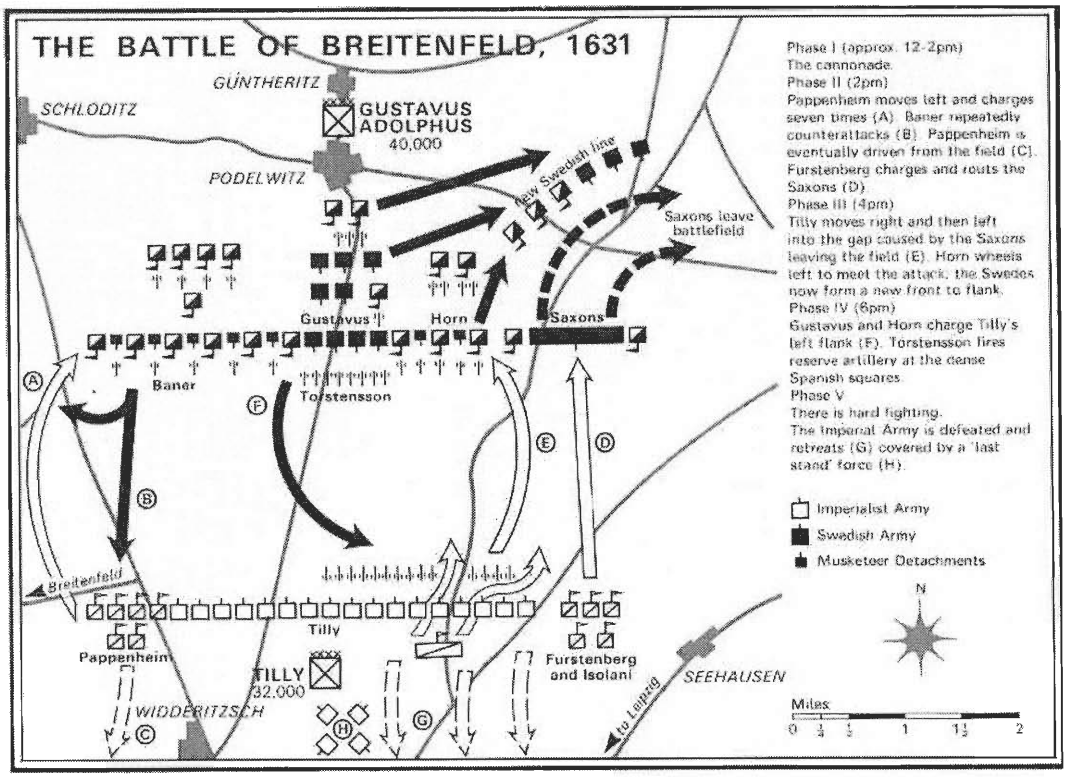



*Figure 5.4 Battle of Breitenfeld (Chandler, p.26)*

The battle began when the Imperial troops opened fire on Gustavus' army with their artillery. The Swedes responded with their artillery and this continued for several hours. Pappenheim, commanding 5000 cavalrymen, decided, against orders, to launch an attack. Using the *caracole* tactic the Imperial cavalry charged the Swedish army. They were forced back by the musketeers deployed between the cavalry. Pappenheim repeated the same maneuver six more times, with the same unsuccessful result each time. The Swedish cavalry drove Pappenheim from the field for good on his seventh try.

The other side of the Imperial line proceeded to attack as well, believing that Tilly had ordered a general advance. They attacked the Saxons and drove them from the field in little time. Seeing the confusion on the Swedish side Tilly now ordered a full assault. His main forces attacked the retreating Saxons while the remaining Imperial troops

attacked the Swedish rear. The Swedish troops quickly maneuvered themselves into position to meet the oncoming assault, a maneuver made possible by the small size of their units. The reserves were also brought in to reinforce the front line. Scottish mercenaries, fighting under Gustavus, begin to fire their muskets and artillery into the oncoming Imperial troops, causing disorder in one of the Imperialist *tercios*. The Scots charged the disordered and retreating troops with their pikemen but had to halt because of the smoke created by the artillery fire.

Gustavus took his cavalry and led four regiments against Tilly's artillery. He overran the troops manning the guns and quickly brought in his own artillerymen to fire the Imperialist guns on the Imperial troops. The slow tercios made for easy targets and the casualties began to quickly mount up for the Imperial army. Tilly was wounded during the battle and 7000 of his troops were killed. A further 6000 were wounded or captured. The Imperial army retreated from the battlefield as a result of their defeat.

**Aftermath**

The Battle of Breitenfeld could be considered the turning point in the Thirty Years' War. It prevented the Emperor from regaining control of the Protestant German states and gave momentum to the Protestant side. The battle is considered by many historians to be the first major modern land battle and it established Gustavus as one of the most skilled modern commanders.[39]

Gustavus was able to put into practice all of the reforms that he had instituted in his army and came out victorious. The shortcomings of the *caracole* resulted in the defeat of the Imperialist cavalry and the great *tercios* were overwhelmed by the Swedish artillery and infantry. The large size of the *tercios* prevented them from being able to

maneuver quickly to position themselves against the attacks from the very mobile line formations of the Swedish army. Gustavus eventually was killed on November 16, 1632 in the battle of Lutzen but his tactics became copied by commanders across Europe.

## VI. Musketeers

### Description

The musketeer was a member of the infantry along with the pikemen. Like the archers before, the musketeers used their weapons, the matchlock and flintlock musket, to dispatch the enemy from a distance. Many armies found that the introduction of the musket into their arsenal resulted in a huge increase in firepower. Some of the biggest advantages of the musket were its ability to penetrate the heavy armor of the cavalry. The musket could also be firmly rested against the shoulder allowing for better aim and required very little training to operate.[40] By the end of the 17th century, the infantry of most armies was almost entirely composed of musketeers.

The appearance of the infantry during the first half of the 17th century resembled that of civilians, except for the large amount of equipment that was hung from the musketeer's shoulders and waist. The military dress of the time tended to follow civilian fashion until uniforms were introduced along with standing armies during the second half of the 17th century. Generally the clothes of the rank-and-file were identical with the dress of the town and country people.[41] The officers on the other hand usually had clothing that was of better quality. Below the waist this clothing usually consisted of shoes, hosiery and wide trouser pants that went down to the knees. Above the waist a tunic, a long close fitting jacket with a high collar, was worn along with a feather hat or helmet.

Along with the civilian clothing the musketeer had about him a great deal of equipment. In the musketeer's left hand was his musket, and if needed in the right was his forked rest. About the musketeer's waist was where the majority of his equipment

was located. For close combat the musketeer carried a sword on the left and sometimes a dagger on the right. Also on the right side of the musketeer's waist hung his supply of powder, shot, and any extra match cord. Depending upon the date, a musketeer would have two powder horns, one for the coarse powder and one for the fine ignition powder, and a small leather bag to hold his shot. During the thirty years war however the shot and coarse powder began to be packaged together in a paper wrap, and these were then hung on a sash that was on the musketeers shoulder. Once the sash was in place, the match cord and the shot were often hung upon the sash as well.

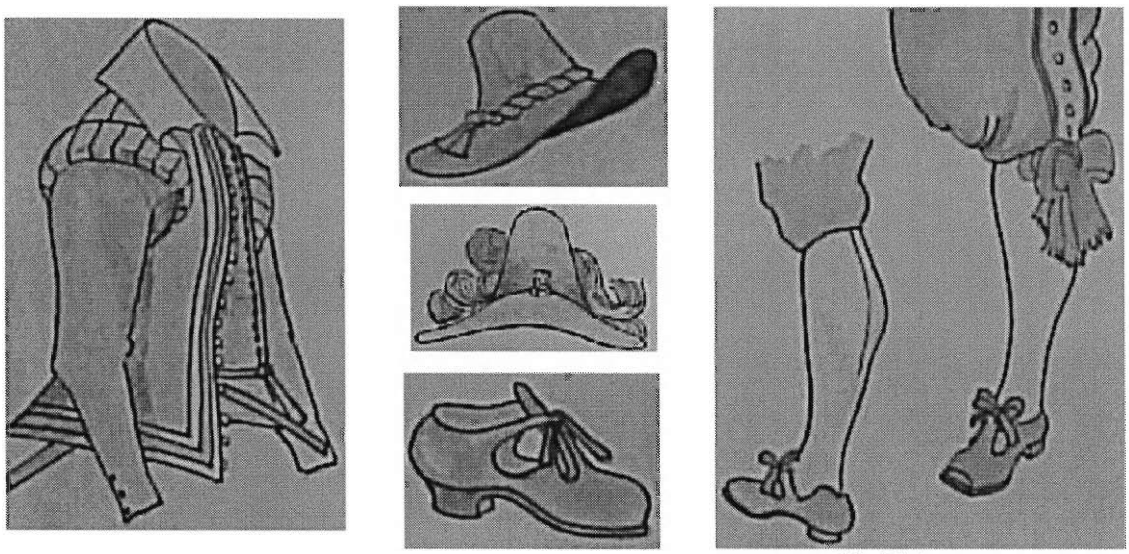


*Figure 6.1 Musketeer's Clothing (Wagner, pp. 91-92 )*

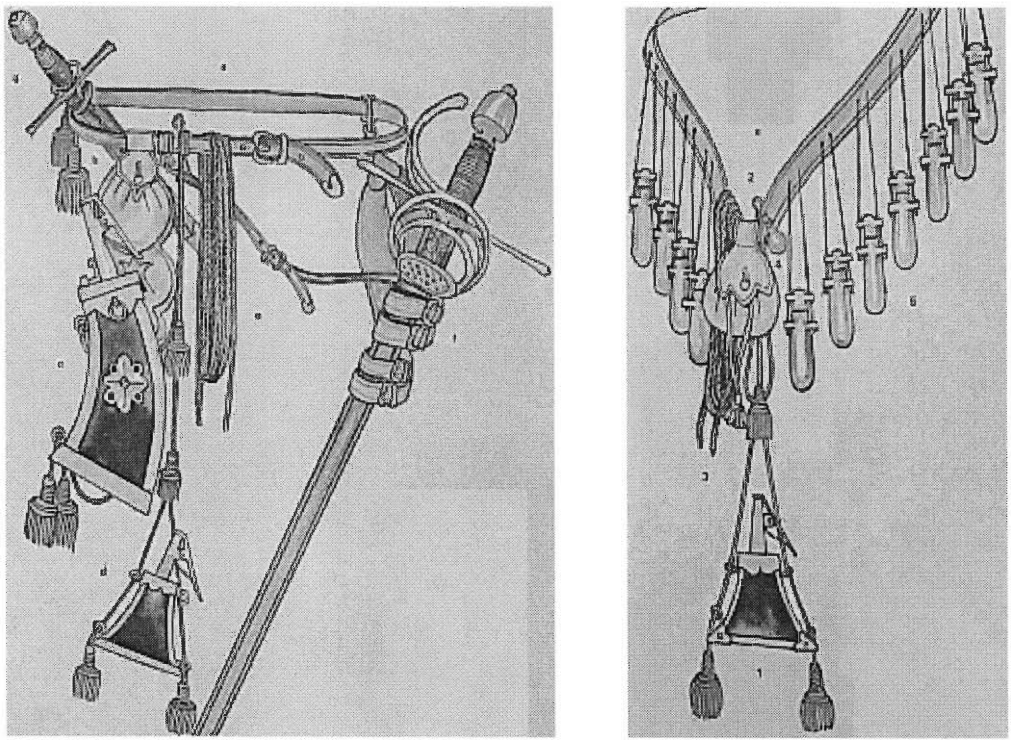


*Figure 6.2 Musketeer's Equipment (Wagner, pp. 256-257 )*


*Figure 6.3 Musketeer Example (De Gheyn, p. 12 )*

*Figure 6.4 Musketeer Example (De Gheyn, p. 46)*

Figure 6.5 Musketeers Equipment 1640's (Roberts, figure J)


*Figure 6.6 Musketeers Equipment 1640's (Roberts, figure D)*

**The Musket**

The musketeer's main weapon was the matchlock musket, so called because it held a piece of match and was designed by locksmiths. The matchlock musket had distinguished itself as an effective weapon on the battlefield as early as the 1520's and at the turn of the 17th century the matchlock had become a well refined weapon. During the 16th century gun makers had sought by a process of trial and error to discover the most efficient forms of barrel, stock and lock that could be devised within the limits of the technology. With the turn of the 17th century the matchlock saw no sudden change in the

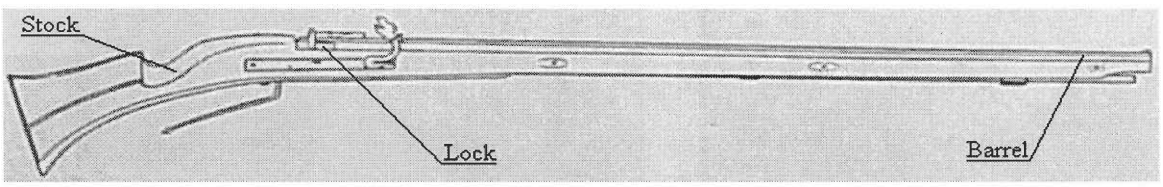



*Figure 6.7 Matchlock Musket (Pollard, p. 48)*

general lines of its development. It did however mark the beginning of a period of consolidation.[42] Gunmakers began to make the musket to certain specifications, so the occurrences of odd barrel and stock sizes began to diminish. With the introduction of standing armies the standardization of the musket continued as governments created contracts to have the weapon made to certain specifications laid out by their armies.

At the beginning of the 17th century the matchlock musket was a very long and heavy weapon. These muskets were usually 4 to 5 feet long, weighed up to 15 pounds and had caliber's ranging from .85 to .90 . The reason for this was power and accuracy at long range. Longer barrels allowed the musket to attain better accuracy at longer ranges. During the 17th century the size of the matchlock began to shrink. As the tactics on the battlefield changed, mobility was of greater importance. Gun weights dropped from 15 pounds down to 10, and the caliber became a standard .76 to .79. This allowed most musketeers to fire the weapon without a rest, while still retaining a large caliber.[43]

The matchlock musket was comprised of three basic parts that were the stock, lock and barrel. The stock was the wooden part of the musket that had a butt end to allow the musketeer to rest the gun against the shoulder when firing. Often this end of the musket would be used as a club if the musketeer had run out of ammunition. The rest of the stock held the lock, barrel and ram rod. The lock was the firing mechanism for the musket and was located in front of the butt right behind the barrel. The matchlock ignition system utilized a mechanical means of applying the burning match to the priming powder. The match was secured in a curved arm called a serpentine. The lock also had a pressure lever called an action level beneath the butt of the stock. This lever would

cause the serpentine to rotate forward via a spring plunging the match into the primed touchhole.

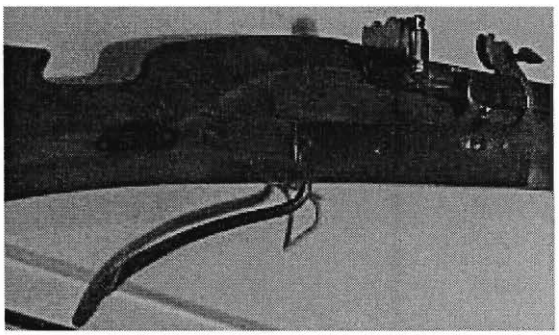


*Figure 6.8 Musket 1600's (HAM 460)*

One of the modifications made during the Thirty Years War was to replace the action lever with a trigger. One of the problems with the action lever was that there was nothing protecting it from being accidentally pressed. Thus starting in the 1620's a short action trigger was used and a trigger guard added.

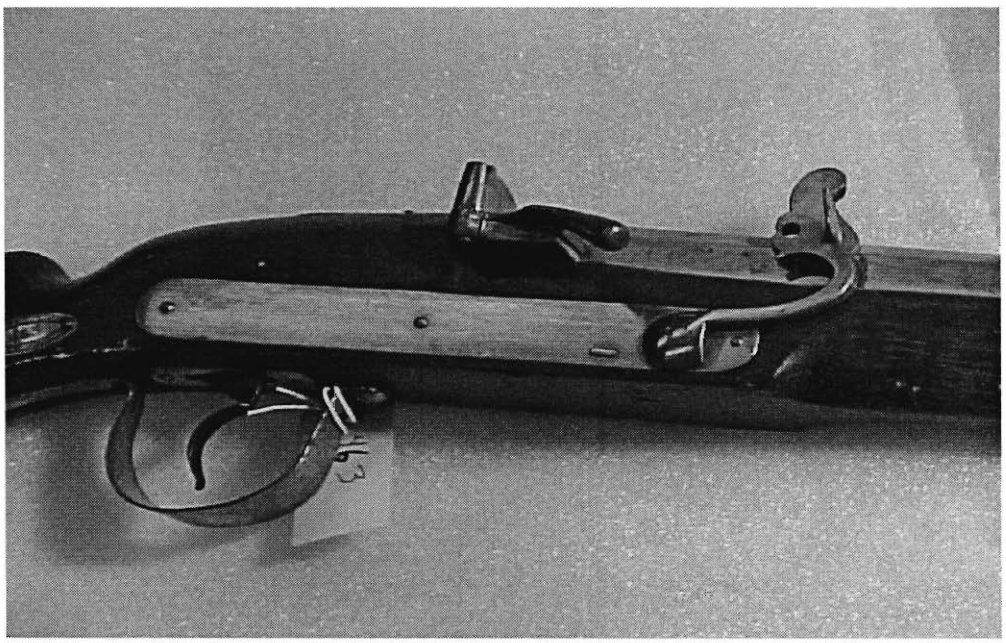


*Figure 6.9 Musket 1620's (HAM 463)*

This new trigger design had a number of advantages the lock could be built as one piece and thus was attached to the side of the stock. This allowed it to be removed easily for cleaning and servicing. Also the new trigger was easier to use and offered a better grip. Lastly the guard prevented any accidental discharges.

Lastly there was the barrel. The great size of the barrel was largely responsible for the high weight of the musket. A small hole was drilled into the side that allowed the ignited priming powder to fire the gun. The barrels also tended to be very long in order to make the musket somewhat accurate at long range.

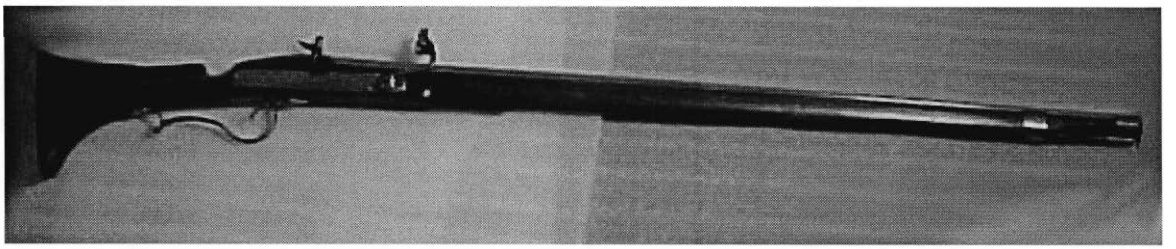


*Figure 6.10 Musket 1620's (HAM 461)*

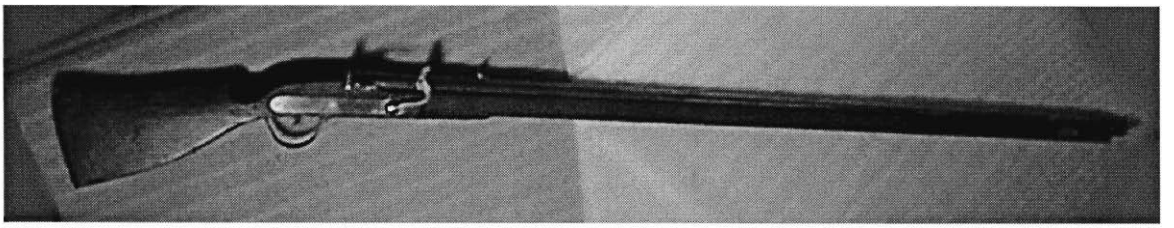


*Figure 6.11 Musket 1630's (HAM 459)*

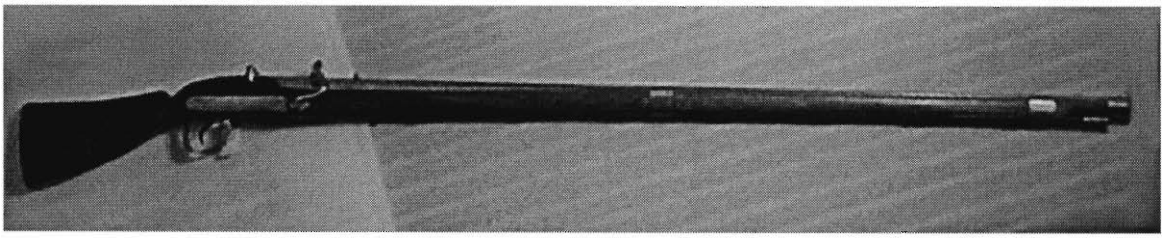


*Figure 6.12 Musket 1640's (HAM 463)*

In order for the musketeer to fire his matchlock musket, there were a number of steps that had to be performed. The musketeer would start by opening his flash pan and blowing into it to remove any excess priming powder from the last time the weapon was discharged. Next the fine priming powder would be poured into the pan and the pan cover would be closed. Again the musketeer would blow on the priming pan to remove any excess powder. Once the priming pan was closed and clean the shot would be loaded into the barrel. Depending upon the system used, the musketeer would either tear the paper charge and dump its contents in his musket or he would use his coarse powder flask to add the proper amount of powder followed by the shot. The ramrod would then be drawn from the gun to ram the shot and powder into the barrel of the musket. Once the ramrod was replaced under the barrel of the musket, the gun was almost ready to fire. The musketeer would then take his match cord in hand and blow on it to get it glowing a bright red. Next the match was placed in the serpentine such that the burning end has been cleanly exposed, allowing it to properly ignite the priming powder. Finally the last thing the musketeer had to do before discharging the weapon was open the priming pan. Once open the matchlock could be aimed and fired.[44]

The matchlock musket was a very popular weapon with the armies of Europe for a long time. There were several reasons for why it was used for so long by the infantry. Foremost was the fact that the matchlock was inexpensive and easy to produce in numbers since it had no complicated parts. This allowed the musket to be supplied in great numbers to the military. The weapon was very mechanically reliable due to its simplicity as well. Moreover, the infantry tactics of the time, which involved bodies of

men firing at fairly close range would have gained little from firearms equipped with more complex systems of ignition.[45]

Another advantage of the matchlock was its familiarity. There were many gunsmiths who could produce and service the matchlock, making it relatively easy to get a matchlock repaired or manufactured. The opposite was true for the wheel lock, as gunsmiths with the skill to make them were few and far between. The matchlock musket was also very easy to use on the battlefield. The matchlock required very little basic training, and once the routine tasks of loading and firing the weapon had been mastered, the musketeer could be an effective force in battle.[46] The musket's accuracy and range was also very attractive. The stock of the matchlock could be rested against the shoulder and the musketeer could then use the sight on the barrel to accurately hit his target at great distances.

However there were certain inherent disadvantages to the matchlock which eventually led to its replacement by the flintlock. The biggest annoyance of the matchlock system was the match cord. The musketeers of the 17th century had no way to start a fire quickly, and therefore had to have their match cord burning all the time. Even in times of inaction such as while on the march, every tenth man had to have his match cord lit. In order to fire his weapon the musketeer had to rely on the burning match cord, which meant that the musketeer was usually at the mercy of the weather. If it was windy or raining the match could be easily extinguished. It was also difficult to move groups of musketeers in secrecy at night because the glowing ends of the match would easily betray their position.[47]

**Equipment**

The musketeer required a great deal of tools and supplies in order to be effective on the battlefield. One of the tools the musketeer carried was the forked rest or fourquette. Early muskets were heavy and difficult to hold up and aim. The fourquette was a staff usually about three to four feet in length with a fork at the top to rest the musket in. The fourquette bore the weight of the musket allowing the user to aim it accurately. At the bottom of the fourquette was a point that was stuck into the ground to keep it from moving. As muskets become lighter there was less of a need for a rest to hold the musket up.

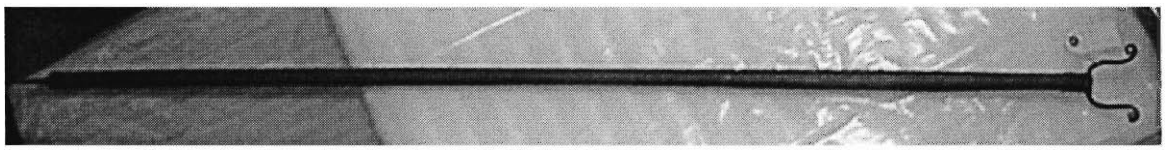


*Figure 6.13 Forked Rest for a Musket (HAM 973)*

In order to fire the musket gunpowder was needed. To carry this powder the musketeer carried one or two powder flasks. The powder flasks were small metal containers that had a measuring device built in to the spout. The measuring device allowed the proper amount of powder to be placed into the muskets barrel and priming pan. The majority of powder flasks had rings attached to the sides. These rings were used to secure the flasks to the musketeer's belt or bandoleer and keep them from bouncing around too much. Two types of powder were used to fire the weapon. The fine priming powder and the coarse barrel powder. Since only small amounts of priming powder were need the flasks for this type tended to be small while the coarse powder was required in slightly greater amounts and needed a larger powder flask. During the early

part of the 17th century the musket ball and its powder were wrapped together in paper, eliminating the need for the second flask.

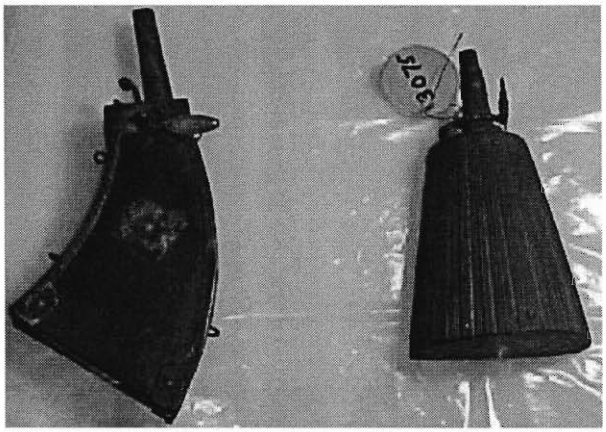



*Figure 6.14 Powder Horns (HAM 148, 3075)*

The match cord was an integral part of a musketeer's equipment. The match was rope that had been dipped in a solution of saltpeter and allowed to dry. This caused the match cord to burn slowly and evenly.[48] Generally match was distributed in six-foot lengths and when it was not required to have it burning was kept rapped around the belt or bandoleer. However when the match cord was lit, a small metal cap with breathing holes was placed over the burning end to prevent accidents.

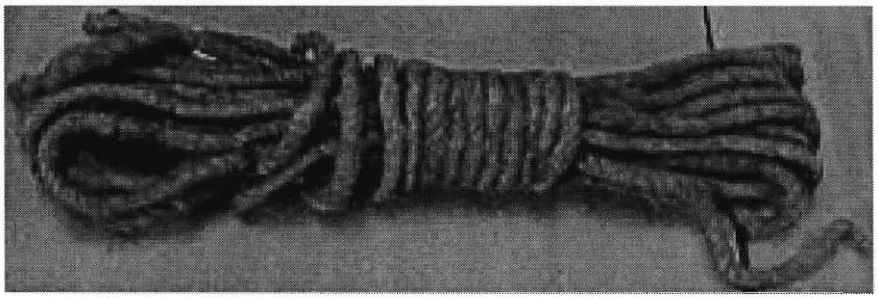


*Figure 6.15 Artillery Match, Musketeers was not as thick (HAM 185)*

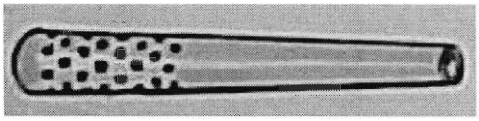


*Figure 6.16 Match Cap (Wagner, p. 256)*

One of the other things that the musketeer had as part of his equipment was a leather bag to carry their shot. Sometimes a musketeer would carry one of these even if they had paper cartridges. The touchhole that connected the priming pan to the barrel often became clogged after discharging the weapon several times. In order to clean the hole the musketeer carried a small pin shaped tool that was used to remove any excess powder that had piled up.[49]

**Training**

As mentioned before, the musket did not require much training in order to be used. During the 17th century there were several manuals that showed how the musketeer was to load, fire and march with his weapon. Most consisted of about forty to fifty different commands that brought the musketeer from rest to firing. Once someone had mastered these commands they could load their musket quickly without injuring one's self. Below are some of the drawings within one of the manuals from the period, *Directions for Musters* by Thomas Buck and Roger Daniel.

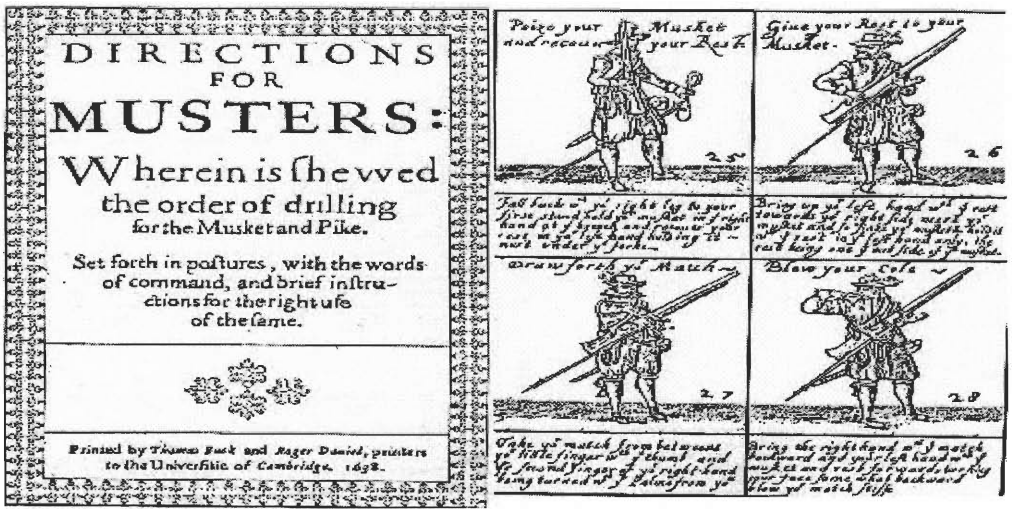



*Figure 2.17 Musters (Buck)*

## VII. Pikemen

Pikemen were important to warfare in seventeenth century because musketeers could not sufficiently defend themselves against a cavalry charge. Therefore men armed with pikes were a necessity for battle in the open field. As time went on there came to be more musketeers and fewer pikemen. Some regiments even went to battle without any pikemen, though this was rarely the case.

In the words of one contemporary pikemen could 'only receive the messengers of death but musketeers can send them'. [50] Though the pikemen wore armor they had very little protection from the musketeers' shots. Early in the seventeenth century the pikemen wore a considerable amount of armor, including a helmet, breast- and backplates, tassets and a gorget. While the three-quarter armor and half armor of the time included pouldrons and vambraces, the pikemen's armor did not, for they would have been too cumbersome. By the middle of the century many regiments moved away from the use of tassets and gorgets, again due the feeling that they were more cumbersome than they were worth. Many regiments even went as far as to wear no armor at all. It is thought that possibly only the London trained bands wore complete corslets (breastplate, backplate, and tassets) in any real quantity. Though the pieces of armor were the same there were many different grades of armor type. The armor could be lined or not lined, decorative or plain, and russetted or not. Russetting was a treatment of the armor to prevent rusting.

*Figure 7.1 Pikeman's helmet, corslet, and tassets (Haythornthwaite – ECW, p.25)*

There were many opinions on the subject of the arming of the pikemen, one such opinion was that of Edward Davies. In his book *The Art of War and Englands Traynings* (1619) his opinion was found to be as follows:

> It is necessary that his corselet and gorget be fit for his body, as also that his tassets and pouldrons or arm-pipes be large and suitable, all these to be strongly buckled and riveted, well oiled and bright, then a murren or head-piece well lined, and fringed, agreeable to the same: then a straight pike of a middle size, of 15 foot of length, with a sharp iron pike or point at the end, of the right Spanish fashion, well oiled and bright. Then that he have a good back-sword with an Irish basket hilt, and hanged in a strong belt.
>
> Note that all pikes of the same company ought to be of one length, otherwise if they disagree, they will be uncomely, and seem to the beholders like

unto organ-pipes, which be of different lengths. Moreover, they are very unprofitable for service, for they will greatly trouble each other, and especially the huge and long pikes, and therefore are to be refused. Like wise a short pike is not good in a main square, neither in camp or battle, except it be in strait and narrow places.

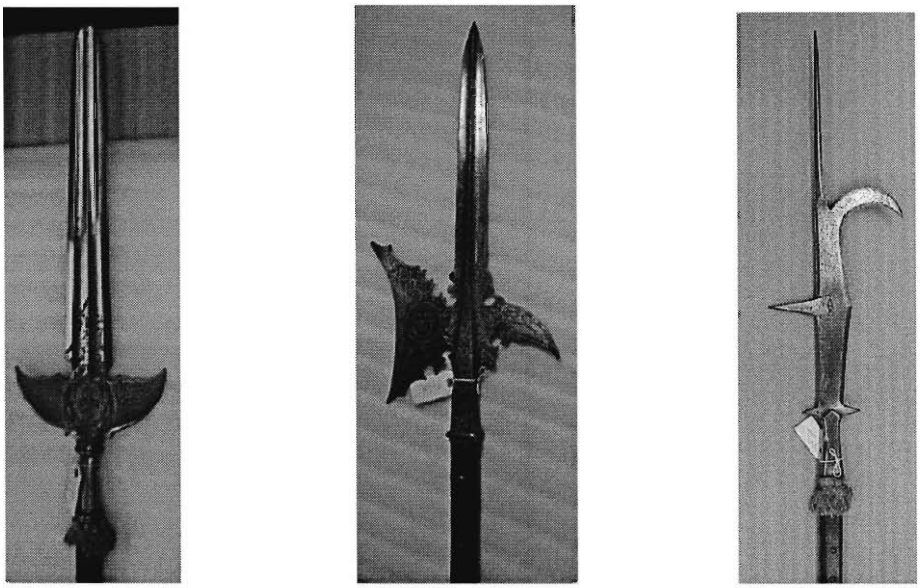
Other equipment was used by the pikemen, the most important being the buff coat. The buff coat was worn by just about every pikemen whether he wore armor or not. The buff coat was originally a thick jacket made of leather worn for riding and war. It became the standard form of protection for soldiers, being thick enough to minimize injury from a sword blow. When worn under a suit of armor it would act as padding between the armor and the person thereby lessening crushing blows. Other equipment included: gloves to help protect against abrasion as well as aid in the holding the pike, a knap-sack or leather satchel for keeping clothing and rations, a belt for the sheath of the sword to be attached to, and some may have carried long knives.

There were four main pole-arms used during the seventeenth century, which were the partisan, the halberd, the bill or "brown bill", and the pike.

The partisan was primarily an officer's weapon, carried mostly as a badge of rank. The weapon was six to eight feet in height with a symmetrical head consisting of a blade with one or more branches at the base.

The halberd is a pole-arm weapon having an axe head balanced by a beak or fluke and topped by a sharp point. The butt end of the shaft of the pole was usually covered with a cap of iron or brass, which was known as the ground iron, butt cap or foot.

Although it was sometimes used as a combat weapon, officers more often carried the halberd as a badge of rank; the guards of important government officials also carried it as a ceremonial arm.



*Partisan (HAM 1051)* *Halberd (HAM 2666)* *Bill (HAM 2536.7)*

*Figure 7.2 Pole arms (Higgins Armory Museum)*

The bill, or "brown bill" as it was often called due to the browned finish of its blade, evolved from the farm tool having the same name. The bill had a hook-shaped blade with a cutting edge on the concave side as well as various spikes and projections on the back. In the 1590s it was advocated for use together with the pike but was subsequently issued only when other pole-arms were unavailable.

The most important pole-arm of the time was the pike for which the pikemen got their name. A pike (from the French verb *piquer,* "to prick," or "to puncture") was simply a long-shafted form of infantry spear. There were two types of pike, the full pike and the half-pike, and as their names suggest the only difference lies in the length of the

shaft. The full pike normally had a shaft length of about 14-18 feet, where as the half pike shaft length ranged from 6 to 10 feet. Due to the varying lengths of pikes it was recommended that all the pikes within a given regiment be the same length. Orrery's *Treatise on the Art of War* proposed 16 ½ feet to be the ideal height. Pikes were composed of ash shafts (the choice wood for pole-arms), topped with a pike head (usually leaf-shaped or diamond-shaped) attached to long metal straps or "langets" to prevent the head from being cut off (about 4 feet in length), and lastly ground irons were also common.

*Figure 7.3 Pike head and langets (Haythornthwaite – ECW, p.29)*

Edward Davis felt that pikes should have fabric 'grips' and be trimmed with handsome tassels in the middlemost point to protect soldiers' hands from the water that runs down the wooden shaft when in the rain. Though the pike was a form of infantry spear it was not thrown, but rather used as a thrusting weapon. By massing together in "squares" as they were called, pikemen could form a virtual wall of pike heads, which could endure cavalry attacks and provide protection to the musketeers.

**The Training of The Pikemen**

The basic training of the pikemen revolved around 32 basic moves or 12 basic exercises. Each of the exercises had verbal commands associated with them indicating each particular motion of the exercise. Initially the soldier was shown each motion and

then was to be drilled in each one. The pikemen were expected to recognize and remember each exercise and motion. Once it was decided by the captain that his soldiers could handle their pikes, the motion statements were no longer mentioned, just the individual commands. During the training it was important to keep each exercises separate from each other therefore their pike was set down in between the end and beginning of each new exercise. The basic commands were as follows:

Advance your pike
- First motion
- Second motion
- Third motion

Order your pike
- First motion
- Second motion
- Third motion

Shoulder your pike and carry it level
- First motion
- Second motion
- Third motion

Slope your pike

Port your pike
- First motion
- Second motion
- Third motion

Charge your pike in one motion

Cheek your pike

Trail your pike

Palming your pike charge it
- First motion
- Second motion
- Third motion

Charge your pike against the right foot and draw your sword.

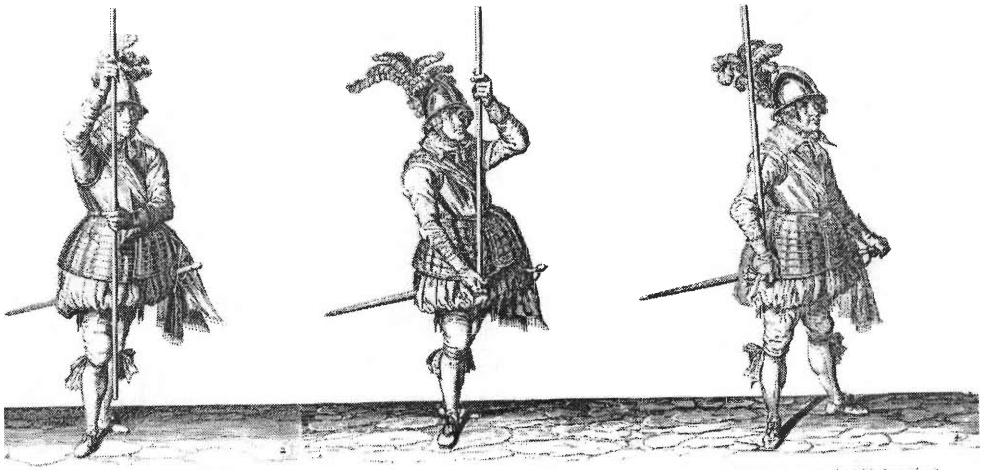
Charge your pike backwards
- First motion
- Second motion
- Third motion

Right to your order and your pike sloped
- First motion
- Second motion
- Third motion

When looking at the pictures on the following pages or at the originals in *The Exercise of Armes*, by Jacob De Gheyn it can be noticed that there are two different sets of pictures for the ordering of the pike (pictures 5-7 and 15-17); this is due to the last position of the previous exercises. It can be seen however that the last two motions of each exercise are the same, just from a different perspective. While there were many other training manuals being written at the time, Jacob De Gheyn's manual was quite impressive and thus was copied and incorporated into many other people's works.

Many training manuals like Jacob De Gheyn's were ideal for the training of proper fighting forms, while others such as Edward Davies' looked more into the various aspects of war. Davies wrote about three particular things involving the pikemen: the arming of the pikemen (as seen previously), how pikes were to be carried in array, march or battle, and how the pikes were to be raised up and abased (lowered) in the closing and opening of a battle.

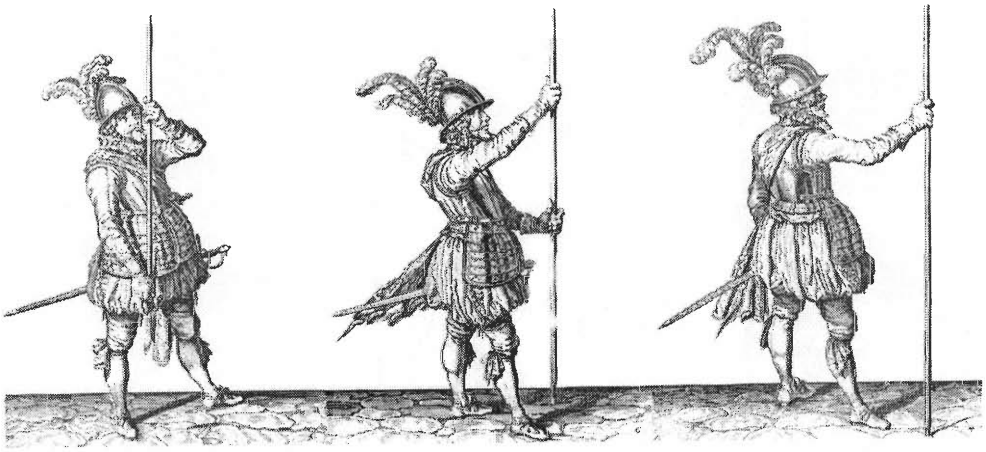
III. 1. Your Pike being ordered or standing downe



2. Advance your Pike (first motion).

3. Advance your Pike (second motion).

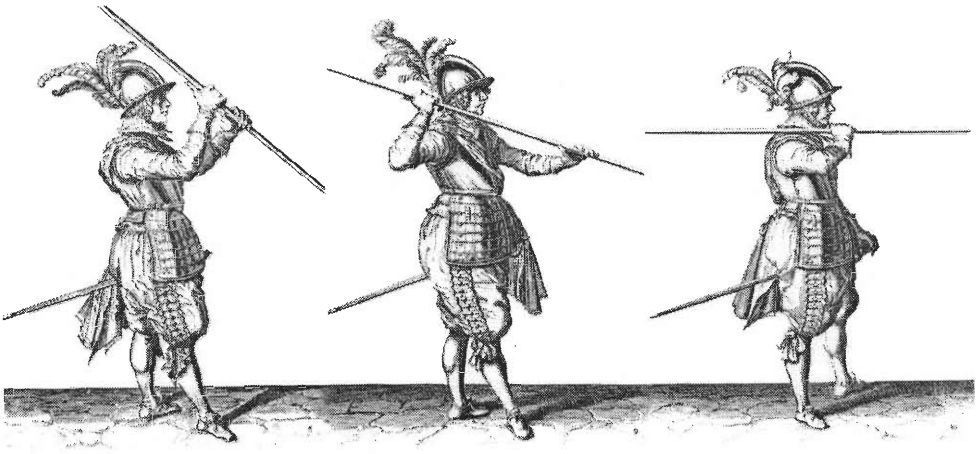
4. Advance your pike (third motion).



5. Order your Pike (first motion).

6. Order your Pike (second motion).

7. Order your Pike (third motion).

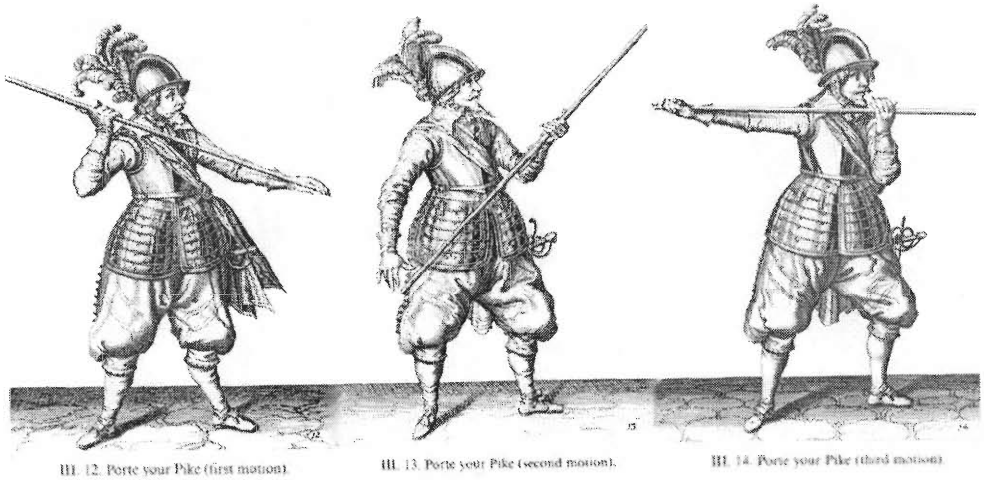


Ill. 8. Shoulder your Pike and carry it levell (first motion).

Ill. 9. Shoulder your Pike and carry it levell (second motion).

Ill. 10. Shoulder your Pike and carry it levell (third motion).

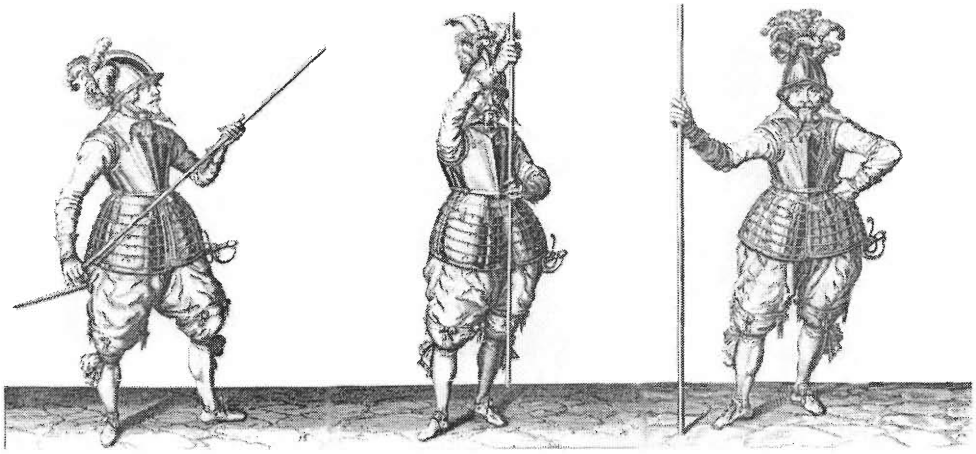
Ill. 11. Slope your Pike.



Ill. 12. Porte your Pike (first motion).

Ill. 13. Porte your Pike (second motion).

Ill. 14. Porte your Pike (third motion).



III. 15. Order your Pike (first motion).

III. 16. Order your Pike (second motion).

III. 17. Order your Pike (third motion).

2. Advance your Pike (first motion).

3. Advance your Pike (second motion).

4. Advance your pike (third motion).

III. 19. Charge your pike at one motion.

Ill. 20. Chaske your pike.

Ill. 21. Trayle your pike.

Ill. 22. Palming your pike charge it (first motion)

Ill. 23. Palming your pike charge it (second motion)

Ill. 24. Palming your pike charge it (third motion).
[More than three motions are allowed.]

Ill. 25. Charge your pike at the right foote and draw your sword.

III. 26. Shoulder your pike.

III. 27. Charge your pike backword (first motion).

III. 28. Charge your pike backword (second motion).

III. 29. Charge your pike backword (third motion).

III. 30. Right to your order and your pike slope (first motion).

III. 31. Right to your order and your pike slope (second motion).

III. 32. Right to your order and your pike slope (third motion).

*Figures 7.4-36 Postures of The Pikemen from The Exercise of Armes.*

Training also involved how the pikes were to be carried in array, march or battle. Davies wrote a good depiction of just how this should be done,

> Those that are appointed to carry pikes in array of ranks or battle, must know that pikes amongst all other weapons that belong to soldiers, is of greatest honor and credit: and truly, whosoever doth carry and manage the same weapon well and with good grace, doth make a very beautiful and pleasant show to the beholders, and chiefly when it is carried upon the shoulder, sustained and supported with a good grace, and the hand that doth sustain it be on that side the shoulder where it is placed, and with *il Gombedo alto.*
>
> They must likewise be advertised which march in the foremost ranks, if they be upon the right side, to hold their pikes continually in marching in the right hand, and upon the right shoulder without ever changing it: and so likewise being upon the left side of the rank, to hold it always upon the left shoulder: those that be in the midst of the ranks have liberty to use that side that is best for their commodity, either upon the right or left hand, and to move their pikes from shoulder to shoulder at their choice and pleasure: It is true that the just carrying of the pike of those that march in the midst of the ranks, is to hold it upon the left shoulder, and to carry their right hand behind upon their dagger, or upon their side, and so generally all, as well they that be in the midst, as those that be in the head of the ranks are to observe this order, to carry that hand which is at liberty behind them, or upon their sides. Let him march then with a good grace, holding up his head gallantly, his pace full of gravity and state, and such as is fit for his person, and let his body be straight and as much upright as is possible, and that

which most imports, is that they have always their eyes upon their companions which are in rank with them, and before them going just one with the other, and keeping perfect distance without committing error in the least pace or step, and every pace and motion with one accord and consent, they ought to make at one instant time. And in this sort all the ranks entirely are to go, sometimes softly, sometimes fast, according to the stroke of the drum. The heel and tip of their pikes would be equally held, both of length and height, as near as is possible, to avoid that they fall not out to be by bearing them otherwise, like unto organ-pipes, some long, some short. The measure and proportion thereof, to hold the heel of the pike is this: It is necessary for him to have an eye to the rank that doth march before him, and so carry the butt-end or heel of his pike, that may be just over against the joint of the hamme of the soldier, that in march shall be straight before him: and so every one from hand to hand must observe the proportion of that height, that is right behind upon the joint of the knee, for by doing so they cannot commit error, carrying in their march the leg that is under that arm that sustains and carries the pike of just and even proportion, by moving their pace right under the staff of the pike, going in their march, as I have said before, just and even, with a gallant and stately, and sumptuous pace: for by doing so, they shall be esteemed, honored, and commended of the lookers on, who shall take wonderful delight to behold them march in that order.

**With also other necessarie notes:**

And whereas I have said befor that the souldiers should march forfard with one consent: I mean not only that the pike men ought to observe that order but

also that the musketeares are to follow the same rule of order: because that the whole company must be ready to march forward at one instant time observing the true strokes or battery of the drue, which active observation may well be compaired to a dancer; for the one by hearing his music is prepared to tread the measure answerable to the time: And the other by hearing the warlike and comfortable stroke of the drum: is ready to advance his pace and march forward.

The Officer is to pace towards his people, so to give the word, and so to lead march, and also observing the stroke of the drum, the first rank being the file leaders it to follow their leader: The second rank every one to follow his pile-leader also: the third, fourth and fift ranks; and so the rest with one consent.

I hold it therefore both convenient and needful for all men that follow the warres, to learn all warlike sounds that the drummer beats, as the call, the march, to draw up main battle, the charg, the retire, to troupe,to wheel about which is also a charge, then and lastly the Diana. And whereas every nation do differ the one from the other in the battery of their drums, and chiefly in the sound of their march every nation or Province do also differ in the mark of their colors, for that they beare in their colors the proper Armes or Scutchion of the Nation under which they do serve. But to return, let a souldier be diligent to learn, as I said before, the strokes of the drum: And chiefly to understand the usuall strokes of march which the drum beat in the regiment wherein he beareth arms: he must also take notice of the marks that are upon the colors; especially of the ensigne which he serveth under, the knowledge whereof may serve his turn so well that it may save his life, for by night being in fight the enemie, and being also being

ingnorent of the sound of the drum, he may as well fall into the hands of his enemies as otherwise, which may cost him his life.

Another important aspect of training involved how the pikes are to be raised up and abased (lowered) in closing and opening of a battle. Davies again wrote a good depiction of just how this should be done,

> I will not omit to put in memory unto them that know not of the particulars of those things and order that are required in making a battle of footmen. Therefore those which would make a battle of footmen, must be advertised that in shutting up the said battle, the ranks of pikes as well armed and unarmed, must not raise up confusedly, but with order; that is, when the Sergeant major, Captain, or Lieutenant shall say: Raise or right up your pikes, then it is requisite (necessary) that the first and foremost rank must begin to raise up it self: and that the Second do not move to raise up it self till the first be raised up: and so the third and the fourth: the same order is to be observed in all the other ranks, from one rank to another.
>
> The like rule is to be observed by them in laying down of their pikes upon their shoulders: for so much as rank by rank, in order and without confusion they ought to let fall their pikes; appointing the first rank to fall after the second, the third after the fourth: and so is all the rest of the ranks to follow the same order, Till the hindermost rank of all: and by observing that order, they cannot commit disorder, but rather make a gallant show, and prevent many confusions.

# VIII. Cavalry

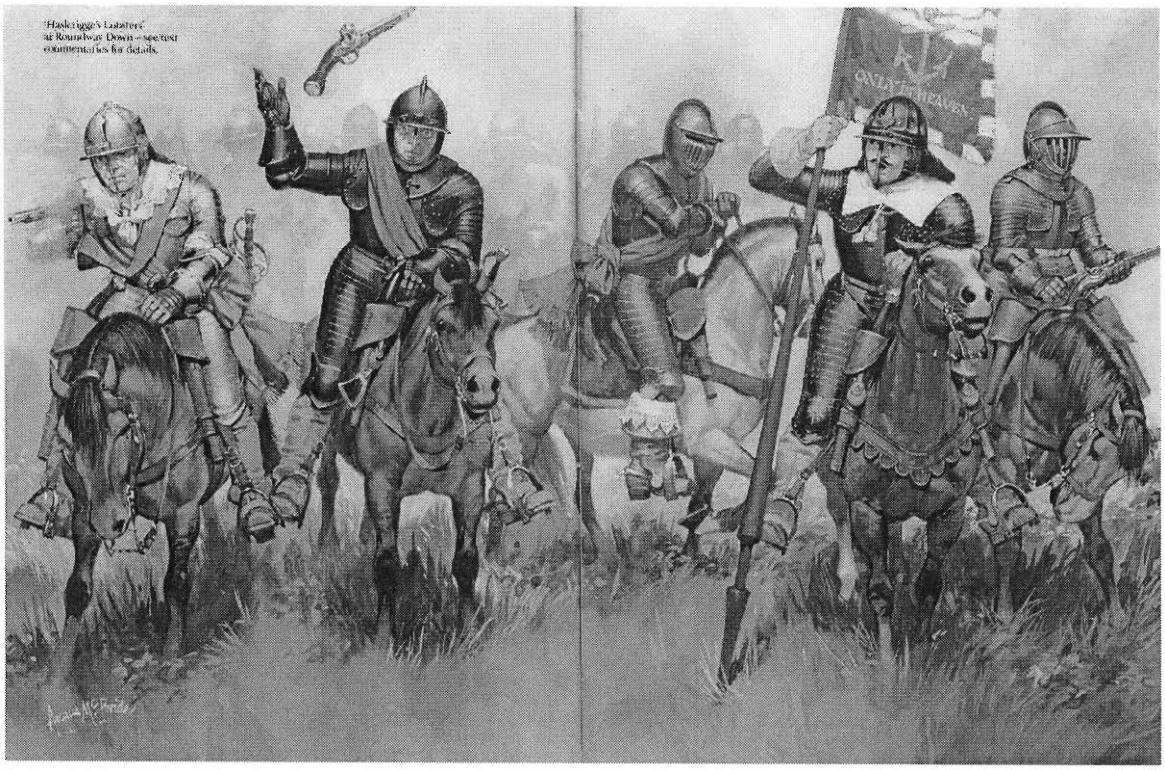


*Figure 8.1 Cavalry on the Battlefield (Tincey, p.38-39)*

Cavalry, a word that came from the Latin word caballarius, meaning horseman[51], was divided into three major types. They were: heavy cavalry, light cavalry and the dragoons.

**Heavy Cavalry**

The heavy cavalry was called the cuirassier, a name that came from the armor the horsemen were wearing, the cuirass. The armor of a cuirassier (Figure 8.6) consisted of breastplate (Figure 8.3a) and backplate (Figure 8.3b), a pair of pouldrons (Figure 8.4a), a gorget (Figure 8.4a), a helmet (Figure 8.4b), vambraces, gauntlet (Figure 8.4c), long tassets with poleyn (Figure 8.4d) and guard de reine (Figure 8.4e). In the seventeenth century the armor for the torso, the breastplate, was usually musket-proof, evidence of which can be found on some of the artifacts with a deep dent in the breastplate. (Figure 8.2)

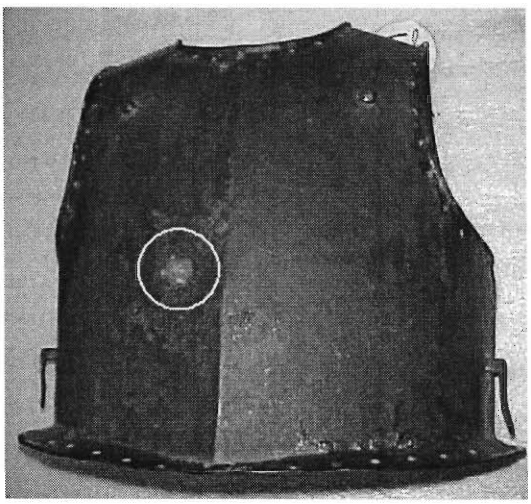
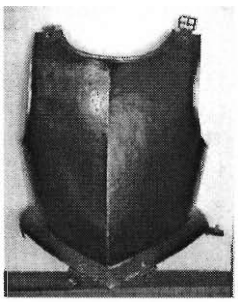
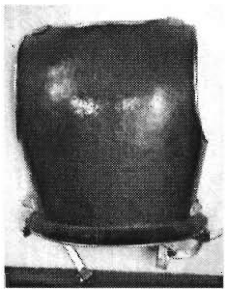


*Figure 8.2 Proof Mark (HAM 248)*

Most of the other armor pieces were made pistol proof. The difference was in the caliber of the weapon; the musket packed more power therefore left a bigger dent. To prevent an injury, the riders needed thicker armor. The armor that was musket-proof was very heavy, which is why only the breastplate was made so. The enemy fired their weapons when the rider was charging so the musket proof breastplates prevented the annihilation of the front ranks. The pouldrons, or shoulder defenses, were made the same on both shoulders. In previous centuries the left pouldron was made larger to protect and absorb the impact of the lance. The gorget was a piece of armor sometimes connected to the helmet. Its role was to protect the horseman from beheading and it also distributed the weight of the armor. The helmet of the cuirassier was usually open and the face covered with a sort of grill. Vambraces were also called cannons; they were armor that protected arms of the horseman. Tassets protected riders' thighs from being cut by the enemy. Most of the time the tassets were combined with poleyns, which was a piece of armor that covered the kneecaps. They were usually made of articulated plates, which made the tassets very flexible. The guard de reine was made to protect the riders' buttocks. Under the entire armor the horseman usually wore a buff coat, made of tough leather, which acted as a sort of padding for the armor (Figure 8.5).

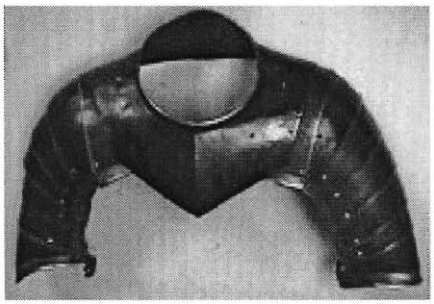


*a) Breastplate(HAM 609)*



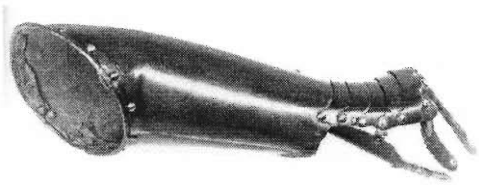
*b) Backplate(HAM 609)*

*Figure 8.3 Cavalry Armor*

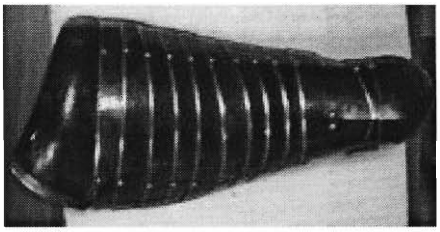


*a) Pouldrons and gorget(HAM 609)*

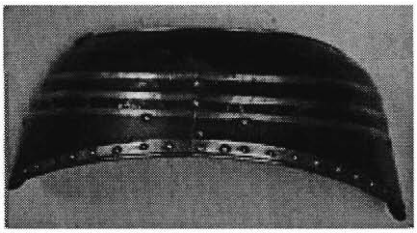
*b) Helmet(HAM 609)*



*c) Gauntlet(Tincey, p.27)*



*d) Long tassets with poleyn(HAM 609)*



*e) Guard de reine(HAM 609)*

*Figure 8.4 Cavalry Armor*

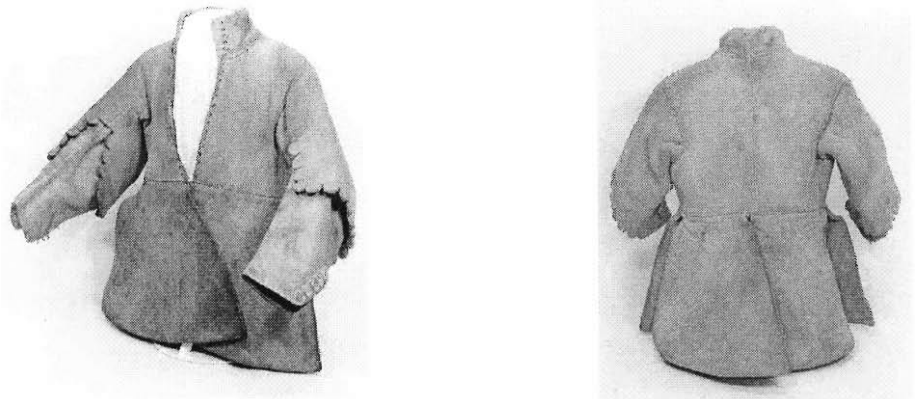


*Figure 8.5 Buff coat front and back (Tincey, p.45)*

During this period the armor lost its fluid shapes and beautiful finishes in favor of functionality. Most of the highly decorated armors were primarily used for ceremonies.

At the beginning of seventeenth century there existed a type of cavalry armed with a lance and given the name of lancers. The lance was an eighteen foot long wooden shaft with a steel tip like one carried by a pikeman.[52] Later the lance was given up in favor of gunpowder weapons. The reason for this is that the training of the lancer was very time consuming, mostly because of the size of the lance. A contemporary writer, John Cruso, points out that the size of the lance may be somewhat made up; he wonders who could hold an 18 foot long lance in one hand while steering a horse. The cuirassier was just like a lancer (Figure 8.6) except without the lance. The lancer and cuirassier were also armed with a sharp pointed sword. The pistols proved more effective than a lance, therefore the lancer lost his position on the battlefield and was replaced by the cuirassier armed with two pistols carried at the saddle. Along with that came a flask with gunpowder, additional bullets, which were in shape of a ball, and even some pre-made cartridges.

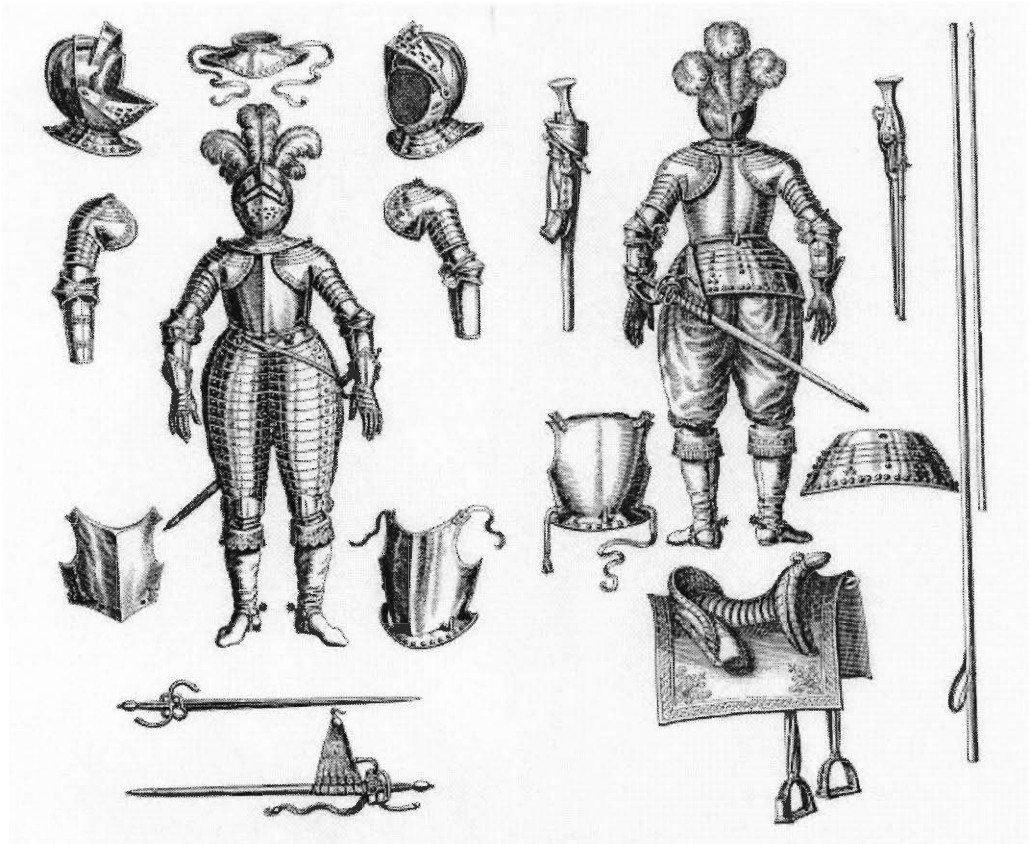


*Figure 8.6 The lancer (Wallhausen, Figure 2)*

**Light Cavalry**

The second major type was light cavalry. Some sources distinguish different subtypes of light cavalry. Although they are named differently, the arquebusier, harqubusier (Figure 8.7) and carbinier are basically identical. The difference in names is because of the firearm that the particular unit carried. The three guns were arquebus, harquebus and the carbine. The difference lay in the weight, size and caliber of the firearm.

*Figure 8.7 Equipment of the Harquebusier (Tincey, p.29)*

The armor of these units was the same. They wore a type of helmet called the morion or tri-bar pot. The tri-bar pot helmet is shown in the figure 8.7. For body protection they wore only a breastplate and backplate. For armaments they had a firearm and sword. The firearm usually consisted of a flint-lock or wheel-lock gun of the type associated with the name of the unit. Sometimes they were armed with pistols just like the cuirassiers. When the fighting came up close the soldiers used a sword.

**Dragoon**

The third type of horsemen was the dragoon. The dragoons were actually not considered cavalry for the reason that the dragoons didn't fight on horseback. They rode horses to the battle, but only as a mode of quick deployment. When the units came close to the front lines they would leave the horses and fight on the ground just like regular infantry. When the dragoon soldier dismounted he threw the reigns of his horse over the neighboring horse and so on down the line, then the last soldier would try to keep all the horse with him so they would not get lost (Figure 8.8). It did not work all the time.

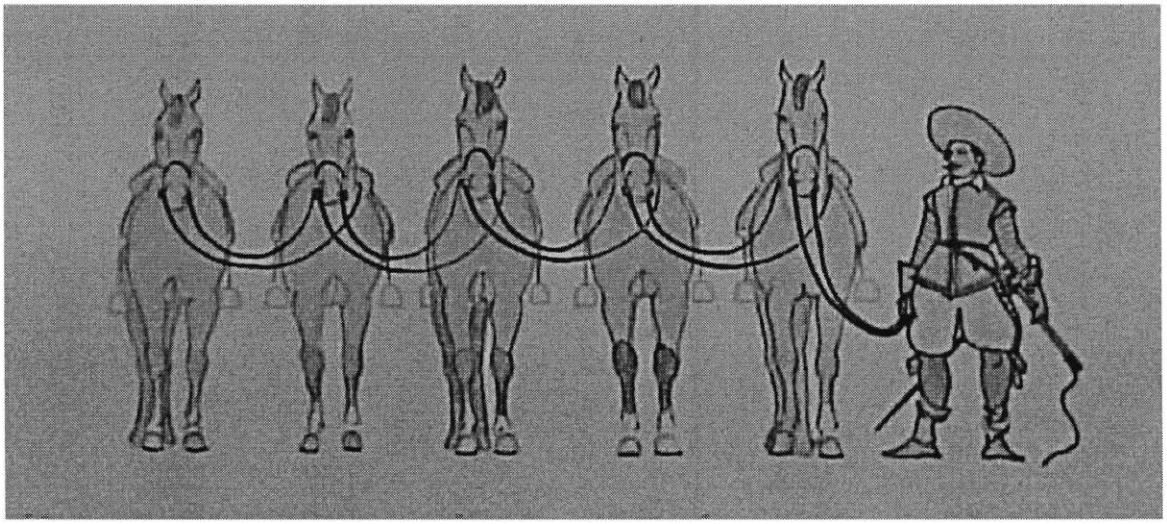


*Figure 8.8 The linking of horses (Wagner, p.84)*

The dragoons were also divided into two types. One carried a musket and the other was equipped with a pike. The reason was the same as with the pikeman and musketeer. The pike-equipped unit protected the musketeers when they fired their guns. The horses that the dragoons used were not the best available, in contrast with the ones that were given to the heavy and light cavalry, because when left on the battlefield they sometimes were taken by the enemy or were killed in the battle. Another reason for that is that the dragoons' main use for horse was to get to the battle, then the dragoon no longer needed a horse. However, they still had to learn how to fire the musket while riding on horseback, which makes the dragoon appear as part of the cavalry. The musket that the dragoon carried was the same musket used by the infantry. Later in the century the musket was modified. The gun became smaller and the firing mechanism was changed to the wheel-lock which will be explained later. Because of these changes the gun became easier to carry and fire.

*Figure 8.9 Dragoon officer, and soldiers; mounted and dismounted. (Tincey, p.41)*

**Cavalry Firearms**

In the beginning of the 17th century the musket was a very heavy, cumbersome weapon. The early cavalry muskets were of matchlock type. This meant that the soldier had to have a match-cord to fire the weapon. This was extremely hard on horseback: it was hard to guide the horse and fire the weapon at the same time. The new ignitions were of the wheel-lock type. This type of ignition came into increasing battlefield use in the first half of 17th century, although the type of ignition existed in 16th century. Before the wheel-lock ignition was not reliable enough to be useful in battle. However, the wheel-lock was the most expensive ignition to manufacture. The guns were mostly used for hunting and for the cavalry.

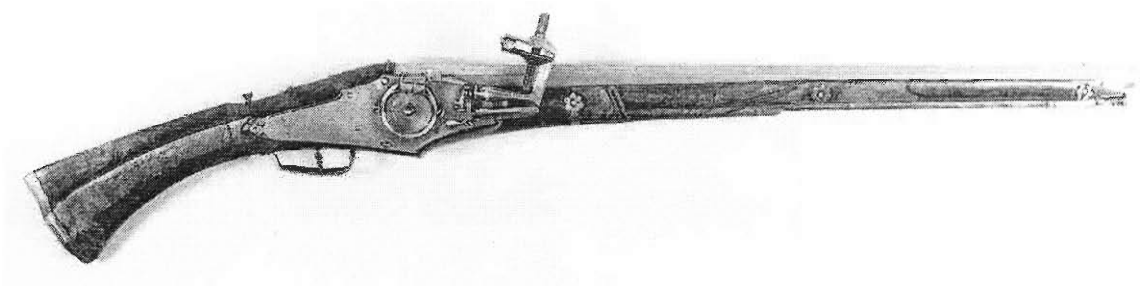


*Figure 8.10 A wheel-lock pistol (Tincey p.47)*

The soldier no longer needed to load the gun just before using it. The matchlock could be preloaded, however the wheel-lock didn't require the placement of the lit match-cord. When the soldier had the wheel-lock wound and loaded he could just pick up the gun and fire, as opposed to matchlock. Matchlock ignition required match-cord to be lit before firing. The wheel-lock gun had greater accuracy. The reason for this is that the soldier did not have a lit match in his face and also had longer time for aiming. Its shortcoming was that a skilled person had to fix it if the weapon broke and it was also more expensive.[53]

The quote below is from an appendix to *English Military Discipline* published by Robert Harford in 1680. It refers to the firearms of presumably the middle of the 17th century. The quote describes how particular firearms were used and the differences between them. The firelock most likely refers to wheel-lock ignition system, however it sometimes also referred to the flintlock as well.

**Of Muskets:**

The Butt of the Musket must be put to the breast half a foot below the chin.

**Of Firelocks:**

With a Fire lock one may shoot juster than with a musket, because it is presented in a quite different way; that is to say, the end of the Butt to the shoulder, the side to the cheek, shutting the left eye, and aiming with the other through the sight hole, which answers to the little button on the muzzle of the barrel. Firelocks are apter to mis-give than Muskets, through the defects of the Flints and Springs.

**Of the Pistol:**

Pistols are not all of the same length nor size. The usual length of the barrels of those which are at present used among the Horse is a foot, and of stock and all a foot and a half or thereabouts.

The bullet sized to the bore is five lignes [1 ligne = .22583 cm][54] in diameter, the charge a dram of powder, and it will carry forty paces, more or less, according to the goodness of the powder.

**Of Carabins:**

Carabins are a kind of Fire Arms, which take their name from those ancient Souldiers, called Carabins, who commonly made use of them in the Wars. They are of two kinds, the common and the extraordinary. The common are those which were used by the King's

Guard not long ago, and are usually called Carabins with great Locks; which differ in nothing as to length, size and carrying, from Fusils and Mousqetons, but only that they have Wheel-works. The extraordinary are those which the French call Arquabusses Guttières; such as are those still used by all the Arquabussiers, whose little Wheel-work is provided of a double spring or facilitating and speeding the discharge, and whose barrel, being thicker than that of common Carabins, can carry blank a thousand paces, with the same proportion of powder as is necessary for Fusil; because it is screwed and rifled, that is to say wrought and crevassed in the inside from the muzzel to the breech in the form of a screw, and from thence proceeds the justness of Arquabusses.

All Carabins or Arquabusses have Wheel-works, as well those of great as small Locks, which are bent with a spanner proportioned to the thickness of the Axel-tree of the Wheel.

Heretofore were used Arquebusses, which fired with a Match, in the same manner as Muskets, but these Arms are now out of use.

The King commands at present- that in every Troop of his Guards be carried eight rifled or screwed Carabins, with locks like those of Fusils, Mousquetons and Pistols.[55]

## Training

Cavalry training started with the basics. Mounting (Figure 8.11), dismounting and controlling the horse in various gaits (Figure 8.12) were the first skills a horseman had to learn.

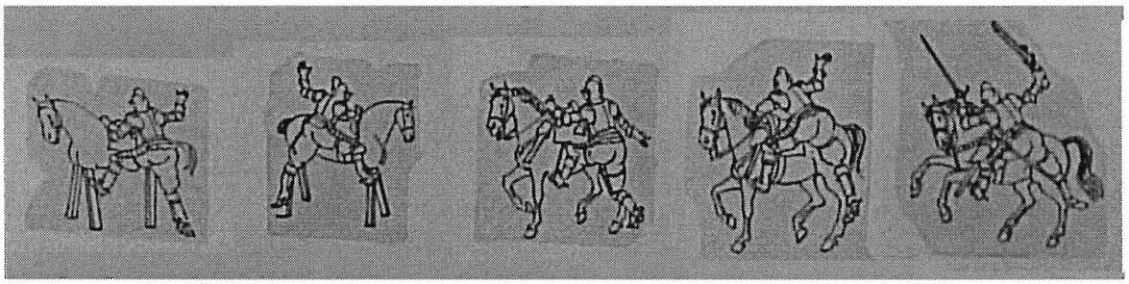


*Figure 8.11 Training in mounting a horse. (Wagner p.71)*

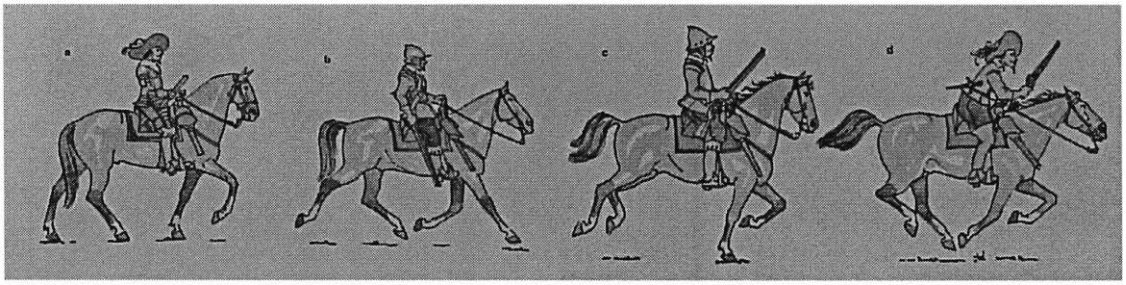
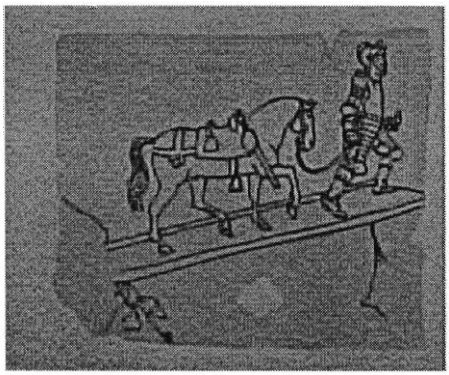
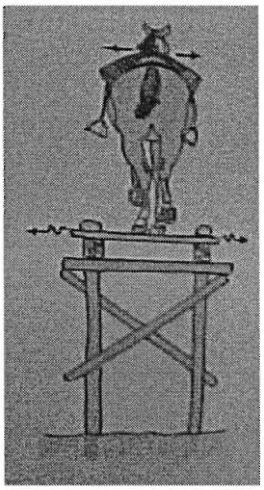


*Figure 8.12 The horse in different gaits. (Wagner p.73)*



a)



b)

*Figure 8.13 Training horse in bridge crossing (Wagner p.80)*

The next level was to navigate obstacles. The horse had to learn how to cross moats that were both dry and covered with water. It was trained to go across swinging or swaying footbridges over water (Figure 8.13 a, b). The horses were also trained not to be afraid of fires. At this time there was a tendency to train a horse to attack the enemy on its own. After these skills were taught, the advanced training begun. The advanced training was to teach the horsemen to fall into squadrons and into different formations.

The horseman had to learn how to use weapons on horseback. That included drawing and firing pistols and also drawing and using a sword. The cutting weapon was drawn by the right hand over the left so the edge would not cut his arm; another reason may be that the left arm would hold the scabbard down while the sword was drawn out. The pistols were in holsters on both sides of the saddle.

The horseman's training included learning certain commands which coordinated the actions of the whole line. It was important that the troops in a line did everything together so the line behind could attack as soon as the line ahead was done. Additionally the commands instilled to soldiers' memory what they needed to know. As a result of this part of training the horsemen's actions were done almost by instinct.

Following are the commands for the cuirassier from *Militarie Instruction for the Cavallrie* by John Cruso. The original was written in 1632.

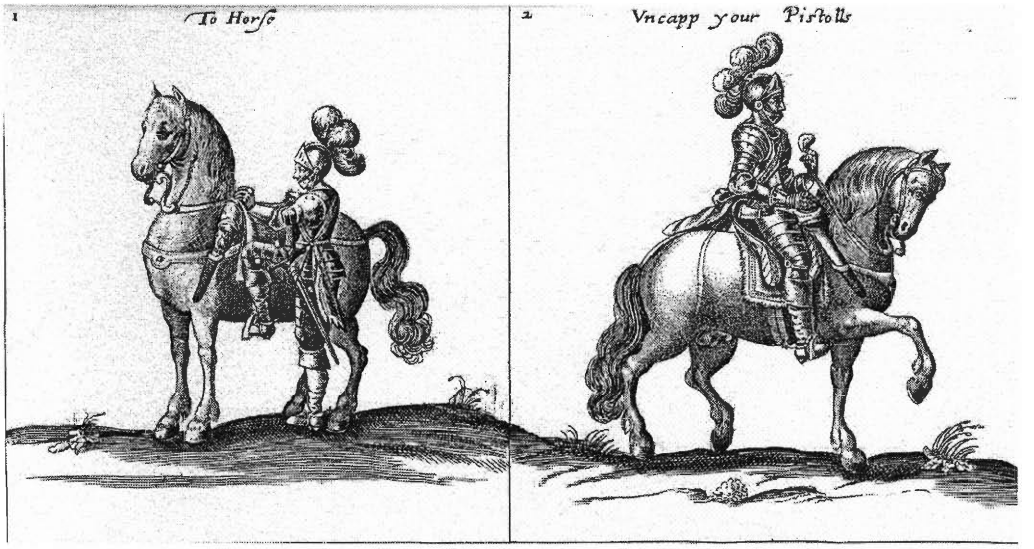
**1. To Horse**.

Both reins hanging in a loose position over the horse neck, and upon the pummel of the saddle, the horseman is first to take the ends of the reins above the button in his right hand, and with the thumb and two first fingers of that hand to

draw them to an even length. Then putting the little finger of his hand betwixt both reins under the button with other three fingers of the same hand on the further rein, and the thumb on the nearside of the button, to grasp both reins, that so ([before he endeavor to mount] he may have his horse head in balance and at command: then grasping the pummel of the saddle with his left hand, and standing with his full body close to the horseside, and just betwixt the bolster and cantle of the saddle always on the nearside of the horse) with the help of his right hand he shall put the left foot into the left stirrop, and with his right hand taking fast hold on the highest part of the cantle behind, he shall (with the help of both hands) gently (yet strongly, and in a right up posture, without inclining his body to either hand) raise himself until he may stand perpendicular upon his left foot, and then putting over his right leg, place himself in the saddle. (Figure 8.14a)

**2. Uncap your pistols.**

With the right hand he is to turn down the caps of the pistol cases. (Figure 8.14b)




*a)* *b)*

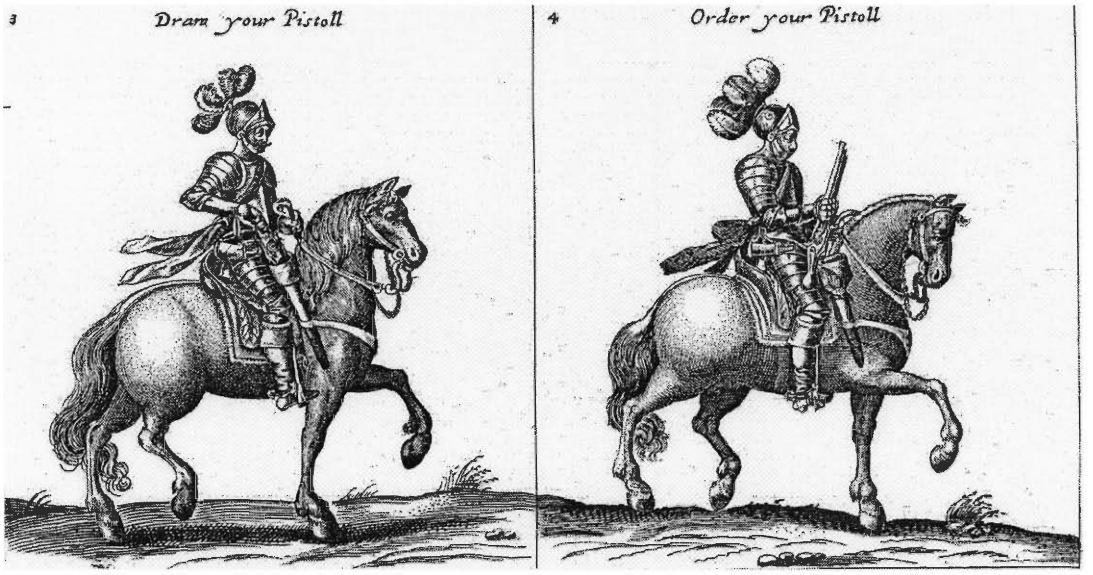
*Figure 6.14 Military commands. (Cruso, Figure 13-1 and 13-2)*

3. **Draw your pistol.**

He is to draw the pistol out of the case, with the right hand, (and always the left pistol first) and to mount the muzzle of it. (Figure 8.15a)

4. **Order your pistol.**

He is to sink the pistol into his bridle-hand, and to remove his right hand towards the muzzle, and then to rest the butt end upon his thigh. (Figure 8.15b)




a) b)

*Figure 8.15 Military commands. (Cruso, Figure 13-3 and 13-4)*

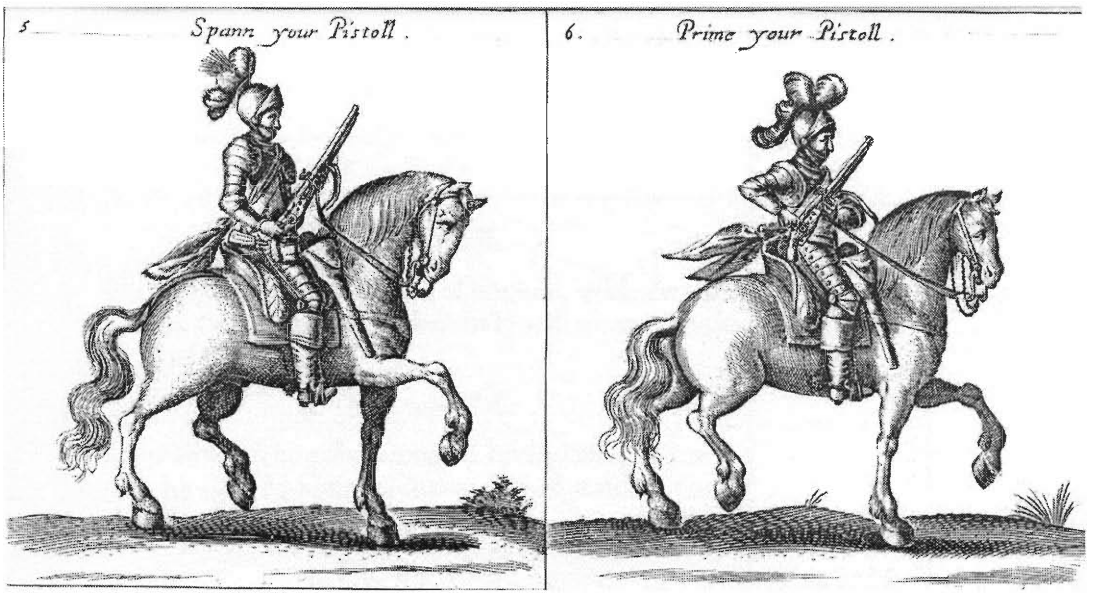
5. **Span your pistol.**

He is to sink the pistol into his bridle hand, and taking the key (or spanner) into his right hand, to put it upon the axletree, and to wind about the wheel till it

stick: and then to return the spanner to its place, being usually fastened to the side of the case. (Figure 8.16a)

**6. Prime.**

Holding the pistol in the bridle hand (as before) he is to take his priming box into his right hand, and (pressing the spring with his forefinger to open the box) to put powder into the pan. (Figure 8.16b)




a) b)

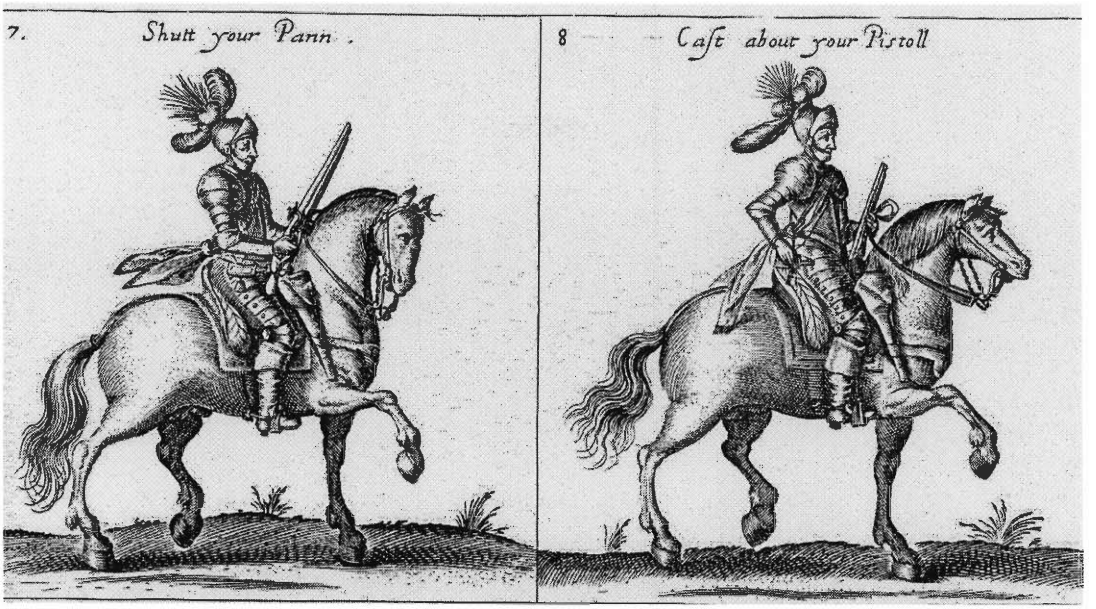
*Figure 8.16 Military commands. (Cruso, Figure 13-5 and 13-6)*

**7. Shut your pan.**

He is to press in the pan-pin with his thumb, and to shut the pan. (Figure 8.17a)

**8. Cast about your pistol.**

With the bridle-hand he is to cast about the pistol, and to hold it on the left side, with the muzzle upwards. (Figure 8.17b)




*a)* *b)*

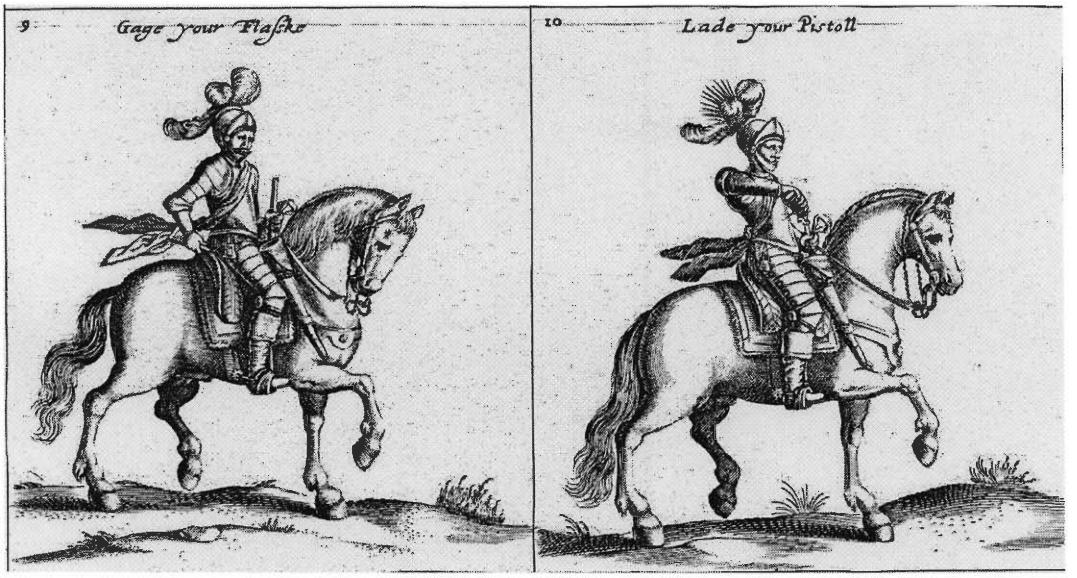
*Figure 8.17 Military commands. (Cruso, Figure 13-7 and 13-8)*

**9. Gauge your flask.**

He is to take the flask into the right hand, and with his forefinger to pull back the spring, and turning the mouth of the flask downward, to let go the spring. (Figure 8.18a)

**10. Load your pistol.**

Having gauged his flask (as in the former posture) he is to press down the spring (which opened the flask, with his forefinger, and so to load his pistol). (Figure 8.18b)




*a)* *b)*

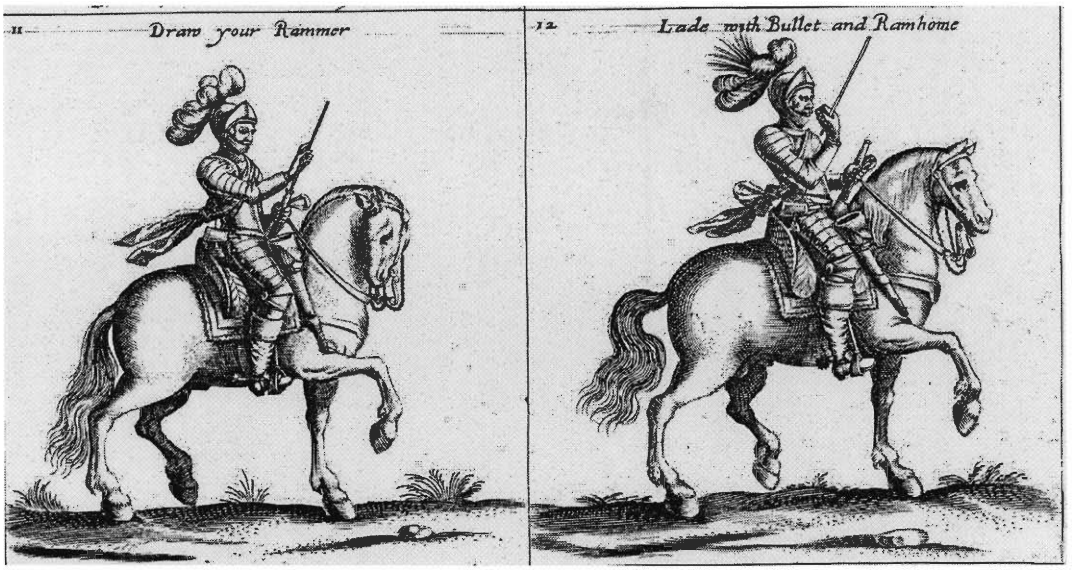
*Figure 8.18 Military commands. (Cruso, Figure 13-9 and 13-10)*

**11. Draw your rammer.**

He is to draw his rammer with the right hand turned, and to hold it with the head downward. (Figure 8.19a)

**12. Load with bullet, and ram home.**

Holding the rammer-head in his right hand (as before) he is to take the bullet out of his mount, or out of the bullet bag at the pistol case, being in fight, with the thumb and forefinger, and to put it into the muzzle of the pistol, and the rammer immediately after it, and so to ram home. (Figure 8.19b)




*a)* *b)*

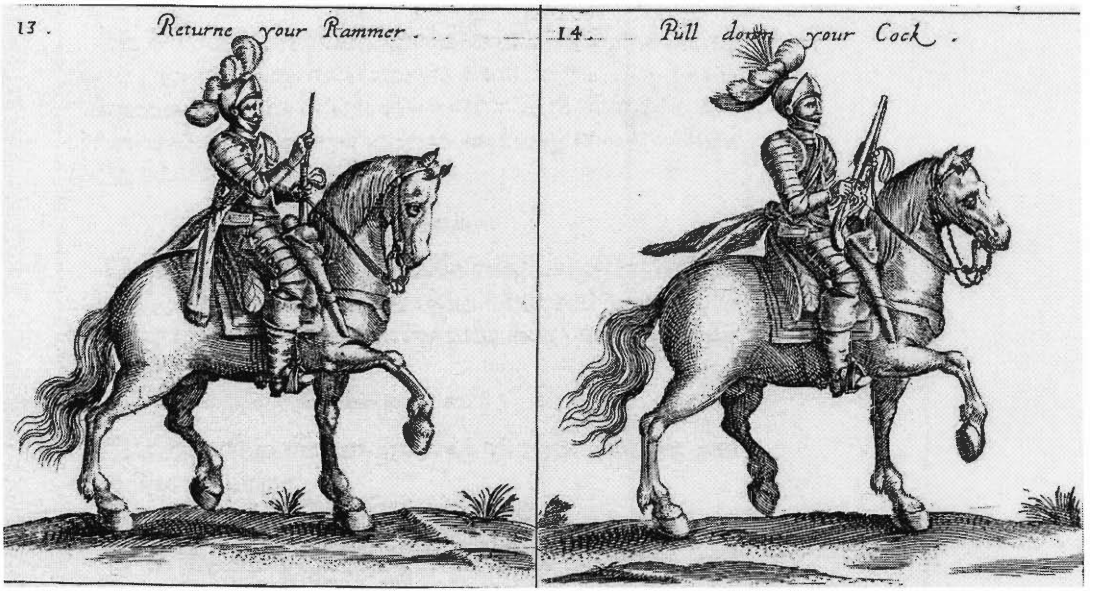
*Figure 8.19 Military commands. (Cruso, Figure 13-11 and 13-12)*

**13. Return your rammer.**

He is to draw forth his rammer with the right hand turned, and to return it to its place. (Figure 8.20a)

**14. Pull down your cock.**

With the bridle-hand he is to bring the pistol towards his right side, and placing the butt end upon his thigh, to pull down the cock. (Figure 8.20b)




*a)* *b)*

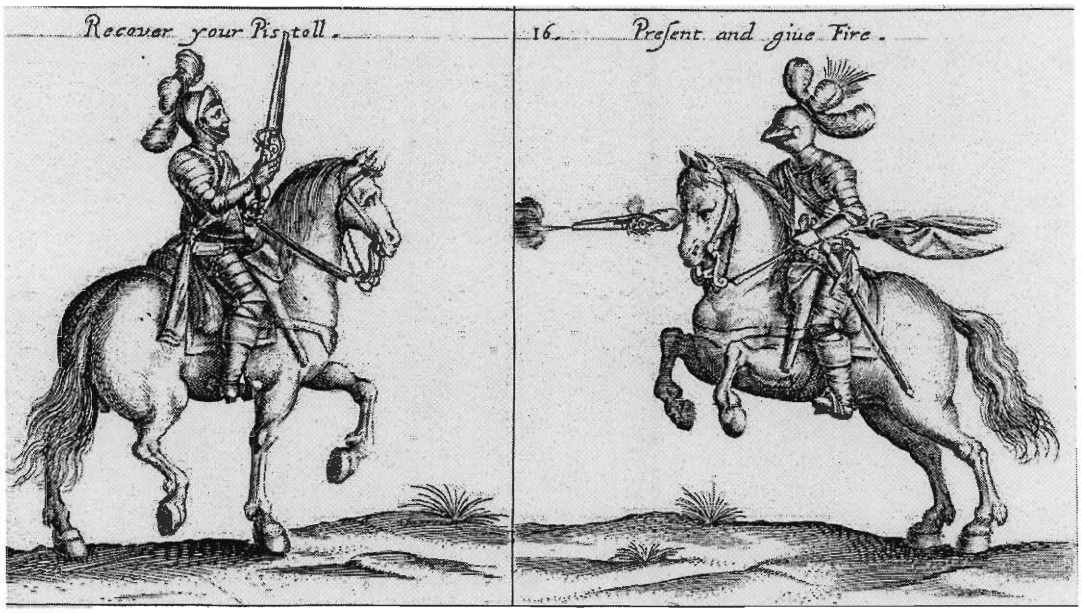
*Figure 8.20 Military commands. (Cruso, Figure 13-13 and 13-14)*

**15. Recover your pistol.**

He is to take the pistol into his right, mounting the muzzle. (Figure 8.21a)

**16. Present, and give fire.**

Having the pistol in his right hand (as in posture 15) with his forefinger upon the tricker, he is to incline the muzzle (with a fixed eye) towards his mark, not suddenly, but in degrees, (quicker or slower according to the space he rides) and that not directly forward toward the horse head, but towards the right, turning his right hand so as the lock of the pistol may be upward: and having gotten his mark, he is to draw the tricker, and give fire. (Figure 8.21b)




*a)* *b)*

*Figure 8.21 Military commands. (Cruso, Figure 13-15 and 13-16)*

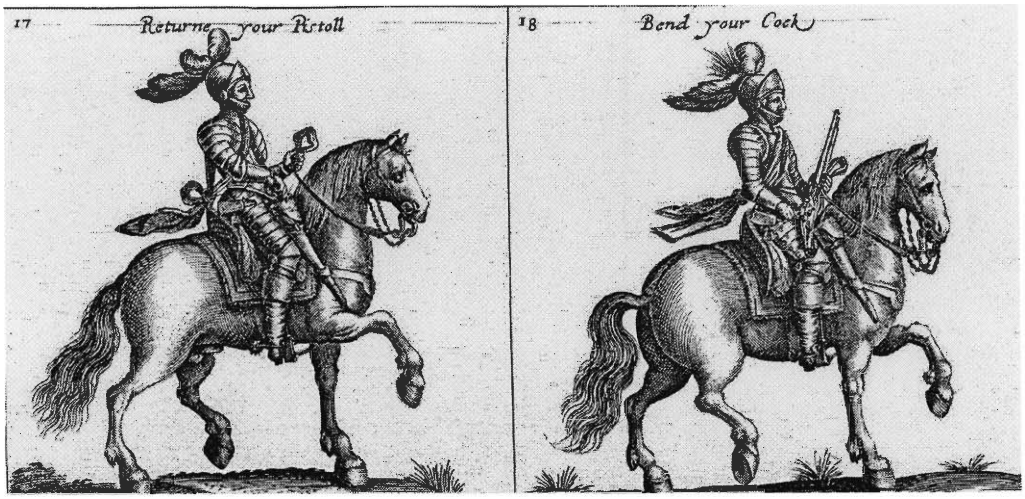
**17. Return your pistol.**

He is to return his pistol into the case, and then to draw his other pistol (as occasion may serve) and to do as before. (Figure 8.22a)

Now concerning the snap-hence pistol, those postures wherein it differs from the fire-lock pistol, are there as in Figure.

**18. Bend your cock.**

Holding the pistol in the bridle-hand, (as before has been showed) with the right hand he is to bend the cock. (Figure 8.22b)




a) b)

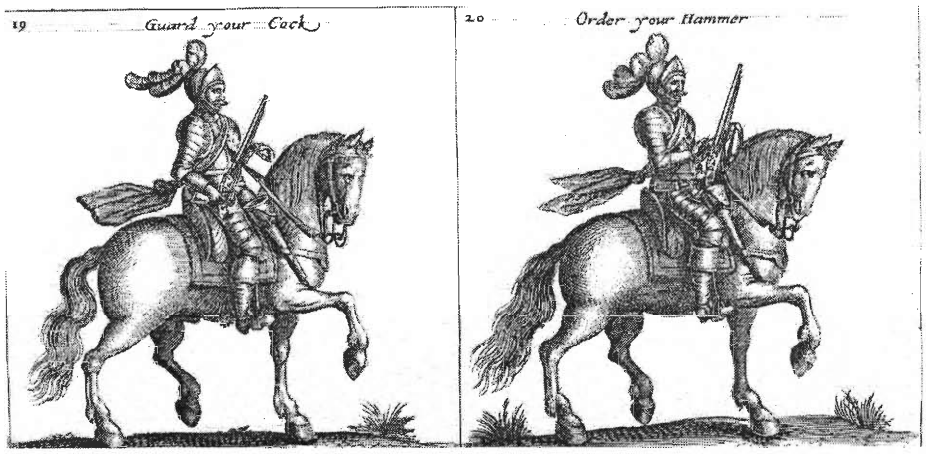
*Figure 8.22 Military commands. (Cruso, Figure 13-17 and 13-18)*

**19. Guard your cock.**

With the right hand he is to pull down the back-lock so to secure the cock from going off. (Figure 8.23a)

**20. Order your hammer.**

With the right hand he is to draw down the hammer upon the pan. (Figure 8.23b)




*a)* *b)*

*Figure 8.23 Military commands. (Cruso, Figure 13-19 and 13-20)*

**21. Free your cock.**

With the right thumb he is to thrust back the back-lock, and so to give the cock libertie.[56] (Figure 8.24)


*Figure 8.24 Military commands. (Cruso, Figure 13-21)*

A game of skill, called Quintain (Figure 8.25), was used to practice the skills needed by the horseman. We really do not know how the Quintain was played or practiced. One of today's conjectures is explained here. The horseman at full trot came up to a mannequin holding a shield. When the shield was hit a lance the mannequin swung around and a centrifugal force made a sand-filled bag swing also. If the horseman was not quick enough the bag would hit him.[57]

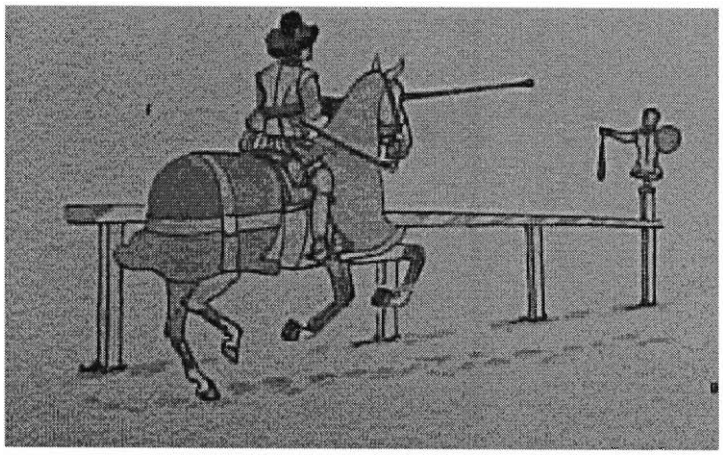


*Figure 8.25 The Quintain. (Wagner, p.81)*

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## XII. Endnotes

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[1] Kamen, p. 161
[2] Ibid, p. 162
[3] Polisensky, p. 78
[4] Wedgwood, p. 86
[5] Ibid, p. 125
[6] Spahn, p. 5
[7] Wedgwood, p. 204
[8] Spahn, p. 7
[9] Wedgwood, p. 327
[10] Spahn, p. 7
[11] Wedgwood, p. 387
[12] Wagner, p. 291
[13] Spahn, p. 8
[14] Wagner, p. 291
[15] Spahn, p. 10
[16] Ibid, p. 11
[17] Haythornthwaite,Philip, *The English Civil War 1642-1651*, pp.9-10
[18] Churchill, pp.218-19
[19] Haythornthwaite,Philip, *The English Civil War 1642-1651*, pp.377-8
[20] Roberts, p.17
[21] Wagner, p.13-15
[22] Harper's Military Encyclopedia, p576
[23] Wagner, p32
[24] Roberts, p.16
[25] Ibid, p16
[26] Ibid, p.23
[27] Harper's Military Encyclopedia
[28] Haythornthwaite, *Invincible Generals*, p. 14
[29] Ibid
[30] Ibid, p16
[31] Roberts, p.6-7
[32] Jones, p.223
[33] Haythornthwaite, *Invincible Generals*, p. 20
[34] Holmquist, p.7
[35] Haythornthwaite, *Invincible Generals*, p. 22
[36] Ibid, p.26
[37] Ibid, p.37
[38] Chandler, p.27
[39] Haythornthwaite - Invincible Generals, p.40
[40] Wagner, p. 250
[41] Ibid, p. 248
[42] Pollard, p. 62

[43] Wilkinson, p. 14
[44] Gheyn, pp. 5-87
[45] Pollard, p. 63
[46] Wilkinson, p. 14
[47] Ibid, p. 14
[48] Held, p. 36
[49] Wagner, p. 250
[50] Turner, p.178
[51] The American Heritage Dictionary of the English Language.
[52] Cruso, p.29
[53] Greener, pp.64-66
[54] http://www.unc.edu/~rowlett/units/dictL.html
[55] Jackson & Whitelaw, pp.4,5
[56] Cruso, pp. 38-41
[57] Wagner, p.36

## Appendix A. Museum Exhibit

The 17th-Century Arms and Armor exhibit at the Higgins Armory Museum was modified to incorporate several additional artifacts and a new barrier. The original armor exhibit in the Great Hall consisted of 7 suits of armor. They were: Composite Half-armor for a Pikeman, 1625-50 (HAM 360), with a pike (HAM 494); Three-quarter Armor for a Cuirassier, 1625-50 (HAM 2471); Three-quarter Armor for a Cuirassier, 1620-25 (HAM 1000); Three-quarter Armor for a Cuirassier, 1610-20 (HAM 702); Composite Three-quarter Armor for a Cuirassier, 1610/20-45 (HAM 2878); Composite Field Armor, 1600-30 (HAM 2354); and Composite Three-quarter Field Armor, 1600-30 (HAM 191). The existing case contained a matchlock musket (HAM 460) and a powder flask (HAM 263). A rope barrier was used to prevent the public from touching the armor.


*Figure A.1 Original 17th-Century Armor Display*

The new design includes a new case containing 4 cavalry items. This is in addition to the existing case containing the musket. The rope barrier has been replaced with a sturdy wooden barrier. This barrier allows several information cards or labels to be placed on the wooden surface, which is covered by Plexiglas. A label describing the decline of armor in the 17th-century has been placed in the center of the barrier.

**Cavalry Case**

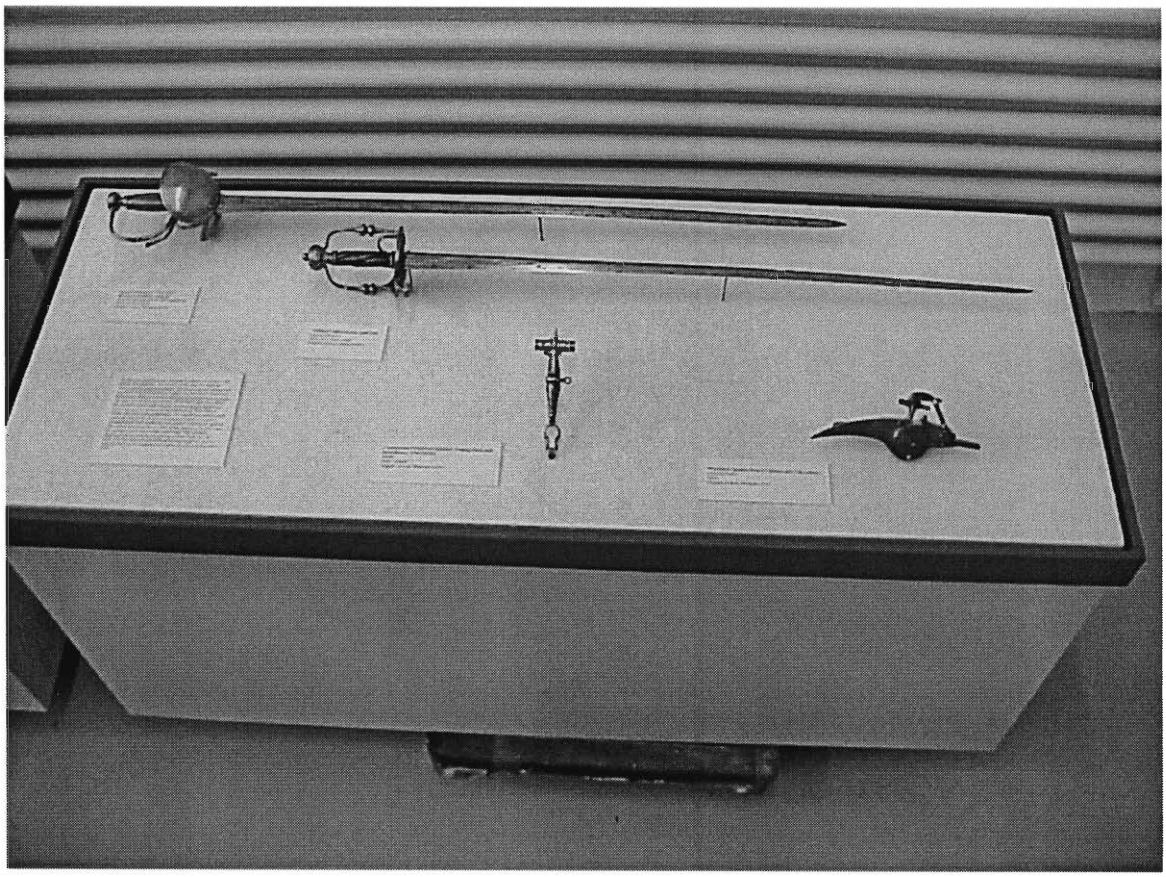


*Figure A.2 Cavalry Case*

The artifacts in the Cavalry case consist of the following: "Walloon"-Hilted Sword, 1650-1700 (HAM 605); Broadsword (Bilbo), 1600-50 (HAM 671); Wheel-lock

Ignition for a Carbine, mid 17th century (675); Combination Wheel-lock Spanner, Priming Flask and Screwdriver, 17th century (1456). Included in this case is label describing the items contained inside the case. The label reads as follows:

> By the seventeenth century the usual weapons of cavalry were swords and firearms. The swords in this case illustrate two forms used by mounted soldiers. The most common firearms for a trooper were harquebus or carbine (a short form of musket) and pistols. Both used either a flintlock or a wheel-lock ignition, the latter of which is shown here. When the trigger was pulled, the serrated wheel inside the lock revolved against a piece of pyrites secured in the jaws of the mechanism. This created sparks that ignited the gunpowder. The wheel-lock ignition was especially handy for cavalry use because it did not require a burning match cord, unlike the foot soldier's matchlock ignition. The socket wrench in the crossbar of the spanner served to wind the spring-loaded wheel of the wheel-lock. The example displayed has a container for priming powder built into the body. On the other end is a screwdriver that might be used to remove the lock for cleaning or to tighten the jaws of the wheel-lock.

**Musket Case**

The musket case was refurbished and contains the original two artifacts: a matchlock musket (HAM 460) and a powder flask (HAM 263).

*Figure A.3 Musket Case*

**Barrier**

The labels that were originally located next to each suit of armor have been removed and are now located on the barrier. This allows the viewer to read the labels with greater ease. There is enough space on the barrier to place two additional labels in the future. An advantage of the new barrier is that it is located closer to the suits of armor than the previous rope barrier. The viewer can now get a closer look at the armor itself while still not being able to physically touch it.

**New Display of Armor**

The new display of armor remains unchanged save for the exclusion of the Three-quarter Armor for a Cuirassier, 1610-20 (HAM 702).

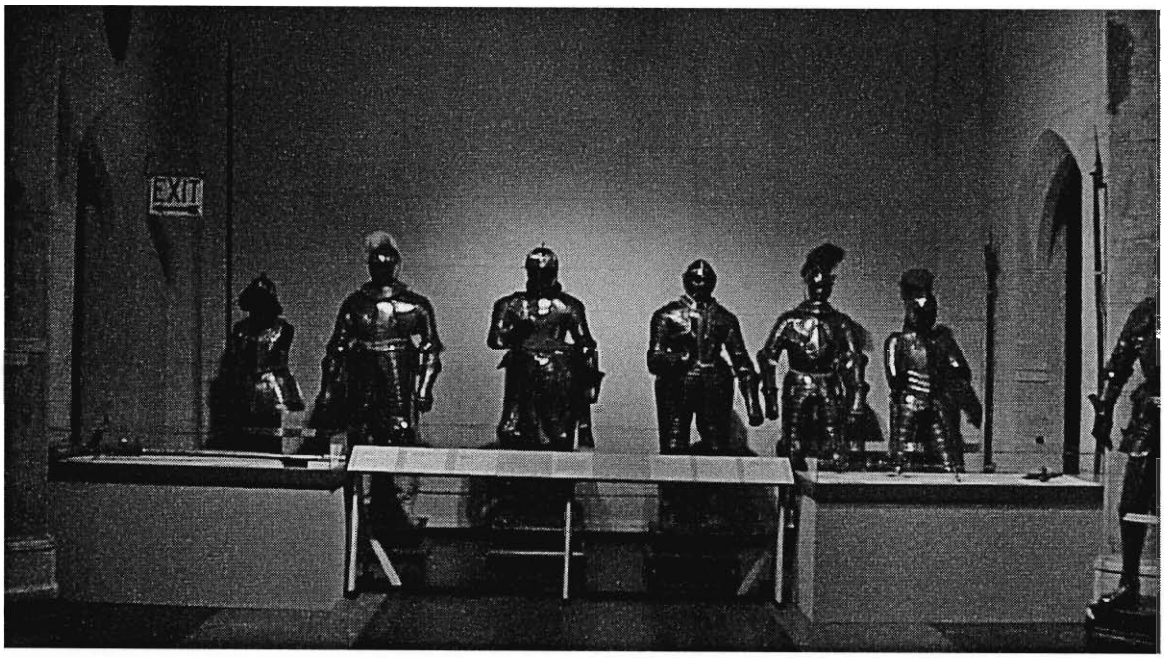



*Figure A.4 Current 17th-Century Armor Display*

**Possible Future Addition**

The Composite Half-armor for a Pikeman, 1625-50, (HAM 360) will be removed and one possible replacement for it could be the Polish hussar half-armor (HAM 568). This piece is much different from the other suits of armor currently on display in the 17th-century section. It is well preserved and would be an interesting addition to the current display.

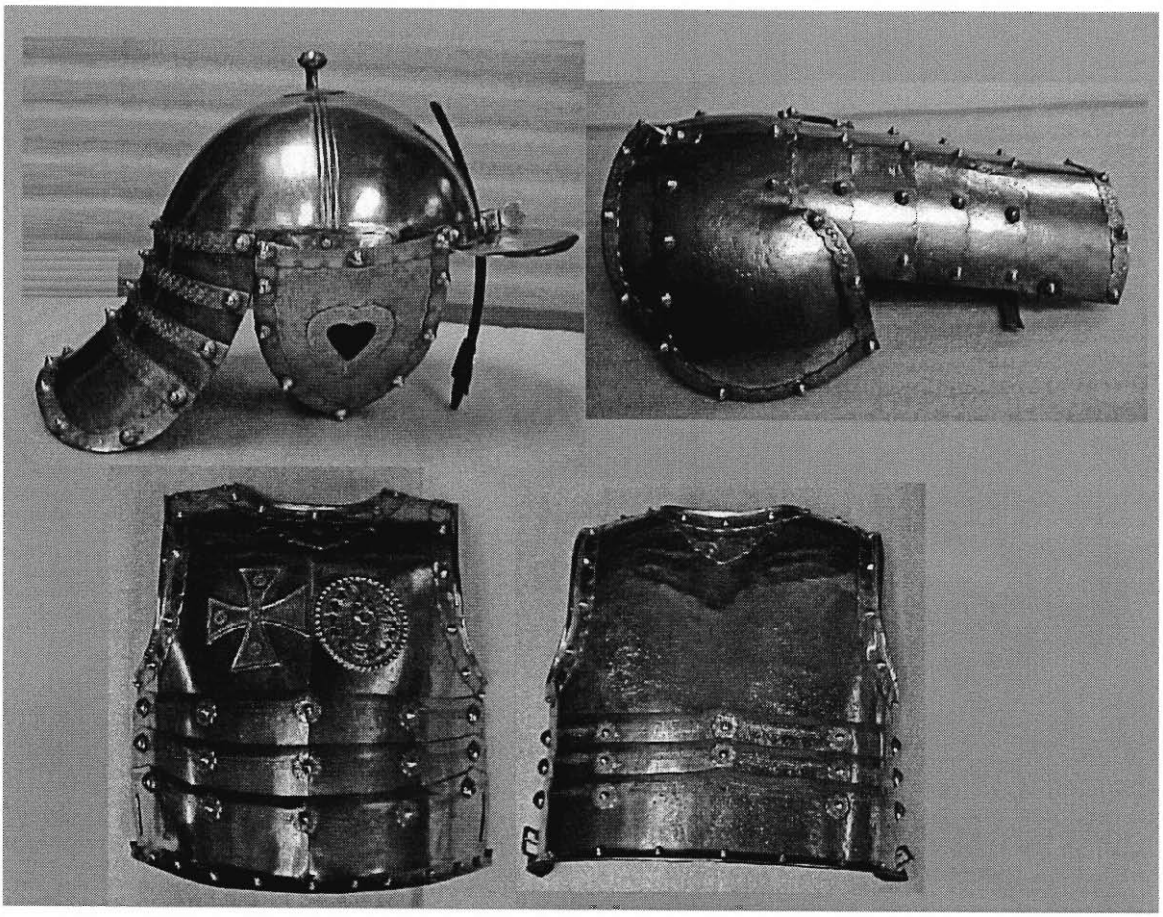


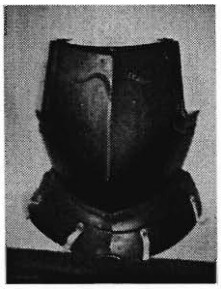
*Figure A.5 Polish Hussar Half-Armor (HAM 568)*

## Appendix B.

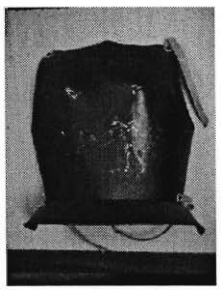
15
Breastplate
NS pallet 2

73
Halberd
3WA2

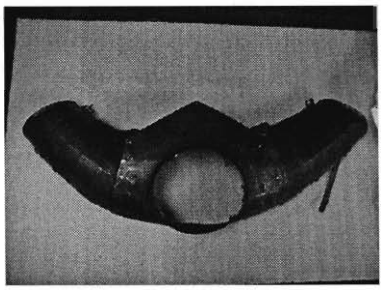
145
Helmet
NS pallet 3



145
Breastplate
NS pallet 3

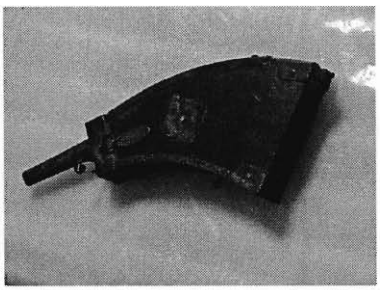


145
Backplate
NS pallet 3

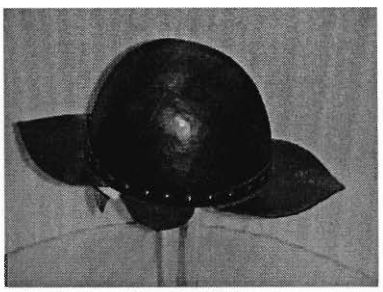


145
Gorget
NS pallet 3

145
Tasset with Poleyn
NS pallet 3

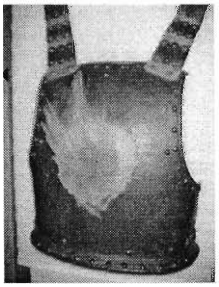


148
Powder Flask
OS shelf

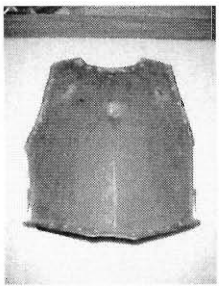


163
Sapper's Pott
(Trench Helmet)
NS E3

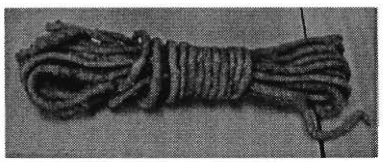
167.1
Cuirass (Breastplate)
NS A20



167.2
Cuirass (Backplate)
NS A20

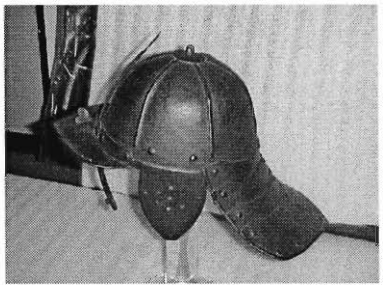


184
Breastplate (Bulletproof)
NS A2

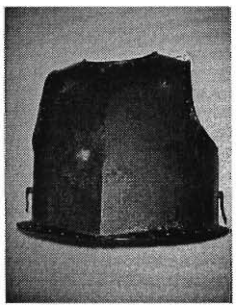


185
Fuse Rope
(Artillery Use)
NS D6

187
Helmet
E15



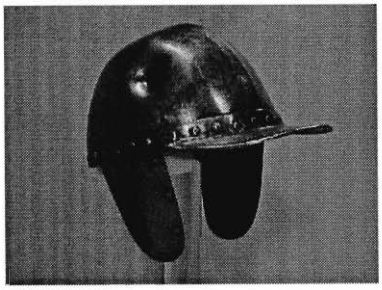
190
Cavalry Lobster Tail Helmet
(fixed tail)
NS H30



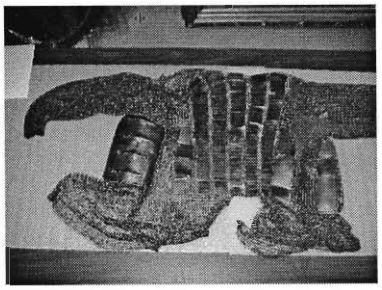
248
Breastplate (Bulletproof)
NS A10

360
Pikeman's Armor
Great Hall (WRA)

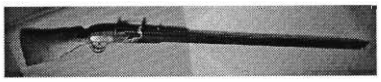
364
Pikeman's Pott
(refurbished)
E36



367
Helmet (bulletproof)
E36



394
Plate and Mail Armor
(Russian?)
NS D53

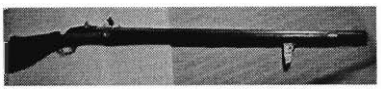


459
Musket
OS table

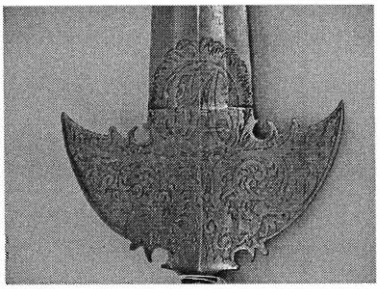
460
Musket
Great Hall (WRA)

461
Musket
OS table

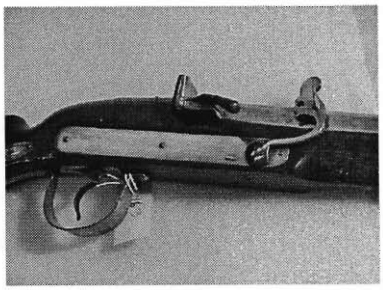
463
Musket
OS row 5



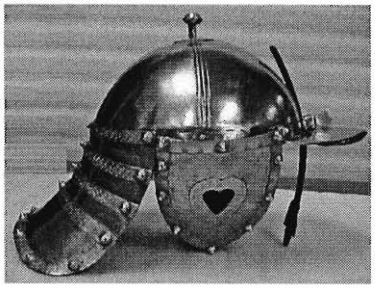
498
Musket
(rampart)
OS table



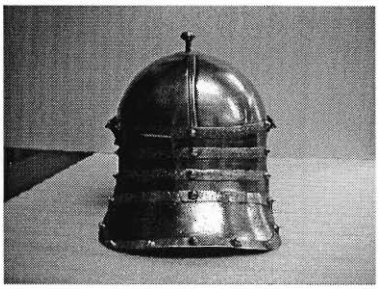
514
Partisan (78")
OS bin 2 left



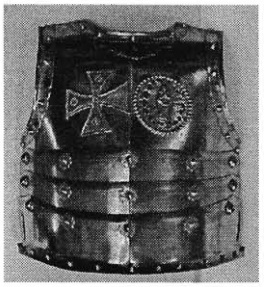
463
Musket
OS row 5



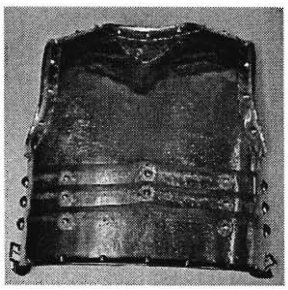
568
Hussar Helmet
(Polish)
NS pallet 4



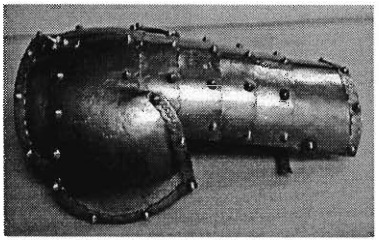
568
Hussar Helmet
(Polish)
NS pallet 4



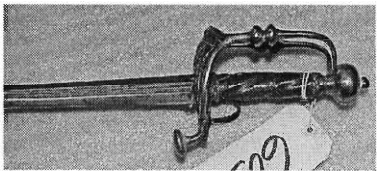
568
Hussar Breastplate
(Polish)
NS pallet 4



568
Half Armor for a Hussar
(Polish)
NS pallet 4

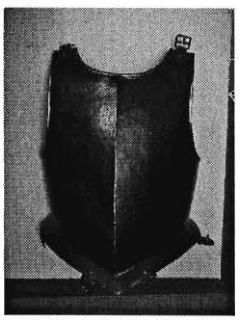


568
Hussar Pouldron
(Polish)
NS pallet 4

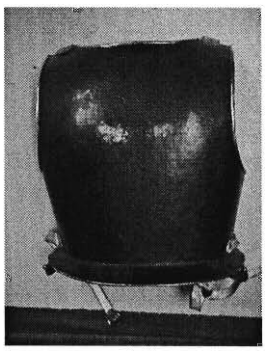


605
Sword
Great Hall (WRA)

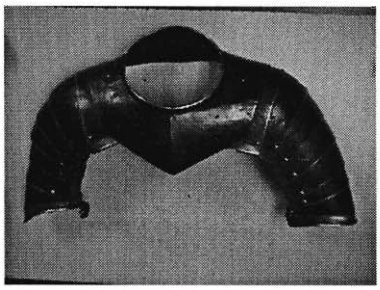
609
Helmet
NS pallet 3



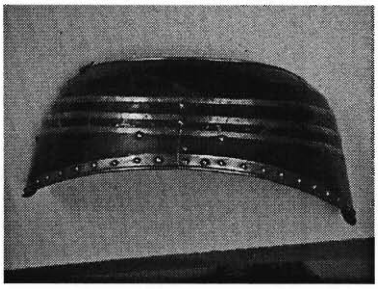
609
Breastplate
NS pallet 3



609
Backplate
NS pallet 3



609
Gorget and Pouldrons
NS pallet 3

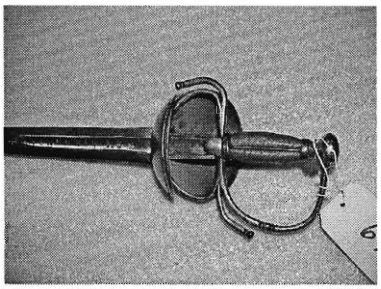


609
Guard de Reine
NS pallet 3

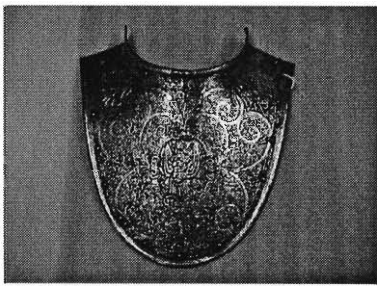
609
Gauntlet
NS pallet 3

644
Cabasset
(pikeman's helmet)
NS G49

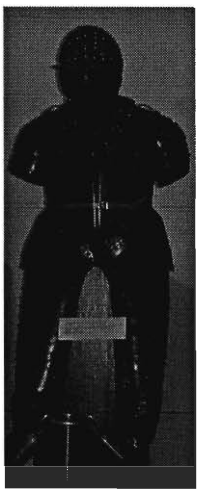
668
Infantry Sword
OS B4



671
"Bilbo" Sword
Great Hall (WRA)

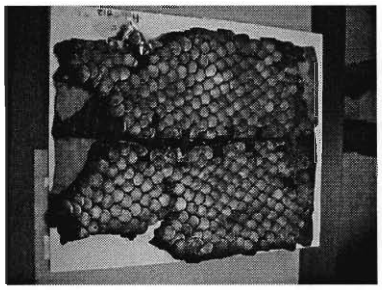


698
Gorget (very ornamental)
NS F30

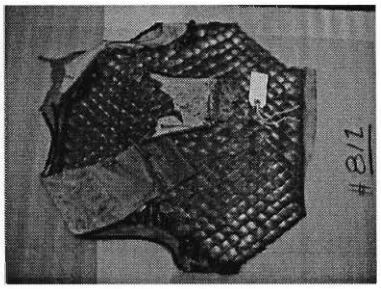


702
Three-quarter Armor
Great Hall (WRA)

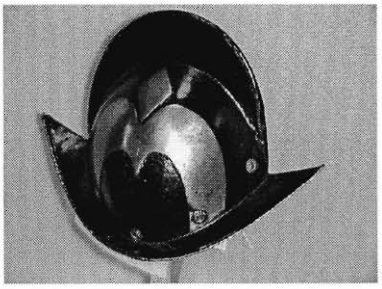
784
Helmet
(articulated tail)
E42



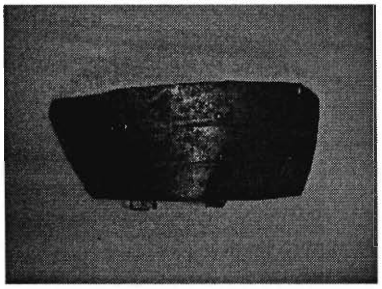
811
Karacena Scale Armor
NS D5



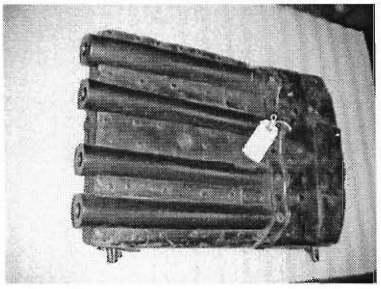

812
Karacena Scale Armor
NS D14



874
Comb Morion
NS G46

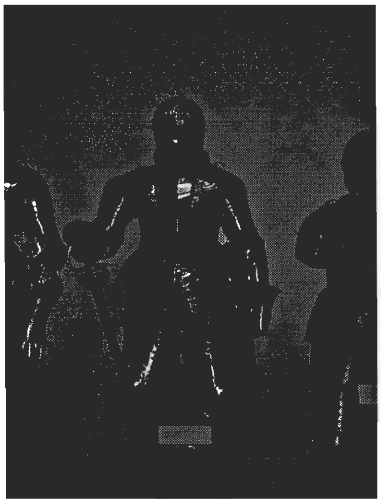


927.2 a,b
Tassets
NS B3

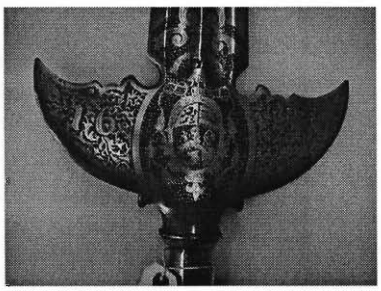


952
Organ Gun Battery
NS G42

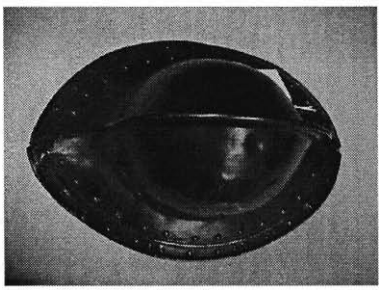
975
Musket Rest
OS bin 2 center



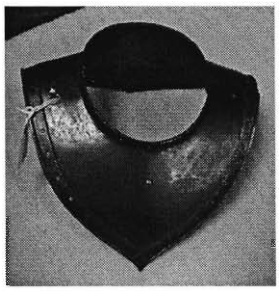
1000
Three-quarter Armor
(German)
Great Hall (WRA)



1051
Partisan
OS bin 3



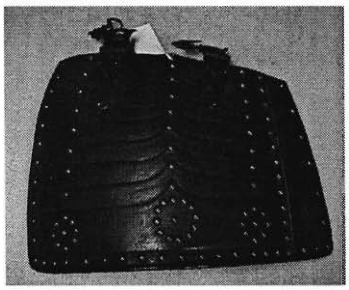
1124
Pikeman's Helmet
NS pallet 2



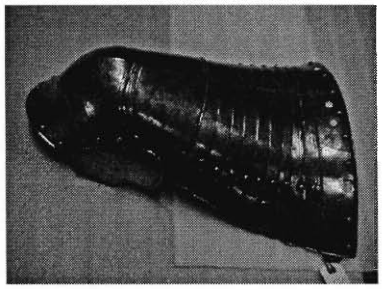
1124
Pikeman's Gorget
NS pallet 2

1124
Pikeman's Breastplate
NS pallet 2

1124
Pikeman's Backplate
NS pallet 2



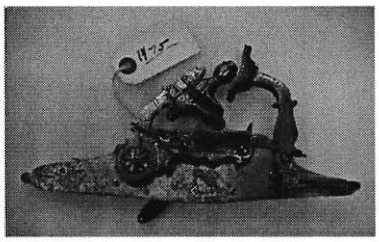
1124
Pikeman's Tasset
NS pallet 2



1145
Cavalry Tasset
NS A29

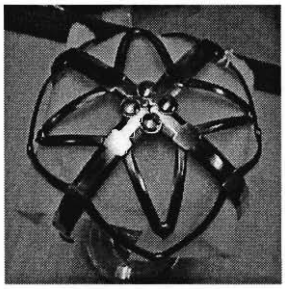
1230
Helmet
E20

1232
Helmet
E18

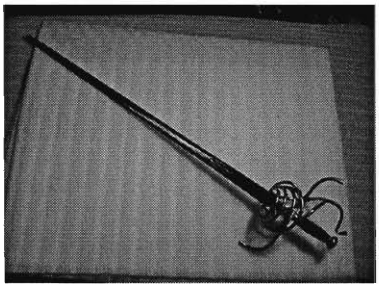


1475
Snaphance Lock
OS row 4C

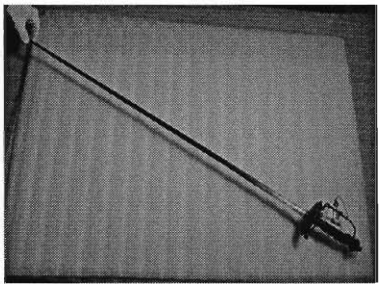
1510
Helmet
E26



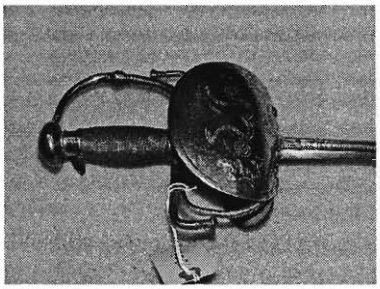
1762
Folding Skull Cap
NS G47



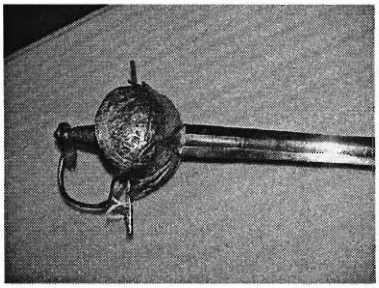
1785
Rapier
OS E7



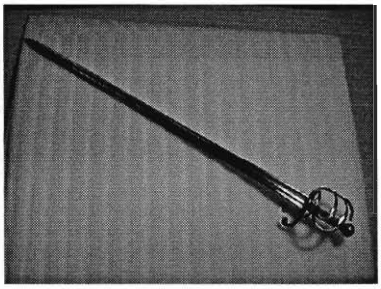
1786.2
Rapier
OS B8



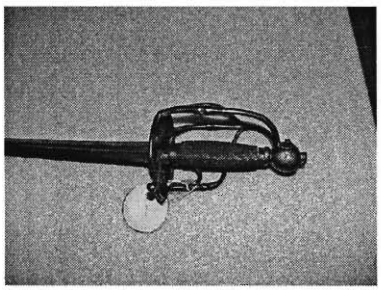
1803.1
Rapier (left-handed)
OS bin 12



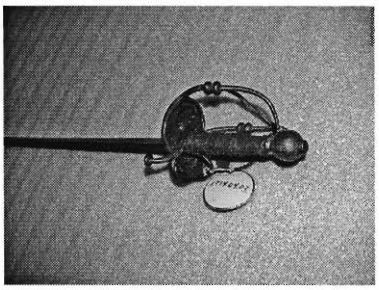
1803.2
Sword
OS B5



1803.3
Rapier
OS B6

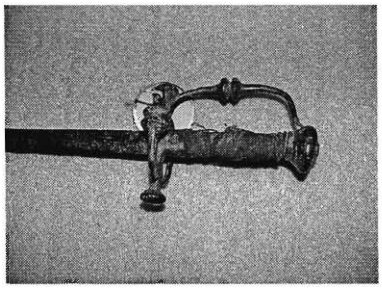


1979.04.02
Rapier
NS F26

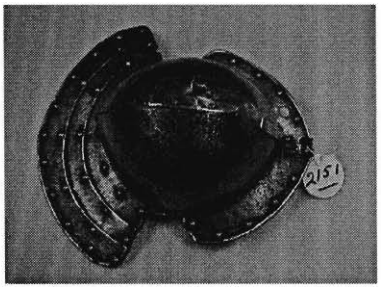


1979.04.03
Rapier
NS F25

1979.04.04
Rapier
NS F25

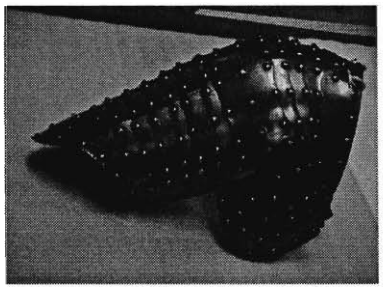


1979.04.07
Rapier
NS F26

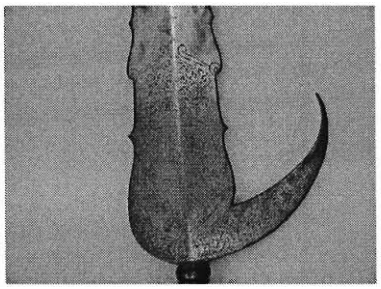



2151
Cavalry Helmet
E13

2365
War Hat
E36

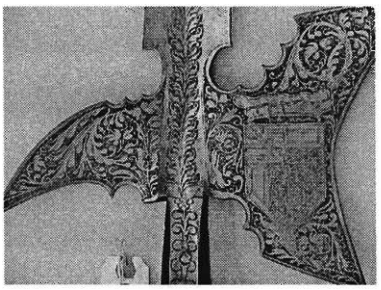


2447
Pauldron
NS A26

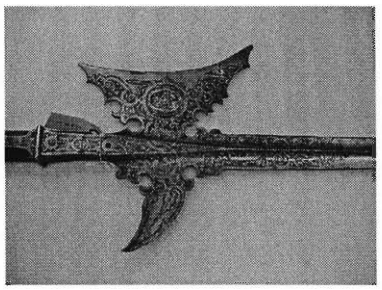


2657
Spontoon of Guard of
Vittore Amadeo II
OS rolling bin G9

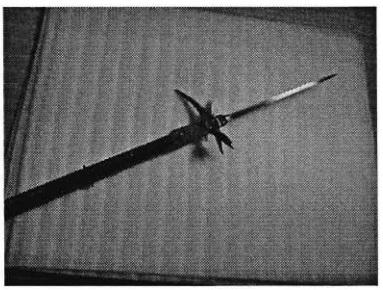
2662
Halberd (c. 1762)
OS bin2



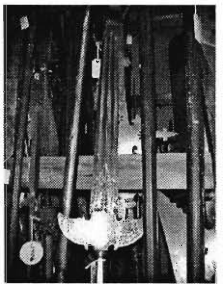
2663
Halberd
OS bin



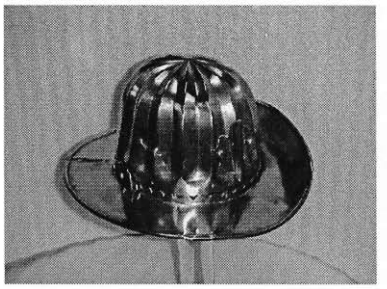
2666
Halberd
OS bin



2679
Lucerne Hammer
OS bin 7 left

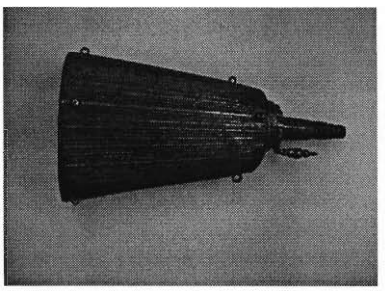


2684
Partisan
OS bin 6

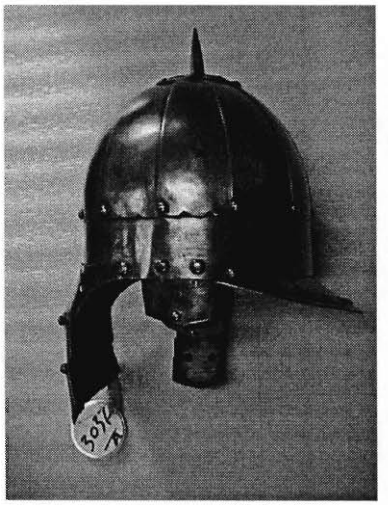


2958
Hat Shaped Helmet
NS G47

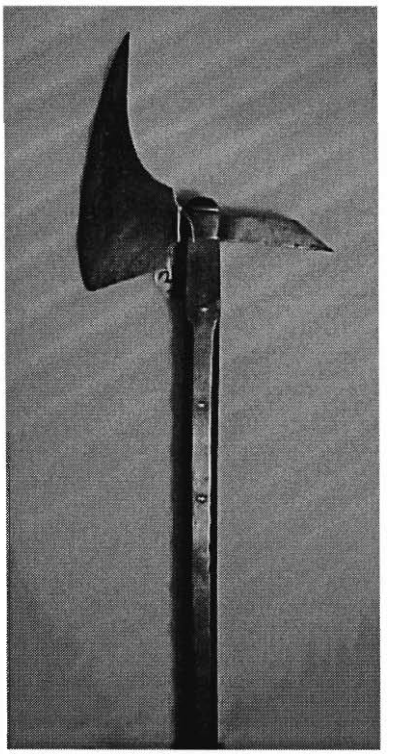
2960.1
Berdysh
(Russian 17/18th century)
OS bin 4 left



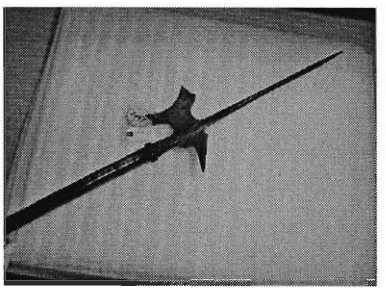
2962
Powder Flask
OS shelf (under guns)



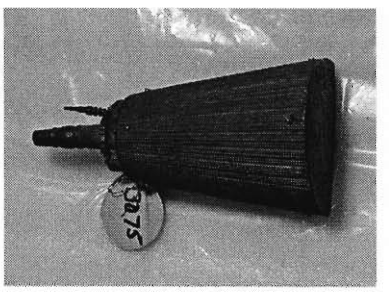
3037.3
Helmet
E19



3038.1
Mordaxt
(Swiss c. 17th century)
OS bin 7 center



3041.3
Saber Halberd
OS bin 4 rear



3075
Powder Flask
OS shelf (under guns)