Sixtheenth-Century Field Tactics

Class given at Pennsic 37 by Dani of the Seven Wells (dani@pobox.com)

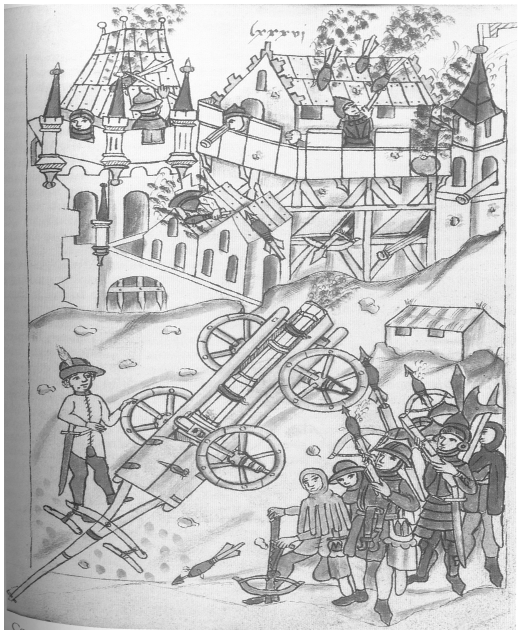


Figure 1: Siege, c. 1400. Bradbury p. 279.

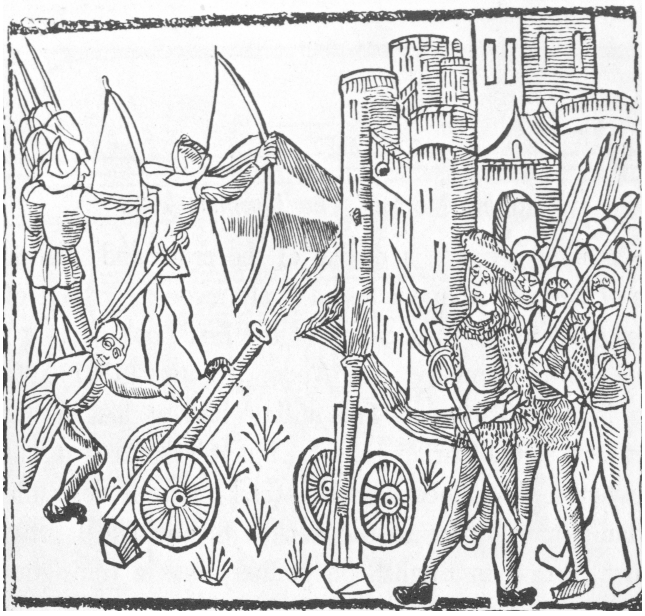


Figure 2: Siege of Troy, 1513

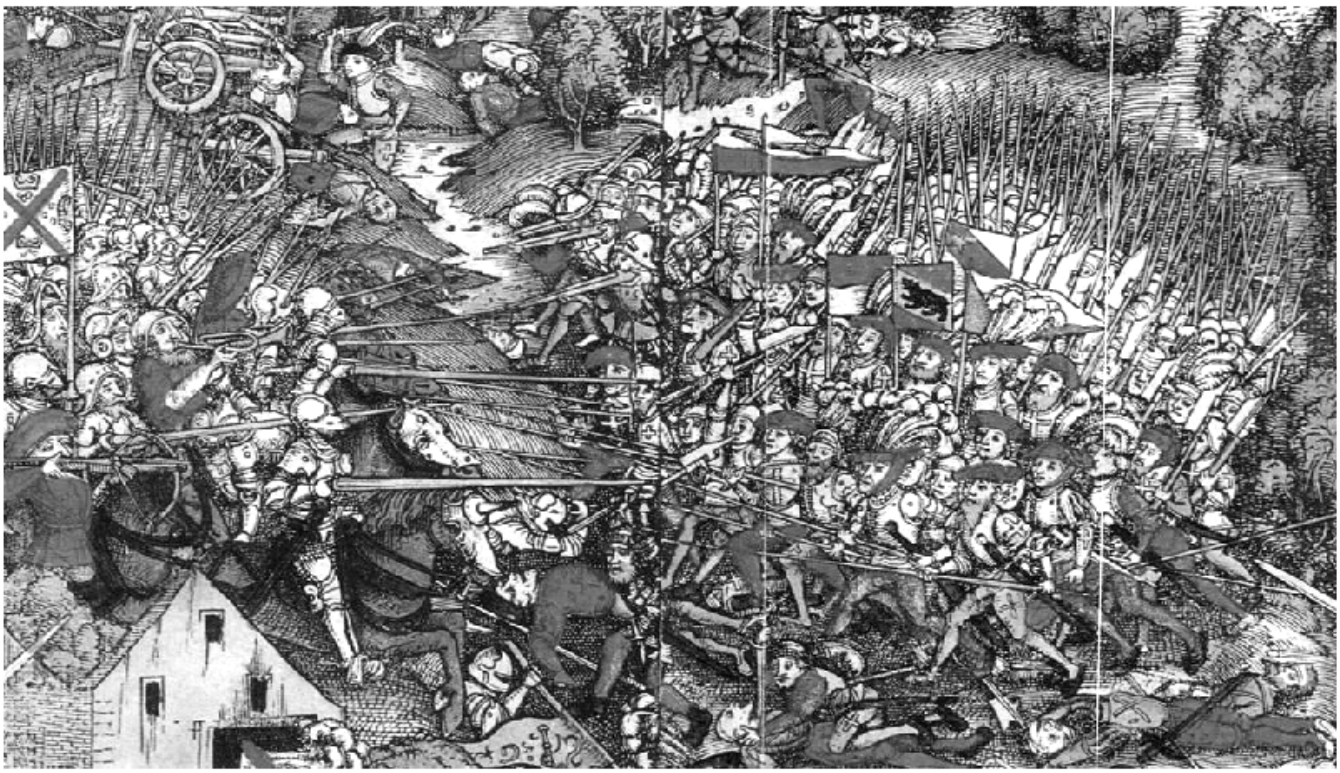


Figure 3: Battle of Dornach, 1499 (Detail)

1494: Charles VII takes an artillery train of 70 bronze cannons on carriages to Italy.
1503: Gonzalo de Cordoba defeats French forces with combined arequebus, pike, and cavalry.
1517: Maximilian I orders crossbows replaced with arquebuses.

Figure 4. Schematic of fortifications, Hale/Whithorne p. 25

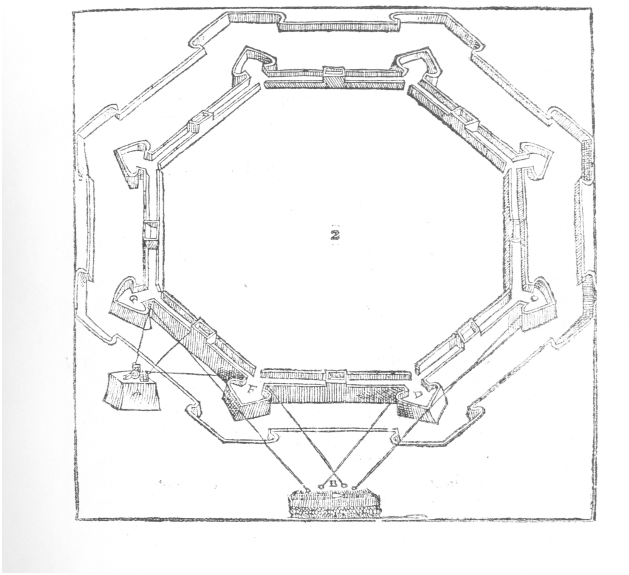


Figure 5: Fortress of Nettuno, 1501-3

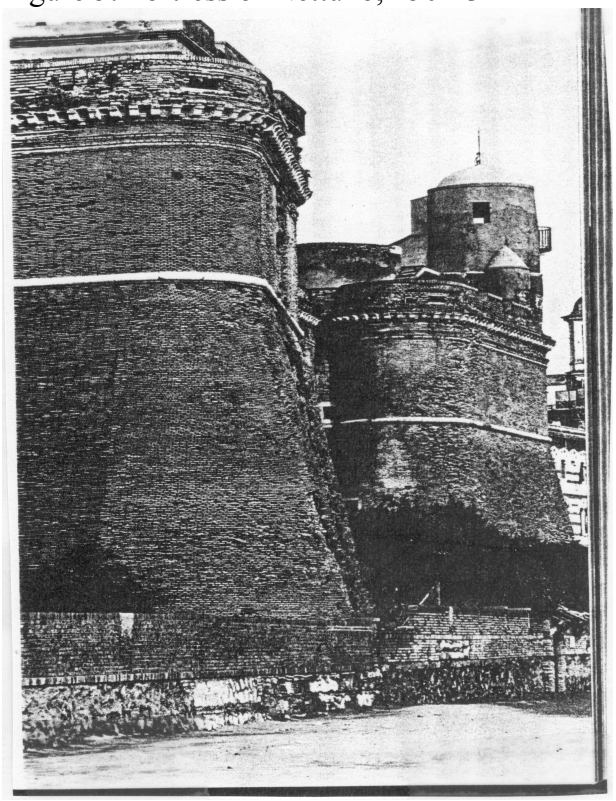


Figure 6: Sidney in Ireland, 1581

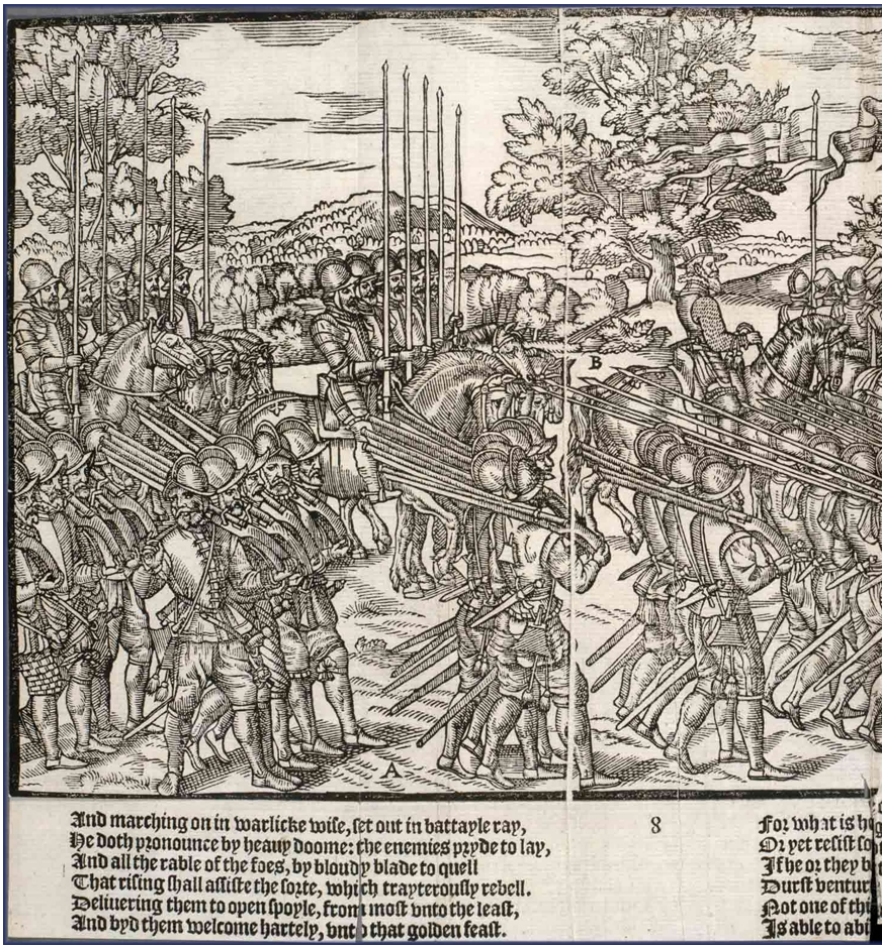


Figure 7: Barret, 1598, p.72

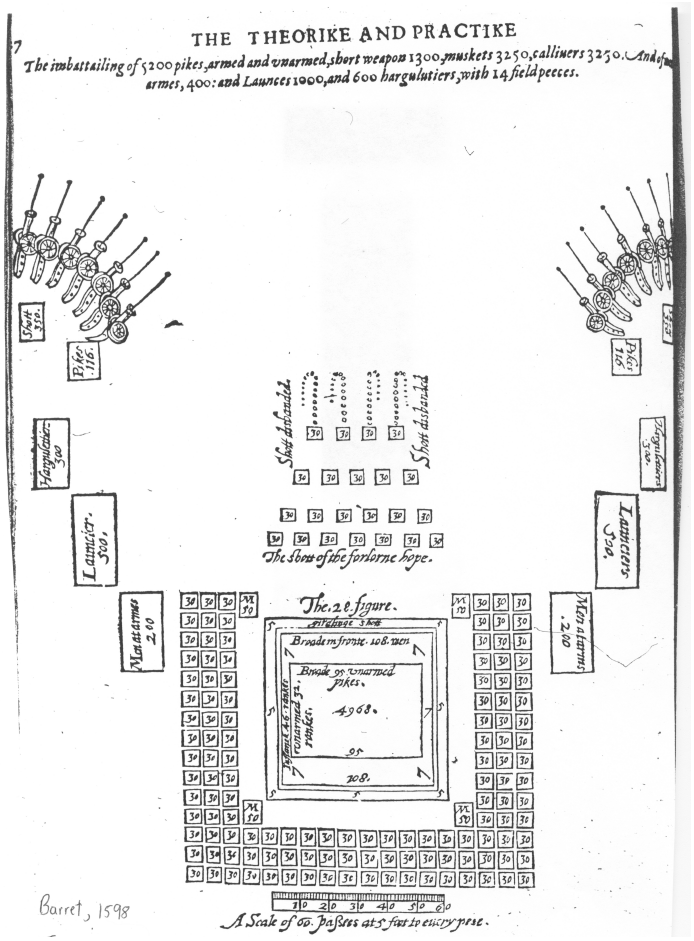
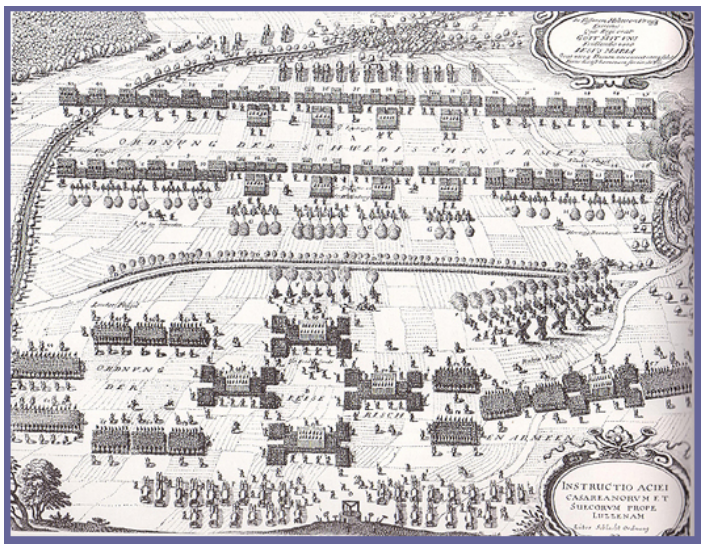
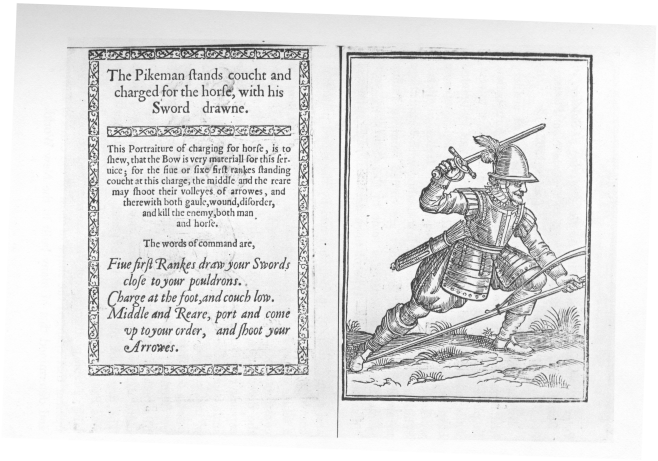


Figure 8: Lutzen, 1632



c. 1590: Maurice of Nassau.
c. 1630: Gustav Adolphus.
c. 1700: Adoption of the bayonet.
c. 1750: Adoption of the iron ramrod.

Figure 9: Hale/Neede p.23


The Pikeman ſtands coucht and charged for the horſe, with his Sword drawne.

This Portraiture of charging for horſe, is to ſhew, that the Bow is very materiall for this ſervice; for the fiue or ſixe firſt rankes ſtanding coucht at this charge, the middle and the reare may ſhoot their volleyes of arrowes, and therewith both gaule, wound, diſorder, and kill the enemy, both man and horſe.

The words of command are,

Fiue firſt Rankes draw your Swords cloſe to your pouldrons.
Charge at the foot, and couch low.
Middle and Reare, port and come vp to your order, and ſhoot your Arrowes.

"The practiced arcabuzero, however much fear he has of the enemy, will never loose the style of loading his weapon and putting the flask on his belt, and priming with his little flask and powder the pan of his weapon, and placing its cord; without stopping to measure or look at it, he will always be able to do it; using his second finger, right hand to measure the cord when he puts it into the serpentine, so it will fall properly on the powder and fire. He who is not practiced, is all the contrary; with fear he has of the enemy he is disturbed and does not load rightly, nor find the powder flask, nor the little flask, and does not fire the forth part of the shots of the skilled..."

"….Space rows fifteen paces apart, with three paces apart in rows. Without haste. Fire first row; without turning heads, make way for the next row... Each man is to have five or six shot in his mouth, and two lighted cords…. Each row fires at most four shots, or five; after that the weapons must be cooled and the men rested. (otherwise the ball will get soft in the hot barrel.)"

Martin de Eguiluz, 1592

"A musqueteer may fail of his shot by sundry accidents, as by the rolling out of the bullet, an badde matche, an matche not right cocked, by evill powder, or wet powder in his pan; and I have often seen an ranke of musquetiers having presented and given fire that three or four of ten have failed of their shot, and ye must know that in service there is no time to prime againe or to right their match, for they must fall away with the rest of their ranke, and make place for the next ranke to give fire.'"

Thomas Kellie, 1627



Figure10: Musket Drill

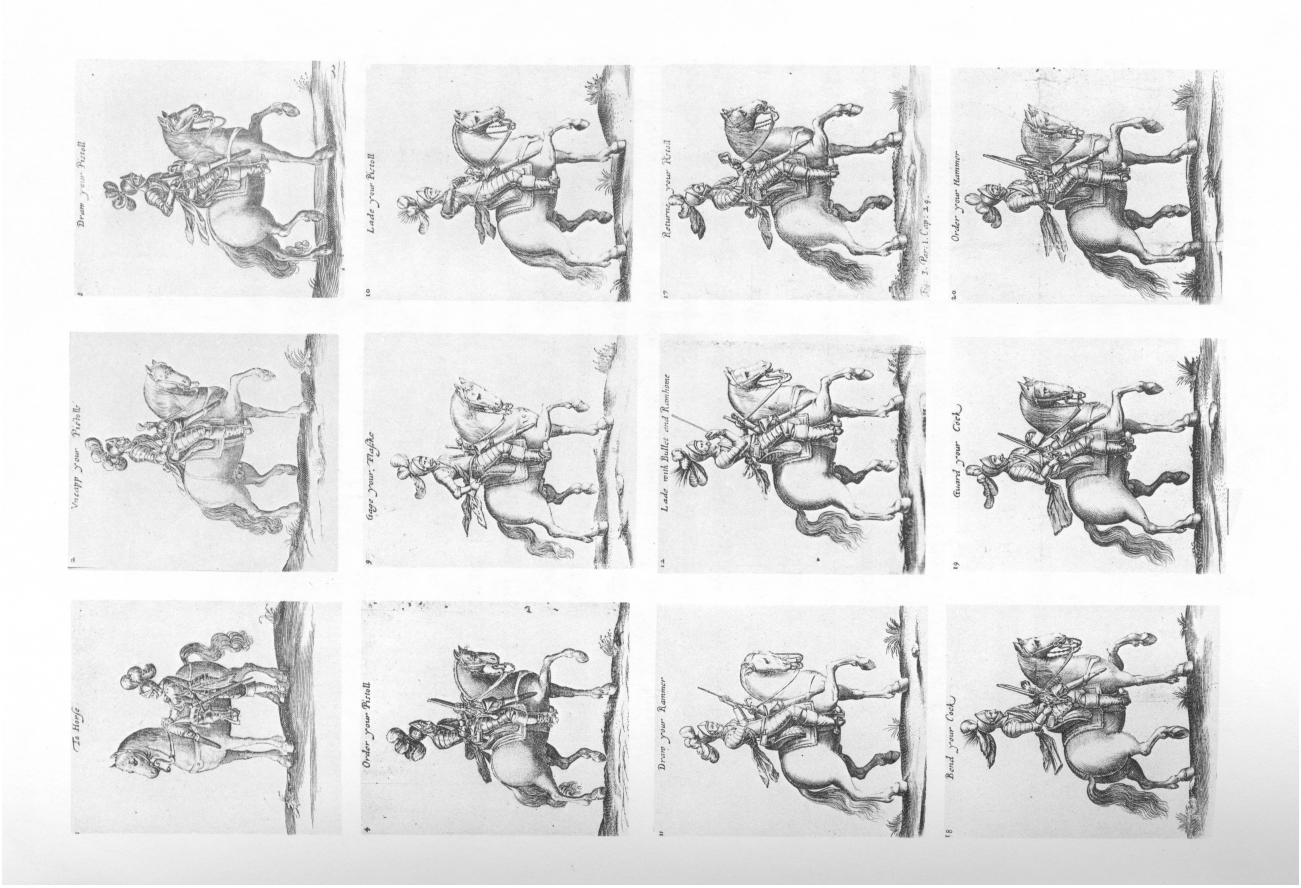


Figure 11: Pistol Drill

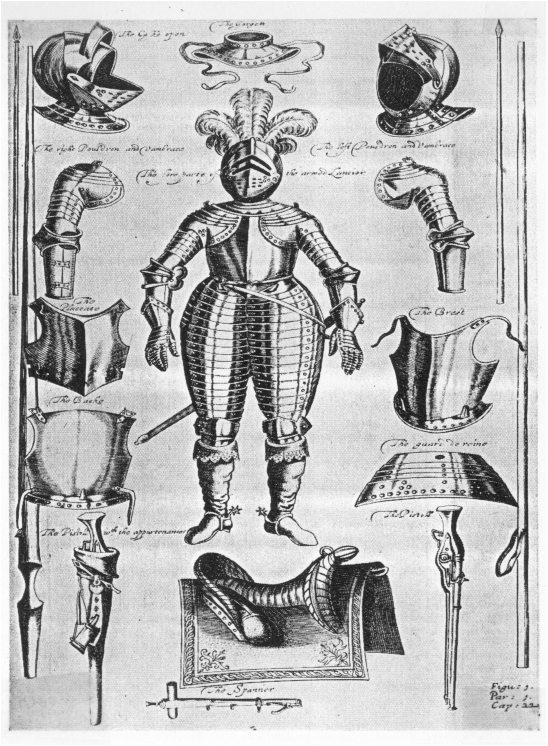


Figure 12: Webb/Cruso, 1632

“[Artillery] is beyond comparison more damaging to him who has to defend himself than to him who attacks…. [Being] obliged to raise your artillery upon your walls…you cannot thus place artillery of the same caliber and power as the besieger’s, as that requires considerable space…[and] you cannot make your batteries secure against the artillery of the assailant.”

“The light horsemen…assault the enemy, whose artillery has discharged once and has passed over the heads of our footmen…. Our horsemen have now gotten it, and the enemies for to defend it are come forward so that neither our ordnance nor the enemy’s can any more do their office.”

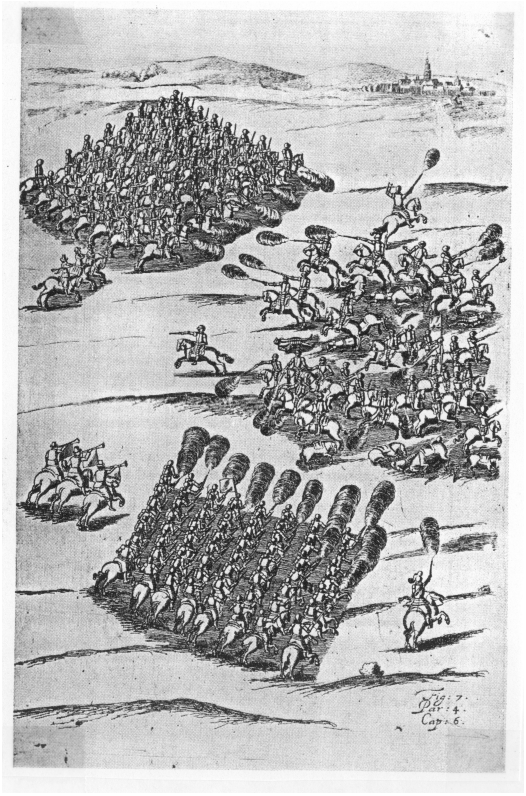
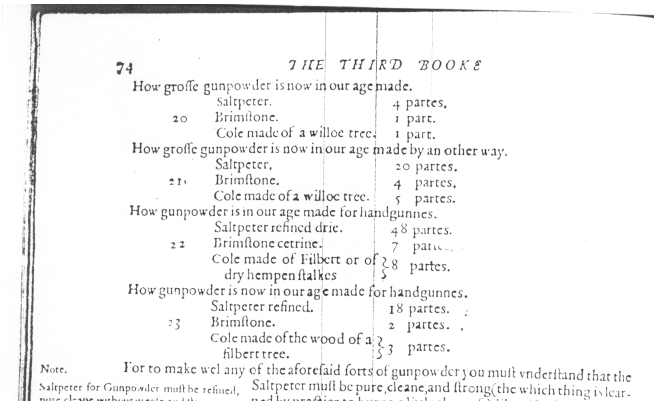


Figure 13: Webb/Cruso - Caracole



74 THE THIRD BOOKE

How groſſe gunpowder is now in our age made.

	Saltpeter.	4 partes.
20	Brimſtone.	1 part.
	Cole made of a willoe tree.	1 part.

How groſſe gunpowder is now in our age made by an other way.

	Saltpeter.	20 partes.
21	Brimſtone.	4 partes.
	Cole made of a willoe tree.	5 partes.

How gunpowder is in our age made for handgunnes.

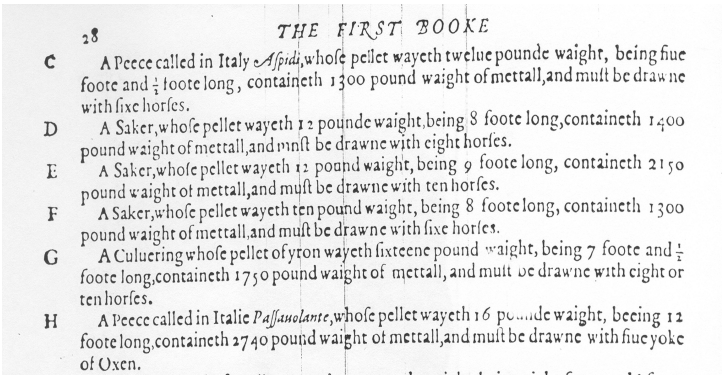
	Saltpeter refined drie.	48 partes.
22	Brimſtone cetrine.	7 partes.
	Cole made of Filbert or of dry hempen ſtalkes	8 partes.

How gunpowder is now in our age made for handgunnes.

	Saltpeter refined.	18 partes.
23	Brimſtone.	2 partes.
	Cole made of the wood of a filbert tree.	3 partes.

Note. For to make wel any of the aforeſaid ſorts of gunpowder you muſt vnderſtand that the Saltpeter for Gunpowder muſt be refined, Saltpeter muſt be pure, cleane, and ſtrong (the which thing is lear-

Figure 14: Tartaglia, 1588, p.74



28 THE FIRST BOOKE

C A Peece called in Italy *Aſpidi*, whoſe pellet wayeth twelue pounde waight, being fiue foote and ½ foote long, containeth 1300 pound waight of mettall, and muſt be drawne with ſixe horſes.

D A Saker, whoſe pellet wayeth 12 pounde waight, being 8 foote long, containeth 1400 pound waight of mettall, and muſt be drawne with eight horſes.

E A Saker, whoſe pellet wayeth 12 pound waight, being 9 foote long, containeth 2150 pound waight of mettall, and muſt be drawne with ten horſes.

F A Saker, whoſe pellet wayeth ten pound waight, being 8 foote long, containeth 1300 pound waight of mettall, and muſt be drawne with ſixe horſes.

G A Culuering whoſe pellet of yron wayeth ſixteene pound waight, being 7 foote and ½ foote long, containeth 1750 pound waight of mettall, and muſt be drawne with eight or ten horſes.

H A Peece called in Italie *Paſſauolante*, whoſe pellet wayeth 16 pounde waight, beeing 12 foote long, containeth 2740 pound waight of mettall, and muſt be drawne with fiue yoke of Oxen.

Figure 15: Tartaglia, p.28

"Great guns do without comparison oftener miss the infantry than hit them, because the foot are so low, and the artillery so hard to be pointed, that if they be placed never so little too high, they shoot over; and never so little too low, they graze and never come near to them."

Machiavelli, 1515

"This is a point hard to be handled by me that have not seene many Armies meete…"

Robert Norton, 1628

"Il fait plus de peur, que du mal"

Blaise de Montluc, 1571

Factoids

Rates of fire. Muskets typically fired about once a minute in 1600, with up to 50% misfires. Rates would go to two shots per minute (for well-trained troops) by 1700 and up to five by 1750. (A 1690 manual gives a 44-step loading drill.) The main improvements were a shift to flintlocks (and lighter muskets), the adoption of the iron ramrod, and the use of the bayonet.

Types of cavalry.

- Cuirassiers wore ¾ armor from helmet to knees with good breastplates, a brace of pistols, and a sword. (The pistols were wheel-locks, about 2ft long. The sword was long cut-and-thrust weapon.)
- Carabiniers (mounted arquebusiers) wore helmet and breastplate, carried a short wheel-lock musket, one or two pistols, and a sword.
- Dragoons had infantry-style muskets, and sometimes pikes, and used horses for quick deployment.

Types of infantry.

- Pikemen wore open helmet, armor on chest (demi-cuirass or plastron), thighs (cuisse) and arms (brassards) and a heavy buff or leather coat and large leather gauntlets. They also carried swords. The pike was 15-18 feet long in the 16th century, but shrank to about 11 feet (not counting point) as lances disappeared. The front 4 feet of pike were metal-shod; the rear was pointed for planting.
- Musketeers also carried a sword or rapier (and sometimes a dagger) and wore a strong leather coat (useful against steel) and a flat-rimmed "pot helmet". The musket was 14-20 pounds, 5 feet long, and fired with a 'match' which was attached to a mechanism that lowered it to the priming pan.

Other types of guns. Predecessors to flintlocks existed, but were expensive. Rifles were expensive, finicky and twice as slow as muskets. (A rifled wheel-lock was accurate to 200 yards, while a musket might be worth aiming at 60 yards.) Arquebuses were light, short guns suitable for skirmishing. (A caliver is an arquebus with a standard bore size.) In the late 16th century, the Spanish musket (which fired a 2 oz ball instead of 1.25, and had more armor-piercing power) was introduced. It required a wooden fork for a rest. In the seventeenth century muskets became shorter and lighter again, and the caliver was abandoned.

Armor – Plate armor was expected to withstand calivers at ten-score yards. A musket could pierce normal plate armor at twenty-score yards and armor of proof at ten-score. There was debate over whether breastplate provided enough protection to justify the weight.

Formations.

- The general solution to low accuracy of fire is mass fire in a common general direction. Breadth of line increases fire; depth gives you more soldiers who aren't loading. Too, the decisive encounter is the "push of pike", and depth of line gives it "sufficient weight". Pike formations are at least 10 deep, and flanked by muskets, which are flanked by cavalry.
- The Spanish school used large tercios (e.g., 50 men wide by 30 deep), which were hard to maneuver except straight ahead – often in a wedge of three tercios or a diamond of four. The Dutch school (not used much before 17th C) called for thinner wider formations with more maneuver.
- Musketeers are widely spaced: 2-3 feet between files (largely to avoid friendly fire – literally – from slow matches), 12-13 feet (reduced to c. 5 feet when within c.50 paces of enemy) between ranks.

Caracole – an attack in which the cavalry rides up to the enemy (zig-zagging and otherwise trying to avoid being hit), fires from close range, in a direction that doesn't aim at friends, and circles round to reload.

Alternative techniques and technologies.

- Turkish cavalry was superior in agility and individual fighting ability, so those who fought them emphasized orderly densely-packed formations. The Turkish composite bow was fast, accurate, and could be fired from horseback. It was also expensive and took a long time to master.
- English longbows had many of the virtues of the Turkish bows, but by the sixteenth century there was nobody to use them.
- Polish cavalry continued to use lances, and was more effective than western argolettiers.

Notes:

Rate of fire was approx. 1/minute (with up to 50% misfires) in 1600, 2/minute (for well-trained troops) in 1700 and up to 5/minute in 1750. Main changes are a) shift to flintlocks (and maybe the lighter muskets) and b) use of iron ramrod instead of wooden.

By 1600 about 2/3 of the men carried [matchlock] muskets.
(Predecessors to flintlock existed, but were expensive. Rifles existed, but were expensive, finicky, and fired once every two minutes.)
Turkish cavalry was superior in agility and individual fighting ability, so there was an emphasis on orderly densely-packed formations. (1620s?)

Three types of cavalry:

- Cuirassiers wore ¾ armor from helmet to knees with good breastplates, brace of pistols, sword. (Pistols are c.2ft long. Sword is long cut-and-thrust weapon.)
- Mounted arquebusiers (aka carabiniers) wore helmet and breastplate, carried a short wheel-lock musket, one or two pistols, and a sword.
- Dragoons carried infantry-style muskets, and sometimes pikes, and used horses for quick deployment of infantry.

Two types of infantry:

- Pikement wore open helmet, armor on chest (demi-cuirass or plastron), thighs (cuisse) and arms (brassards) and a heavy buff or leather coat and large leather gauntlets. They also carried swords. Pike was originally 15-18 feet long, but shrank to about 11 feet (not counting point) as lances disappeared. Front 4 feet of pike were metal-shod, rear was pointed for planting.
- Musketeers also carried a sword or rapier (and sometimes a dagger) and wore a strong leather coat ("nearly sword-proof") and a flat-rimmed "pot helmet". Musket was 14-20 pounds, 5 feet long, and fired with 'match' which was attached to a mechanism that lowered it to the priming pan. In late 16th C, the Spanish musket (which fired a 2 oz ball instead of 1.25, and had more armor-piercing power) was introduced. It required a wooden fork for a rest.

Muskets take 44 steps to load in a 1690 manual (Exercise of Foot) and not accurate past 60 yards. (Rifled wheel-lock was accurate to 200 yards.)

Artillery was smooth-bore, and heavy enough that once it was pointed in a battle it wouldn't be re-aimed.

Solution to low accuracy – by mid-16th C – is mass fire in general direction. Conflicting concerns: Breadth of line increases fire. Depth of line gives it "sufficient weight" when it comes to "push of pike" or "cold steel". (Need enough men who aren't loading.)

Formations: Spanish school used large tercios (e.g., 1500 men each at Breitenfeld, about 50 wide by 30 deep, hard to maneuver except straight) – often in a wedge of three tercios or a diamond of four. Dutch school (was this used much before 17th C?) was for thinner wider formations with more maneuver.
2-3 feet between files (largely to avoid friendly fire – literally – from slow matches), 12-13 feet between ranks – the latter reduced to c. 5 feet when within c.50 paces of enemy.

Pikes occupy center, at least 10 ranks deep, flanked by muskets. They protect musketeers from enemy cavalry, and are the decisive strike force in combat.
Cavalry flanks the infantry. Attacks use caracole system – ride up (zigging and otherwise trying to avoid being hit, fire from close range, in a direction that doesn't aim at friends, and circle round t reload).

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Short citations:

Martin de Eguiluz, *Milicia, discyrso y regla militar*. Madrid 1592. Translation from St. Augustine Restoration Foundation, quoted in http://home.comcast.net/~calderon/matchlocks.htm