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Introduction

The word 'Landsknecht' first appeared in the German language around 1470. It is said to have been coined by Peter von Hagenbach, who records having commissioned such troops for the service of Charles the Bold of Burgundy. Landsknecht literally means 'servant of the country' yet as early as 1500 the word had already transformed into *Lanzknecht* as the pike became the trademark of the footsoldier. Nowadays, however, the term Landsknecht is usually associated with the type of German mercenary originating from what is today Alsace, Baden Württemberg and the Austrian Tyrol and who served during the reigns of Maximilian I (1493–1519) and his grandson Charles V (1519–56).

When these troops were first employed, warfare was in a state of transition. The Burgundian Wars (1476–7) had shown that cavalry was virtually helpless against well drilled pike formations and the new handgun. The fifteen Burgundian 'Compagnies d'Ordonnances' had outlived their usefulness and were considered as nothing more than an army of redundant knights. Moreover the cost of raising such a force of mounted troops had increased considerably due to the rise in the economic and political status of the European nobility. Those who stood to gain therefore were those 'gentlemen of war' or *Kriegsherren*, as they were called in Germany, who could supply large bodies of mobile infantry, usually pikemen, able to follow in the tradition of the now famous and feared Swiss.

It was against this background that Maximilian, heir to the Holy Roman Empire, had to raise a force capable of upholding his claim to the Burgundian legacy of the Netherlands and of controlling his future territories in the east. To this latter end the

Swabian alliance was formed in 1487–8, which set up an army to keep the powerful princes of Bohemia and Bavaria at bay. This initial force of 12,000 foot and 1,200 horse is described by many as the first army of Landsknechts to be recruited on German soil. In 1487, in the same year that the last national joust took place in Germany at Worms, the first units of German Landsknechts were being trained in the streets of Bruges by Maximilian's commander Graf Eitel Fritz von Hohenzollern. However, the campaigns in the Netherlands and



Maximilian I (1459–1519) known as the 'last of the knights', succeeded to the throne in 1493 and by virtue of the marriages of himself, his son, and his grandson, gained the Netherlands and Spain, Hungary and Bohemia, thus creating a vast Empire for his successor Charles V and further members of the Habsburg dynasty. His march into Cologne in 1505, armed with a halberd at the head of a column of Landsknechts heralded a new era in Germany. Apart from the creation of the Landsknechts he is also credited with the development of the first advanced system of ordnance. Both were to prove vital in his somewhat rigorously conducted foreign policy.

(Portrait by Dürer, Kunsthistorisches Museum, Vienna)



The muster parade (*Musterung*) was adopted from the Swiss and was essential in determining the efficiency of the unit to be raised. The precondition for acceptance into the ranks was that soldiers should possess their own weapons. It was the task of the paymaster, who normally stood at the foot of the arch, to ensure that those recruits passing through were of sound mind and body. It often occurred that the paymaster assigned to counting the recruits 'double-counted' for the sake of financing, i.e. to swindle the *Kriegsherr*.

(Woodcut by Jost Amman from 'Der deutsche Landsknecht', by Friedrich Blau, Götting 1882)

later in Bohemia, although successful, were to prove that the nucleus of the 'German' army consisted of nothing more than bands of ill-organised mercenaries.

It was not until after the storming of the fortress of Stuhlweissenberg in Bohemia in 1490, whereupon Maximilian ordered his men to swear an oath of allegiance, that the 'father of the Landsknechts' succeeded in instilling his troops with a sense of discipline and esprit de corps. Only by emulating the Swiss, however, by adopting their customs and tactics, would the German Landsknecht be able to hold his own and to this end Maximilian modelled his whole military system on the armies of the Swiss Confederation.

The Muster

According to Swiss tradition, if a lord required an army to settle a dispute he normally contracted a gentleman of war by means of the *Bestallungsbrief* or letter of appointment. This contained a recruiting commission and the letter of articles, *Artikelsbriefe*,

which set out the legal conditions under which the Landsknechts were to serve. Having accepted the appointment and secured the means of finance, the colonel, or *Obrist* as he was called, then began appointing in turn his second-in-command and the captains in charge of the *Fähnlein* or companies which were to make up the regiment. This done, drummers would be sent out to beat for recruits. The muster was seldom a difficult task; colonels with great reputations such as Frundsberg and von Sickingen were capable of raising armies of 20,000 foot in a matter of weeks. The problem in fact often lay in rejecting those who were either incapable or too ill-equipped to be accepted into the ranks. In spite of the selection process, which depended on whether the recruit brought his own weapons or not, the regiment must have been a motley crew of journeymen, peasants and students all inspired by the chance of adventure and, of course, pay and loot, and the sons of wealthy patricians, there for the sake of family honour.

Having signed up, the recruits were instructed to meet at a certain time and place for the muster-parade. Here they were ordered into two columns facing each other and at the end of the gap between them an arch consisting of two halberds and a pike was erected. It was through this that each man had to pass before being accepted into the ranks. It was the task of the recruiting officer to stand at the arch and check that those men who passed through were of sound mind and body. At this stage the regiment was divided up into *Fähnlein* of 400 men, each *Fähnlein* having 100 experienced soldiers, or *Doppelsöldner* as they were called, since they received double the pay of the ordinary footsoldier.

As soon as the Landsknechts had been paid one month's wage they assembled in a circle surrounding the *Obrist* whose duty it then was to read them their rights, duties and restrictions in the form of the 'Letter of Articles'. The articles consisted of a very detailed code of conduct laying out all the punishable offences such as mutiny, unwarranted plunder, drunkenness on duty, having more than one woman following in the baggage train, and so forth. This was followed by an oath-taking ceremony in which every Landsknecht swore his allegiance to his cause, his Emperor and his officers, and promised to abide by the laws set out in the 'Letter of Articles'.

For the enforcement and administration of these laws the *Obrist* appointed a *Provost* and a *Schultheiss* respectively. During this ceremony the standards were handed over to the ensigns who were obliged to swear an oath never to allow the standards to leave their hands in battle. The ensigns in turn joined their *Fähnlein* where the captain would be introducing the appointed adjutant, chaplain, doctor and quartermaster to his men. The remaining formality was the formation of the *Rotten* or platoons, each being responsible for electing its own *Rottmeister*.

Organisation

Each Regiment normally consisted of ten *Fähnlein* or companies—*Fähnlein* is the German word for a small flag or standard carried within the unit. The *Fähnlein*, as already stated, was divided up into *Rotten* or platoons. Each *Rotte* had ten common Landsknechts or six *Doppelsöldner*. A regiment therefore, usually numbering about 4,000 men, was divided into ten units of 400, each unit having forty platoons of ten men. It must be noted here that this 4,000 was by no means a standard number—the complement often depending on the number of men who presented themselves at the muster

parade. Commanding the regiment was of course the *Feldobrist* or colonel. Sometimes the *Obrist* was in command of several regiments at a time, in which case he received the rank of *Oberster Feldhauptmann*. The task of leading the *Feldobrist's* regiment in this case would fall to the *Locotenent*—(lieutenant-colonel)—the second in command who only held the rank of captain while the *Obrist* was present.

The colonel, as laid down in the Imperial Diet at Worms in 1507, was entitled to a staff or *Staat* of twenty-two officials. This included a chaplain, a scribe, a doctor, a scout, a quartermaster, an ensign, drummer and fifer, and a bodyguard of eight trustworthy men. (See *Table A.*)

Each *Fähnlein* had in turn its own complement of officials. The captain had the privilege of his own personal cook and servant and a bodyguard of two *Doppelsöldner*. There were also an interpreter, a chaplain, a scout, a fourier, and the usual colour party with musicians. The sergeant majors, *Feldweibel*, were given the responsibility of carrying out drill and formation. There was normally a regimental sergeant major—the *Oberster Feldweibel*—who was responsible for battle formation. General discipline and liaison between officers and men was largely the task of the *Weibel* (sergeants) and the *Gemeinweibel*, the latter being elected on a monthly basis as spokesmen for the Landsknechts. (See *Table B.*)

In addition to the above there was an independent group of officials who were responsible for maintaining discipline and ensuring that the Landsknechts conformed with the Articles. The most feared official of all was the *Provost* who remained unimpeachable during his period of office. His retinue consisted of a jailer, a bailiff and an executioner called the *Freimann*, recognisable by his blood-red cloak. The red feather in his beret and the tools of his trade, namely the executioner's sword and the hangman's rope which hung from his belt, acted as suitable deterrents for the Landsknechts, who generally regarded him as an untrustworthy character.

Each Regiment had a full complement of military police and judges, including the *Schultheiss*, the *Profoss* (Provost) and the *Gemeinweibel*. The total pay for these officials came to 236 guilders per month.



The muster parade was followed by the reading of the letter of articles (*Verlesung*). Hereupon the Landsknechts were ordered to form a ring and the colonel (*Obrist*) informed them of their rights and legal restraints. The letter of articles which always accompanied the letter of commission was read every six months and was invoked immediately hostilities began.

(Woodcut by Jost Amman)

Table A

Rank		Pay
<i>Regiments Staat (Colonel's Staff)</i>		
<i>Feldobrist</i>	Colonel	400 <i>Guilders</i>
<i>Locotenent</i>	Lieutenant-Colonel	100 "
<i>Kaplan</i>	Chaplain	12 "
<i>Schreiber</i>	Adjutant	24 "
<i>Wachtmeister</i>	Officer of the Watch.	40 "
<i>Quartiermeister</i>	Quartermaster	40 "
<i>Proviandmeister</i>	Storekeeper	40 "
<i>Feldscher</i>	Doctor	40 "
<i>Feldarzt</i>	Field Doctor	40 "
<i>Trommelschläger</i>	Drummer	8 "
<i>Pfeifer</i>	Fifer	8 "
<i>Dolmetscher</i>	Interpreter.	8 "
<i>Koch</i>	Cook	8 "
<i>Trabant (8)</i>	Bodyguard.	4 " each
<i>Hurenweibel</i>	Sgt of the Train	12 "
<i>Fuhrknecht</i>	Scout	4 "

Table B

Rank		Pay
<i>Each Foot Fähnlein</i>		
1 <i>Hauptmann</i>	Captain	40 <i>Guilders</i>
1 <i>Leutnant</i>	Subaltern	20 "
1 <i>Fähndrich</i>	Ensign	20 "
1 <i>Chaplain</i>	Chaplain	8 "
1 <i>Feldweibel</i>	Sgt Major	12 "
1 <i>Führer</i>	Scout	4 "
1 <i>Fourier</i>	Fourier	4 "
2 <i>Weibel</i>	Sergeants	4 " each
2 <i>Trommelschläger</i>	Drummers.	4 " each
2 <i>Pfeifer</i>	Fifers	4 " each
2 <i>Trabanten</i>	Bodyguards	4 " each
1 <i>Dolmetscher</i>	Interpreter.	4 "
1 <i>Hauptmanns Junge</i>	Captain's boy	4 "
1 <i>Fähndrichs Junge</i>	Ensign's boy	4 "
1 <i>Hauptmanns Koch</i>	Captain's cook	4 "
1 <i>Reisiger Knecht</i>	Horseman	4 "

(From: *Kriegsbilder der deutschen Landsknechte* by von Zwiedeneck-Südenhorst.)

The pay for the whole force of foot-soldiers numbering 4,000 (10 × 400) amounted to 32,000 guilders per month, *Doppelsöldner* receiving 8 guilders per month as opposed to 4 guilders for the ordinary Landsknecht. Thus the total cost of a

regiment for a month was 34,624 guilders. Each Landsknecht was normally contracted to serve for a minimum period of six months.

At the Imperial Diet at Worms in 1521 the reforms of the military brought about a re-

organisation of the war finance system, to assist Charles in his Italian campaigns. The Imperial army was set initially at 20,000 foot-soldiers and 4,000 mounted, each *Reichstand* being obliged to offer a contingent. This force cost 128,000 guilders per month and although a new tax unit was invented—the *Simplum*, equalling the above amount—the problem of financing a lengthy campaign could never be resolved.

In 1526, Frundsberg, for example, was obliged to pawn his estate and treasures (*Mindelheim*) for 30,000 guilders in order to finance a campaign in Italy for Charles V. This sum, however, only covered half a month's pay and his troops mutinied on him. Similarly, the Spanish general Leyva had to melt down the chalices from the church in Pavia and even the gold chain from around his neck to prevent his garrison of German *Landsknechts* from defecting to the French.

Tactics and Formation

In the Burgundian Wars the Swiss had shown the



The oath-taking ceremony (*Vereidigung*) followed the reading of the articles and was an attempt to instil discipline and allegiance into an otherwise unknown band of ruffians intent on money and adventure. The ceremony, which was held by the *Schultheiss* as the official responsible for administering justice, bound the *Landsknecht* to the articles by forcing him to swear an oath of allegiance to the Emperor, or war-lord as the case might be. At the same time the ensigns were awarded their standards, on which they too had to give an oath.

(*Jost Amman*)

tactical superiority that could be achieved by a well trained body of pikemen. This superiority was soon to be challenged by the arquebus (although in the first quarter of the sixteenth century it was still used with some restraint). Despite the 'miracle of Creazzo' where Frundsberg's arquebusiers, withdrawing from earthwork to earthwork, wreaked havoc on the oncoming Venetian foot, skirmishers in open order were considered to be too vulnerable. The upshot of this was that different generals tended to adopt various sets of tactics at these times largely depending on the composition of their forces and the type of terrain. The Swiss, for instance, anxious to shorten their campaigns as much as possible and being largely dependent on the strength of their pikemen and halberdiers, preferred a short swift encounter and were therefore inclined towards a pike charge in echelon formation of *Vorhut* (van), *Gewalthut* (centre), and *Nachhut* (rear). This of course was in turn determined by the lay of the land. The Germans and Spanish, later relying heavily on the strength of their arquebusiers, tended towards a more defensive position, if possible on uneven ground to upset the impetus of a pike charge. As a result of these diverse tactics the general of the day was always at pains to outmanoeuvre his enemy so that when it finally came to a confrontation his forces would have the advantage of terrain.

The German *Landsknechts* who often adopted defensive positions required a new formation which would ensure maximum tactical efficiency from both pike and arquebus. This formation adopted from the Swiss system was called the *gevierte Ordnung* and is the forerunner of the infantry square. In this formation the pikemen and the halberdiers formed a solid square in the centre with the two-handed swordsmen in the front and rear ranks. Behind the first two ranks of *Doppelsöldner* stood the ensigns in the centre of the first three *Fähnlein*. Then came a virtual forest of pikes, in the middle of which were to be found the ensigns of the four centre companies. At the rear came the final three ensigns amongst the most experienced troops in the regiment. These were positioned at the back to add impetus to the attack and also to discourage the faint hearted from deserting the ranks in front. Around this block stood a wall of arquebusiers affording protection from the pikemen and occupying the most effective



The oberster Feldhauptmann (supreme commander) was directly responsible to the Emperor or prince who had commissioned him. Despite this he had a free hand in the composition of his army and the selection of his officers. The Obrist who commanded the regiment was in turn responsible to the oberster Feldhauptmann. The degree of responsibility was rewarded accordingly with one hundredfold the pay of a common Landsknecht. The pay was fixed in multiples of 4 guilders per month at the Imperial Diet at Constance in 1507. The Obrist thus received 400 guilders per month plus an additional 600 guilders for the upkeep of his 'Staat'.

(Woodcut by Hans Döring, 'Kriegsbuch of Graf Reinhard of Solms 1545', Bayerische Staatsbibliothek, Munich)

position in attack. Towards the middle of the sixteenth century the arquebus became more important and it was customary for a regiment in squared formation to have four wings of arquebusiers who were trained to advance and fire and then drop back to the rear to reload, so that the momentum of the advance could be maintained. To complete the defensive position the artillery pieces were drawn up in front of the square where they commanded a good sweep of the battlefield.

Because of this it was necessary to position experienced troops in the front ranks of the square to protect the artillery.

If the order was given to advance, a line of foot was normally strung out in front of the square. Known as the *verlorene Haufe* (forlorn hope) it was composed of either volunteers, prisoners hoping to redeem themselves or those unfortunates who had been picked by lot. It was their task to advance in front of the square with their pikes and two-handed swords to stave off the oncoming enemy and hack his pike to pieces so that their comrades would be able to penetrate the gaps they had made. To remind these *enfants perdus* of the perilous life and death situation they were in, the plain red 'blood flag' was always carried in this somewhat thin rank. The *verlorene Haufe*, often distinguished by the white feathers which the Landsknechts wore in their berets, was sometimes used as a decoy to lure the enemy into thinking that they were being charged, whereupon their countercharge would be met with a hail of bullets from the arquebusiers placed behind them.

In defensive situations the order was given for the regiment to form an *Igel* or 'hedgehog'. This was carried out in either square or circle. In this ploy the arquebusiers moved to the third rank while the pikemen moved to the front, levelling their weapons at an angle to take the oncoming cavalry. The *Doppelsöldner* with halberds and two-handers plugged the gaps in the front and second ranks at the same time, allowing space for the arquebusiers to fire.

Before the battle commenced the commanding officer, who usually stood in the front rank, would call for his Landsknechts to kneel down and give grace to God. This custom was completely misconstrued by the Italian historian Paul Jovius who claims that it was out of fear of the cannonballs which were flying around during the early stages of the battle that the Landsknechts 'took to the ground'. Whatever the case a virtue was made of necessity.

Sir Charles Oman refers to battles in the renaissance era as 'games of chess in which checkmate was accepted with little acrimony and still less bloodshed'. It came therefore as a shock to the Italians when the French, Swiss and Germans crossed the Alps with the intention of taking towns

and slaughtering prisoners. In fact gentlemanly conduct soon began to disappear from the battlefield as devious tactics were introduced. Fronsberger in his masterly work of 1556 lists fifteen ploys which the *Obrist* of the day considered when drawing up his army for battle:

1. The strength of the enemy, his number of horse, and his type of armour should be determined in advance and the lay of the land, the weather, the time of day, all taken into consideration before deciding on the type of battle formation to be adopted.
2. Prisoners should be taken before the battle and subjected to torture to extract the desired information.

3. A suitable body of men should be picked to form the 'forlorn hope'. This should advance in column at the side of the square, veering off and firing before dropping back to reload.
4. The regiment should always be organised in such a way that the heavily armed men are drawn up on the plain while those not so well equipped should be placed at the rear or drawn up on the slopes of a hill. The weakest troops should be facing the left flank of the enemy.
5. The infantry should keep together and avoid extending into a thin line.
6. Advantage should be taken of both the sun and the wind and the Landsknecht should be reminded of the more subtle ways of render-



It was generally the quartermaster's task to advance ahead of the army and take care of the accommodation for the troops. The woodcut, again by Döring, depicts a quartermaster in full armour which by this time—1550—was fully articulated, with the 'lobster' tassets and haute piece. The helmet, similar to that worn by Frundsberg, shows a distinct Roman influence. RIGHT: Since it was customary for the Landsknecht to take his wife and children with him on campaign there often



resulted a train of considerable size and disarray. It was therefore necessary to have some form of police to keep the 'whores', as they were called, in check. The sergeant of the train (above) was assisted in this somewhat demanding task by the Rumormeister, whose duty it was to separate quarrelling women by means of a truncheon known as the 'Verg-leicher' (settler). (Woodcuts by Döring, 'Kriegsbuch, Bayerische Staatsbibliothek, Munich')

ing the enemy pike ineffective by using sand or dust to blind them. (At Bicocca, for instance, the Swiss used stones to disable the German pikemen at a distance.)

7. The light horse should be used to create a dust screen thus enabling a well ordered troop to get behind the enemy lines. Alternatively other *Fähnlein* can be employed to draw the enemy out of his position by faking a rout. As the enemy breaks his ranks in charging after this *Fähnlein* the opening gaps can be penetrated by a well-timed cavalry charge.
8. A further ploy should be the drawing up of several squads of horse, foot and members of the train at some concealed spot at the rear of the army. These are to hide until a crucial stage in the battle whereupon they are to

9. appear seemingly as reinforcements.
9. In close combat situations shorter weapons were to be used at all times, i.e. halberds, *Katzbalger*, two-handed swords and axes.
10. The use of nets to trap the fleeing enemy was also effective on occasion.
11. Disguising oneself as the enemy (which was never a difficult task) was a practice which also was to be exploited. By sending impostors into the enemy camp rumours could be quickly spread that the *Obrist* had been murdered by his subordinate officers.
12. The rear of the *gevierte Ordnung* was always to be composed of sturdy experienced fighters to 'discourage' those cowards wishing to retreat, and to give impetus to the attack.
13. *Rotten* were always to be placed at the disposal of the commander to replace the wounded.
14. Above all it should be the duty of the *Obrist* to maintain morale. Those contemplating desertion from the field of battle, for instance, were to be warned that to do so would be tantamount to killing their comrades standing next to them. It was, however, the punishment of immediate death which deterred such cowards.
15. Before the order was given for a pike charge the *Obrist* was to call up a squad of lancers to advance in front of the pikemen and charge at the right moment with the aim of 'jousting' the pikes out of the enemy's hands.

Towards the middle of the sixteenth century, as the arquebusier and mounted pistolier grew in importance, some of the more daring ploys began to disappear as movement became restricted by firepower.

Weapons

The major weapon of the Landsknecht was of course initially the pike. The ash stave was one and a half inches thick and usually between 14 feet and 18 feet in length. The steel head was 10 inches long and the tip had the shape of a 'frog's mouth'. Adopting the customs of the mounted knight, the Landsknecht would sometimes tie a fox's brush or animal's tail to the top of the pike,



It was essential for the captain (above) to wear armour as he normally fought in the front rank alongside the *Doppelsöldner* and was often challenged to a duel by his counterpart in the enemy ranks. It is interesting to note that the dagger was fastened to the right leg by means of a thin sash—almost in 'gunslinger' fashion. The weapon he is carrying is a boarspear.
(Woodcut by Hans Döring)



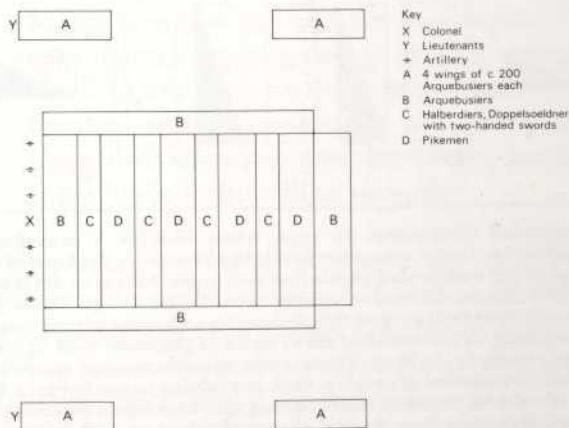
Receiving twice the pay of the common soldier, the *Doppelsöldner* normally held the front and rear positions in the 'gevierte Ordnung'. It was their task to advance in front of the company swinging their two-handed swords, to cut down the pike shafts of the oncoming enemy and establish a lodgement by penetrating the front ranks of the enemy's line of battle while the remaining Landsknechts followed them up, consolidating their position in the gap. Their garish dress soon became a bone of contention with the nobility, who demanded the introduction of uniform so that rank would be distinguishable. Maximilian, however, overruled their demands on the grounds that the Landsknecht deserved at least one luxury in his miserable life. Thus freedom of dress was granted at the Imperial Diet at Augsburg in 1503.

because of an alleged magic healing property and the power of protection.

The halberd, which was relegated to a 'secondary' position, was carried by the nco's and *Doppelsöldner* and used to dress the ranks. It too had a shaft one and a half inches thick but was only six to seven and a half feet in length. There were of course variations of the halberd, notably the Voulge, the Glaive, the Partisan, the Spetum, and a type of Fouchard which was used by Charles V's bodyguards and bore the emblem of the two pillars of Hercules and the Burgundian cross on the blade.

There were two main types of sword designed for different types of combat. In the case of the *Doppelsöldner* both were carried. The smaller 'Roman' styled thrusting sword, known as the *Katzbalger* or 'mangler' had a short metal hilt which joined a broad double-edged blade about 28 inches long and had a guard of two S-curved quillons forming rings. It was carried in a leather or metal scabbard, and the weapon was usually worn horizontally over the stomach at the belt. The *Zwei-händer*, the enormous battle sword about 66 inches long, also had a double-edged blade, sometimes undulating in design with a long grip covered in leather or cloth. The hilt was reinforced with two curved quillons and two ring-guards on each side. The lugs at the heel of the blade served as a second guard, to parry blows as well as to enable the user to grasp the weapon at a lower point, as prescribed in the drill movements. This was facilitated by a leather ricasso between the ring guards and the lugs. On the march it was sometimes slung over the back crosswise by means of a strap.

The other weapon brandished by the *Doppelsöldner* was of course the arquebus. This was a hand gun fitted with the matchlock, which consisted of a lighted fuse or match attached to an S-shaped hook trigger which swung over to ignite the touch powder when the trigger was pulled. This



Formation (*Gevierte Ordnung*) of 4,000 men, c.1540. If the squared formation was attacked by cavalry, the formation was easily adaptable to a defensive ploy. The pikemen facing in the respective directions with the ends of their pikes dug into the earth would still form the main wall while the arquebusiers surrounding them would advance out in line to face the oncoming horse. After their first volleys they would return to the front ranks of pike to reload.

(From von Zwienedeck-Südenhorst)

had a range of up to 400 yards but was inaccurate and often rendered useless by a shower of rain. Although these guns must have had a considerable weight there is little evidence from contemporary prints that the arquebusiers used a rest to support their weapons. The arrival of the longer-barrelled musket around 1520 necessitated the use of a rest. It was not until the middle of the sixteenth century that the first major development was made in firing mechanisms. The wheel-lock pistol made its first appearance at the Battle of Mühlberg in 1547. Invented by the gunsmiths of Nuremberg, this gun worked like a cigarette lighter. When the trigger was pulled, a milled wheel driven by a spring struck a spark from a piece of pyrites or flint which in turn lit the touch powder. Although used mainly by the famous *Schwarze Reiter* these pistols also found their way into the belts of officers and *Doppelsöldner*.

The crossbow, which had originally been the forerunner of the hand gun, gradually became obsolete as the arquebus became accepted as the standard weapon. Yet at Marignano there were still 200 mounted crossbowmen in Francis' royal guard, and Gascon foot brandishing crossbows. The later crossbows were fitted with a cranequin, which consisted of a small iron drum filled with hooks which were actuated by a crank handle thus drawing the bowstring back and setting it in

position. The quarrel or bolt usually had a wooden flight which created a rotary action in flight thereby increasing its penetrating effect. The crossbowmen normally carried a shield which in defensive situations was propped up with a stake or sword so that a wall could be formed.

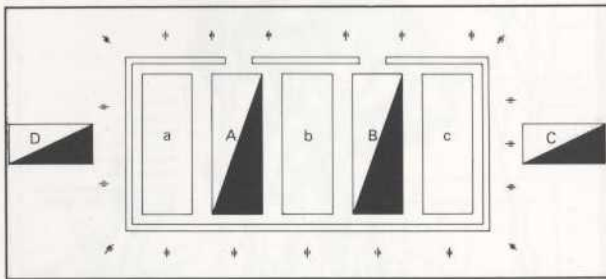
The *Fähnlein* were normally subdivided according to the type of weapon. Since the main weapon was the pike, the core of the unit was formed from pikemen. This nucleus numbered 300, the remaining 100 comprising *Doppelsöldner*, 50 of whom were armed with arquebuses and a further 50 with two-handed swords and/or halberds. Later records show that the number of pikemen began to diminish as the firearm became more popular. Thus, according to Wilhelm Fronsberger, by 1596 only 200–220 pikemen were required.

Artillery and Equipment

In Emperor Maximilian's biography, *Weiss Kunig*, mention is made of the talented young prince who was capable of handling artillery pieces with greater precision than any of the more experienced master gunners of the day. *Weiss Kunig* also records how the young Emperor achieved a new technical superiority in one of the first-ever organised systems of ordnance.

The new pieces which Maximilian ordered to be made at the factories of Beck at Augsburg, and of Sattler at Nuremberg incorporated several new developments. Firstly they were lighter, being cast in bronze, their calibres being bored out. For the first time the barrels were carried on carriages whereas earlier they had been carried on separate wagons. Trunnions and elevating mechanisms began to appear and there were also developments in the type of shot, which incidentally was now iron instead of stone. Freysleben, the keeper of the Imperial arsenal, records the major types of cannon which the Emperor had constructed:

1. The *Hauptbüchsen* or heavy siege-guns were nothing more than huge gun barrels mounted at an angle on wooden supports with numerous rows of shoring behind the barrel to take the shock from the recoil. Often such cannon were so cumbersome that they took days to set up



Hungarian Ordinance. In 1532, when Charles V marched against the Turks, who were besieging Vienna, at the head of a huge army numbering 90,000 foot and 30,000 horse, he devised a new battle formation which would resist any Turkish assault. Jovius describes this formation as having a front 1,000 paces long. It consisted of three units of pikemen each 24,000 men strong (a, b, & c). These were suitably spaced apart to allow two masses of cavalry, each containing 10,000 horse (A & B), to take up position. Surrounding this enormous formation was a five man deep 'hedge' of arquebusiers spaced 30 yards from the pike and the horse. There were two gaps in this 'hedge' to allow the horse to charge through at the enemy. Outside this bloc the artillery was spaced at suitable intervals and the whole formation was flanked by two wings of Hungarian horse—(D & C). Known as the Hungarian Ordinance, this square was far from cumbersome and the Turks were eventually repulsed by effective charges of the Imperial horse and foot.

(From Rüstow, 'Geschichte der Infanterie' 1884)