David A. Parrott

Strategy and Tactics in the Thirty Years' War: The »Military Revolution«

For twenty years Professor Michael Roberts' work on the »Military Revolution« of the period 1560—1660 enjoyed undisputed pre-eminence as the accepted interpretation of military developments in early modern Europe[1]. In 1976, an article by Geoffrey Parker made the first — and to my knowledge, only — general criticisms of Roberts' thesis that a series of tactical changes had a revolutionary impact upon European warfare[2]. Professor Parker expressed reasoned doubts about whether these changes could be described as revolutionary, since serious inconsistencies emerge in any attempt to assess their practical impact. Why, in 1634, did the tactically conservative Spanish army wipe out the »new model« Swedish at Nördlingen[3]? Why were the developments in tactics and strategy unable to bring the European conflict to any decisive conclusion? Parker's suggestion is that Roberts greatly over-emphasized inflexibility and traditionalism in the »conservative« armies, particularly the Spanish. He proposes that it is possible to trace a receptiveness to similar tactical developments back at least to the *condottiere* of the fifteenth century, and that a willingness to approach common military problems was not confined to the Dutch and the Swedes. In matters of developing firepower, the quality of cavalry, the deployment of small units and in effective training, the Spanish army was quite as progressive as its rivals[4].

Yet the effect of this is to confirm by implication the importance of the tactical changes commonly ascribed to the Nassau and to Gustavus Adolphus. The value and relevance of these developments in explaining military success in the first half of the seventeenth century are not questioned; neither is the assumption of the importance of tactical change explored in any general way. Some further re-evaluation of the way in which battles were won and lost during the period may therefore be possible and valuable even though, in the absence of entirely accurate accounts of the conduct of specific engagements, some of the proposals must remain conjectural.

Professor Roberts moves from the tactical changes which were the essential element in the »Military Revolution«, towards their main consequence, the development of a new concept of strategy, which envisaged war upon a much broader scale, fought by incomparably larger armies[5]. This, once again, is supported largely by reference to Sweden. Professor Parker's modification — that strategy had always been determined by geography, and above all by the presence or absence of modern fortresses — is equally clearly a reflection of his concentration upon the Low Countries and the territories of the Spanish Crown[6]. My research into the administration and organisation of the French army in the second quarter of the seventeenth century leads me to propose an alternative argument; while it would not be reasonable to maintain that military art actually regressed after 1560, a case will be made that the characteristic of the period was not revolution, but an almost complete failure to meet the challenges posed by the administration and deployment of contemporary armies. Battles were won and lost largely incidentally of the tactical changes of the period. Moreover, battles themselves were rendered almost irrelevant by the failure of a broader concept of strategy to come to terms with the real determinants of warfare in this period.

I

Professor Roberts argues for tactical developments in two general respects: changes in the size and shape of formations deployed on the battlefield, and a more effective co-ordination of infantry, cavalry and artillery.

A) A central contention is that the average size of infantry units was very substantially reduced in the century after 1560, and that this reflected a conscious tactical choice on the part of the »progressives«[7]. Yet as Parker suggests, the phenomenon of a decline in unit size was equally evident in the case of the Spanish *tercios*[8]. In France, the 1534 and 1558 plans for legions of 6,000 men gave way to the reality of regiments of 1,500—2,000 men by the later sixteenth century[9]. It seems more appropriate to regard the first stage of the reduction in unit size as a simple response to improvements in the firepower of hand guns. The primary aim of a general reduction was to make better use of the shot, which had hitherto been regarded as a secondary weapon, incapable of winning a battle in its own right.

The redoubtable Swiss phalanx of the later fifteenth century had been composed of two groups of soldiers, those carrying the *langspiess*, the eighteen foot ancestor of the shorter, more manoeuvrable pike[10], and those armed with close-range weapons, principally the halberd. The weight and awkwardness of the *langspiess* rendered it far less attractive to the Swiss soldier, and the imbalance between the two weapons was causing concern by the early sixteenth century[11]. In fact, however, the increasing deployment of a third weapon — firearms under the generic term of *arquebuses* — completely changed this situation. While every attempt was made to preserve the proportion of *langspiesse*/pike in the infantry unit, the halberd was sacrificed to the *arquebuse*, and the number of troops armed with these was permitted to rise[12]. The contributory factor in this may have been the development of more effective firearms, though whether this can be identified with a clearly recognised single innovation — the introduction of the musket — seems open to question[13]. The crucial decade for the emergence of firepower could well be the 1520's. Within three years both the Swiss phalanx and the French *gendarmerie* suffered crushing defeats at the hands of Spanish *arquebusiers* operating in conjunction with artillery from prepared positions[14]. From these events it is possible to trace a steady upward growth in the proportions of firearms within the infantry unit, through the Spanish developments of the 1550's/60's[15], up to the high point of the concern to maximise firepower, evidenced in the reformed Dutch army of the late sixteenth century[16].

In this situation, the reduction of the overall size of the infantry unit appears as a logical consequence. The shift from halberdiers to *arquebusiers*/musketeers is only comprehensible if it is assumed that the commanders actually wished to employ their enhanced firepower. There is necessarily a limit to the number of rows in a formation which can be equipped with firearms; beyond this depth the soldiers will obstruct one another, or the time taken for successive discharges by each row will exceed the time required for the first row to reload. The obvious means to ensure that all the firearms could be used was simply to decrease the depth of the entire unit, spreading the shot outwards in lines or shallow blocks. If, however, a large unit of c. 3,000 troops were to be disposed in this shallower formation, it would either be dangerously over-extended, or large numbers of shot would be excessively distanced from the protective body of pike. The reduction of the overall size of the unit to a typical 1,500—2,000 appears to have solved these problems.

The further reduction, undertaken by Maurice of Nassau, from 1,500 to 550 men, seems less clearly advantageous. Yet on the supposition that this was also integral to »progressive« armies, considerable ingenuity has been devoted to showing the superiority of the Dutch battalion. One proposal is that as the proportion of officers in this smaller unit was much higher, the troops could be better drilled and supervised in the execution of complex commands. Yet Jacobi of Wallhausen, one of the strongest exponents of the Dutch reforms, criticises this as simple extravagance, increasing the wage bill for each unit to no practical purpose[17]. The implication of the proposal is

that the existing regiments were passive monsters, incapable of adjustment to changed circumstances on the battlefield and impervious to the commands of their officers. In fact, the number of officers in a typical regiment appears to have been perfectly adequate. Manoeuvres and drill exercises depended less upon the officers than upon the experience of veterans, soldiers who were placed in the three important positions in each line: *chef de file, chef de demi-file* and *chef de serre-file.* These key men, the *appointés* in each company, would be expected to take up marker positions at the front, middle and rear of each line to ensure that the inexperienced recruits executed orders and held their positions[18]. It might be suggested that only states which lacked the nucleus of a »standing« army would require the very elaborate drill instructions and small formations characteristic of the Dutch reforms[19]. Roberts himself speaks of the drill sense of the *tercios*[20], while the ability of the Spanish infantry at Rocroi to transform themselves from a line into a massive hollow square is evidence of this capacity in action[21].

The other argument advanced in favour of the Maurician battalion is the supposedly greater flexibility that it gave the commander of the army, who possessed two or three times the number of units as his traditional opponent. Professor Parker points out that the Spanish had employed *escuadrons* of between 600 and 3,000 men whenever these were required for a particular task[22]. The French readiness to form *bataillons* indicates a similar willingness to break up the regiment when it proved necessary[23]. Yet these smaller units were not systematised; pitched battles of the period had little to do with infantry flexibility; military survival and success required the highest levels of cohesion — both within individual units and across the entire front of the army. It is impossible to see how the Maurician battalions could provide this better than the larger units, and the evidence suggests that contemporaries remained in all significant cases unconvinced. The newly levied forces of the German protestants adopted these smaller units — probably to compensate for a shortage of experienced veterans. Their armies suffered an uninterrupted series of major defeats down to 1631. Indeed, even at Breitenfeld, the Saxon army, drawn up on the Dutch model and shattered by the impact of Tilly's regiments, nearly lost the battle for Gustavus Adolphus[24]. Although Gustavus himself was originally persuaded of the apparent advantages of the small unit[25], his experiences in Poland led him to a recognition of the fragility of an army deployed in such formations. In consequence, he joined three or four squadrons together to form the brigade, whose cohesion and striking power was demonstrated so clearly at Breitenfeld and Lützen[26]. Though the squadron retained an administrative existence and could be called upon for special assignments, Swedish success in battle consisted in the greater and greater integration of squadrons into the brigades.

By the 1630's it was evident that the formation of 1,500—2,000 men had sustained its position against the reformers. Yet despite this vindication, the strength of units continued to decline. This phenomenon indicates the limitations of any purely tactical explanation of military developments in this period; the decline owes nothing to conscious choice, everything to the vagaries and corruption of the systems for troop recruitment in a situation of protracted warfare.

In France, financial and supply difficulties, fraud, death, sickness and desertion, combined to ensure that unit strengths fluctuated wildly throughout the campaign, and were in all cases a small fraction of their theoretical »paper« strengths. Although a prestige French regiment was supposedly composed of twenty companies of 100 men, even official calculations took the companies at 60, so that the unit was assumed to be 1,200 strong[27]. In reality the strength could be anything from 1,000 down to 200 effectives, with a typical strength of 500—650[28]. Not surprisingly the French came increasingly to abandon the regiment as a tactical entity, and to amalgamate them

into fighting *bataillons* of 800—900 men[29] — ironically these now proved, in general, to be the larger unit. The practice of separating the administrative and tactical unit, far from being an anachronism, was in fact the only practical approach to the organisation of armies whose effective strength fluctuated wildly. It seems possible that Gustavus Adolphus' decision to combine the two in the squadron, a step whose utility is considered to be self-evident[30], may well have precipitated the same type of uncertainty about real unit strengths and provided an additional motive for the creation of the brigades. Certainly Professor Roberts' contention that the average size of units fell from 3,000 to about 30 men[31] draws attention to a circumstance that was far from generally welcomed. The latter figure reflected not a tactical decision, but the inability of governments to coerce their entrepreneurs into the recruitment and maintenance of full-strength companies. Jacobi of Wallhausen's complaints about the disproportionate cost of officers' salaries in small units find a practical echo in the French administrative correspondence of this period, deeply preoccupied with the financial burden and military inefficiency of supporting low-strength units with a full complement of officers[32].

B) The assumption made about changes in tactical formations, and in particular about the respective deployment of pikes and firearms in the infantry unit, also seem open to question. Characteristic of the descriptions of these tactical developments appears to be an implicit convention that the enemy forces remained static, frozen in a formation that would best illustrate the improved tactics of the army under particular study. It is difficult to discover how, precisely, the *tercios* fought, but circumstantial evidence suggests that they were not prepared to maintain the illogical formations habitually ascribed to them[33].

It is usually proposed that *tercios* and other »large« units were always deployed in a square, deep formation, with a central block of pikemen surrounded on three or four sides by shot, with some additional firearms disposed in wings or separate platoons[34]. The overwhelming disadvantage of such a formation is held to be the restriction upon the firepower that could be brought to bear against an attack upon one side. Yet if the desire to increase the effectiveness of firepower is to be given due weight as the explanation for the reduction in unit size characteristic of *all* armies during the later sixteenth century, then its implications for the deployment of units must also be allowed. For the »Military Revolution« thesis leads to the improbable conclusion that although the »conservative« commanders reduced the size of their units, they persisted in a deep formation that deprived them of the enhanced firepower which had apparently justified the initial reduction.

Underlying this misconception is a persistent confusion between the tactics of the Swiss »steam-roller« of the early sixteenth century, and the characteristic use of infantry as it developed through the century. The Spanish or Swedish pikeman was not part of a solid mass of troops depending upon weight of impact for effect, nor of some inanimate palisade relying upon mutual support and the weight of the ranks behind to meet an enemy assault. Tactical manuals suggest that »close order« between pikes entailed a space of $1^1/_2$ paces between each soldier to allow freedom to use the weapon. The order for an advancing formation was three paces between each pike[35]. Pikemen did not depend, as the Swiss spearmen had done, upon the support of their fellows; as early seventeenth-century manuals indicate, the use of the pike had become a skill quite as elaborate as swordsmanship[36]. Thus, there was no merit in depth of pike for its own sake; only the first six rows would be presenting arms to the enemy, while the other rows up to a generally accepted total of ten were a reserve to fill out gaps in the front lines[37]. The pikes would be deployed in a central, rectangular

block, while the shot was arranged in groups of similar depth on either flank[38]. When these latter were to fire, they would move forward and take up positions in front of the pike, forming either long, well-separated rows or combining these with detached, slightly deeper, units[39]. Their fire was entirely unaffected by the pikes, and only when the enemy drew close would the shot fall back through the rows of pike, or resume their positions on either side of them. If the pikemen are assumed to be tightly packed in a square, the first of these manoeuvres would be dangerous, if not impossible. But this was not the case; the shot could easily pass through the well-spaced pikes, moving forward again when the enemy had retired. Moreover, the commander, if deciding upon an advance himself, could choose between his shot or his pikemen, for they were not locked together in any fixed order. At Nieuport, the Archduke Albert ordered a first assault upon the Dutch positions by 500 shot alone, and only when this failed did he send forward a mixed formation of infantry[40].

It seems evident that from a comparatively early stage infantry units were no longer envisaged as independent moving fortresses; infantry were drawn up in lines and the central concern became the maintenance of a continuous front. What this required, however — and this did represent a seventeenth-century development — was a system of one or more lines of reserves. The Imperial disaster at Breitenfeld was largely a consequence of Tilly's decision, overconfident of the superiority of his troops, to place his entire army in a single line. Although this allowed him to concentrate a formidable shock against the Swedish/Saxon army, the principal lesson of the battle was that this gain did not justify the single-line deployment[41]. The contrast with Lützen is obvious; Wallenstein could contain and throw back successive Swedish breakthroughs by deployment of his reserves. Although possessing very limited numbers of troops, he created three lines so that his main positions were supported by two sets of reserves. There is in fact some dispute about the Imperial battle order. Most of the reliable sources attest to the three lines, with five regiments in the front and two each in the second and third, the cavalry being concentrated upon the wings[42]. Yet there is an alternative, frequently cited, account of an order centred upon four great infantry squares drawn up in a diamond formation, with one further square on the right flank amongst the cavalry[43]. The proposal is not inconceivable; this deployment in squares would be appropriate to a battle in which considerable Swedish superiority might lead to outflanking and attacks against the rear of the army. As it happens, the evidence for the line defence seems more convincing; while Wallenstein was pessimistic and did not envisage any possibility of assuming the offensive, he was sufficiently confident of his position and his entrenchments to draw up his troops in line. He considered, correctly, that the Swedes would concentrate the attack against his centre while his cavalry proved strong enough to hold the flanks. He chose therefore to maximise firepower along the front line.

However, at Rocroi, eleven years later, the Spanish infantry provide a rare example of troops who adopted a square formation. The hollow rectangle, formed after the French cavalry had shattered the Spanish second and third lines, included not merely the *tercios viejos* but also eighteen cannon which had originally been positioned just in front of the first line. The concentration of firepower and the formation's immense stability enabled the Spanish to beat off three attacks made on all sides by the entire French army. The battle was protracted from 8—10 a.m., and while this defence led to the wholesale massacre of the Spanish infantry, it also cost the French very heavily — some 4,000 dead and wounded in an army of 23,000. Most importantly, the defence might have permitted the arrival of Beck and the other Spanish corps, some seven kms. away from the battle at 6.30 a.m. — an appearance which would have tipped a far from predictable engagement in Spain's favour[44].

Lützen and Rocroi serve as practical evidence of the general attitude to this deployment. The square was not an archaic formation close to extinction, still less the fixed order for the *tercio* or other »large« units. It had a place in tactical theory and, occasionally, practice, as an ingenious and skilful deployment of troops to meet one particular circumstance — a numerically superior enemy who might prove able to surround the units. Even works influenced by the Dutch reforms provide numerous prescriptions for assembling these formations. Jacobi of Wallhausen, is his *L'Art Militaire pour l'Infanterie,* illustrates a bewildering variety of rectangles, crosses, circles and other geometric devices for between 100 and 6,000 troops[45]. Indeed, it might be suggested that the concern with elaborate drill rituals and geometric precision was far more characteristic of the neo-classical reforms of the Dutch — the belief that geometry and mathematics could provide preconceived solutions to any likely military contingency[46]. Sir James Turner's criticism of »embattling by the square-root« implies that such practices were still part of military theory in the second half of the century[47]. Elaborate prescriptions for square formations appear in Gaya's 1689 *L'Art de la Guerre,* where the specific context of their use is emphasized[48].
Such deployment in the face of an enemy who might succeed in an outflanking or surrounding manoeuvre had an inherent logic which ensured its survival into the nineteenth century, and its most celebrated use on the Napoleonic battlefields. Yet this survival should not be allowed to conceal the essentially untypical nature of the 360° formation. Its abandonment in most circumstances was a general feature of the »military revolution« period.

C) The argument for tactical change also rests upon assertions about improvements in weaponry and the coordination of the various arms in battle. Here it seems necessary to consider how, in fact, battles were fought in the first half of the seventeenth century. For it seems at least a reasonable hypothesis that the salient feature of battles — the increasing effectiveness of infantry acting in defence — renders most of the assumptions about tactical change irrelevant. Indeed, in so far as tactical innovations had any effect, it was to consolidate this supremacy of the defensive.
This opinion requires some qualification. When armies of obviously unequal capacities were set against each other, the defensive potential of the lesser force could not save it from annihilating defeat. This was the pattern of all the major engagements between the White Mountain and Breitenfeld. It is naive to seek explanations for the protestant — German, Dutch and Danish — defeats in terms of tactical theory: the overcomplexity and passivity of »pure« Maurician tactics. The simpler explanation is that of Clausewitz's »Military Spirit«; an army of veterans, habituated to a long series of wars and victories, possesses an inherent superiority over its contemporary rivals that no amount of tactical readjustment can offset[49].
Clausewitz himself cites the Spanish under Farnese and the Swedes under Gustavus Adolphus as possessing this spirit in the highest degree. The same could be said of Tilly's Bavarian/Imperial army during the 1620's. In the last resort, the Spanish, Imperial and Swedish armies won battles, not because of their tactical practices or innovations, but because they perceived themselves as elite forces, embodying a national military reputation for which they were prepared to make a far greater personal commitment and sacrifice than their opponents. When such elite forces clashed with each other, the result would tend to be bloody and indecisive. The Imperialist/Bavarian forces greatly underestimated this Swedish spirit at Breitenfeld; subsequent battles at the Alte Veste, Lützen, Nördlingen and into the 1640's reveal opponents implacably committed to a *guerre à outrance,* characterised by an apparently incomprehensible spirit of mass and individual sacrifice. This »Military Spirit« is thrown into sharp relief

by contrast with the French involvement in the war after 1635; inexperienced armies, largely uncommitted to the foreign policy, were successively annihilated by Spanish and Imperial armies down to 1643. French forces proved consistently unable to sustain the offensive, despite numerical superiority. Even after this period, French military fortunes fluctuated, and forces always tended towards disaster when drawn into battle. Only after 1660 did growing national awareness and military reform produce an army comparably possessed of a »Military Spirit«.

The »committed« troops of the 1630's were operating in a situation where developments in firearms and their coordination with pikes, immensely strong cohesion within units, earthwork defences and the effective deployment of reserves, rendered the infantry centre of an army practically invulnerable to a frontal assault. Professor Roberts asserts that the improvements in firing drill, new combinations of musket and pike, developments in cavalry tactics and the emergence of a new light artillery, allowed the Swedes to resume the offensive on European battlefields. Great emphasis is placed upon the use of the salvo by the Swedish shot — the discharge of several rows simultaneously rather than in sequence or at will. It is claimed that this both improved the effectiveness of the defence, and permitted successful assaults against prepared positions[50]. The first claim seems open to question; why is »one long and continuated crack of thunder« more intimidating than a continuous hail of fire? Though Professor Roberts asserts that Wallenstein's musketeers had adopted the salvo by the time of the Alte Veste[51], eye witness accounts suggest quite the contrary. The Swedish Intelligencer makes the more typical comment that:

»the cannons and muskets went off all day long incessantly: so that nothing was to be seen upon the mountain, but flame and smoke . . .«[52]

When the practical impact of firepower from defensive positions was so clear, its superficial coordination was probably unnecessary. It may be suspected that salvos were simply the logical product of a specific drill for reloading and firing weapons — itself required as a means to ensure a reasonable rate of fire from units of inexperienced recruits.

The more important claim for the salvo is its supposed ability to »shatter« the enemy's ranks' and allow the pikemen to »push into the ruins« in a successful offensive[53]. That a salvo will somehow blow a hole in an enemy unit is a classic piece of tactical theory divorced from battlefield reality. Even if a large number of shots *did* hit their mark, the effect would not be to break up the unit, but to create a barrier of dead and wounded, further impeding any subsequent advance[54]. In fact, however, the effects of firepower were never as overwhelming as the number of weapons and the close range would suggest[55]. As long as the defending unit was prepared to hold its ground, return fire and could draw upon a typical ten ranks to make good losses at the front, it would be capable of blocking and probably repulsing the post-salvo assault. The apparently improved coordination of pike and firearms was insignificant in comparison with the »will to combat« of the forces involved.

This tactical development was virtually irrelevant to the battles after the Swedish invasion of Germany. Only at Breitenfeld did an assault preceded by heavy fire achieve the expected result — the rout of the Saxon army by Tilly's regiments. But again this is a typical case of a massively confident, »professional« army pitted against a force that was demoralised and inexperienced. Brought up against the Swedish second line, the Imperial assault faltered and disintegrated. Equally, no amount of resolution in their assaults could gain the Alte Veste for the Swedes[56]. At Nördlingen, Saxe-Weimar's troops launched fifteen separate assaults against the Spanish positions on the Allbach without breaking through[57]. When, at Lützen, the Swedish assaults forced through Wallenstein's first line, they were thrown back by counter attacks made by

cavalry and infantry reserves[58]. Faced by confident Dutch or French resistance, even the Spanish infantry proved unable to overcome well-prepared defensive positions, as Nieuport and Rocroi demonstrated[59]. Only one example appears to exist of a battle won by a successful, direct assault upon a prepared centre. At Rheinfelden in February 1638, Saxe-Weimar's troops routed the Imperial forces drawn up outside the town. The circumstances were somewhat exceptional, however, in that the Imperial commanders were totally unprepared for a further attack by Saxe-Weimar only three days after the apparent defeat of his forces. The units were scarcely deployed before the Weimarians made contact with them. There is little reason to suppose that such a direct assault would have succeeded against well-prepared positions[60].

So how were battles won and lost in this period, given the dead-weight of the infantry's defensive supremacy? Essentially by operations on the wings of the armies, usually involving exclusively cavalry, which permitted the victor to outflank the main body of the enemy and to launch a simultaneous assault on the flank or rear. This, in conjunction with the continuous pressure of a frontal assault against the infantry centre, would stand a good chance of shattering the capacity for resistance, and precipitating a rout by those elements of the enemy army less committed to a suicidal defence of reputation.

Breitenfeld, again, is the exception which supports the rule. Had Tilly possessed more troops to fling into the assault upon the Swedish centre, his flanking advantage might have proved decisive. At Lützen, the collapse of the Imperial cavalry on the left flank after the death of Pappenheim almost gave the Swedes an outright victory in this typical fashion[61], while at Nördlingen the Spanish/Imperial counter-offensive was successful precisely because the Spanish were able to break in between the forces of Saxe-Weimar and Horne, outflanking both and undermining their weakening defence[62].

Baner's initial assaults against the front of the Imperial positions at Wittstock were repulsed with heavy loss; the victory was gained, not without considerable risk, by the lengthy manoeuvre which permitted a simultaneous assault on the rear of the Imperial positions[63]. Rocroi serves as the classic model of this type of victory; an initially weak French infantry defence in the centre just held against Spanish pressure. The situation was completely changed by the overwhelming victory of the French cavalry on the right wing, their ability to regroup and to move down against the flank of the second and third lines of Spanish infantry. These non-Spanish auxiliaries were routed, exposing the Spanish front line to simultaneous attack by the French cavalry, and by a considerably revived French infantry centre. Finding themselves in an untenable situation as an extended line, the *tercios* formed themselves into the great hollow square in an attempt to stave off disaster[64]. Further examples seem unnecessary[65]; the pattern by which battles between well-motivated, »professional«; armies were won and lost on the flanks, hence usually by the cavalry, was evident from Lützen onwards.

Given this circumstance, it may be suggested that Gustavus Adolphus' formal attempts to adjust the cavalry's role by a modification of the caracole, were of the most limited practical benefit. After their initial success in the mid-sixteenth century, particularly at Mühlberg, the adoption of firearms by cavalry proceeded everywhere in Europe[66]. The fact that in any engagement with cavalry who were prepared to resort to the *arme blanche*, the pistoleer force would be worsted, was overlooked[67]. The underlying rationale of cavalry equipped with firearms, and their elaborate employment in the caracole[68], was the same orthodoxy that it would be possible to blow holes in ten-deep infantry formations as a prelude to charging to contact, or to break the order of an opposing cavalry force preparatory to a clash with swords. The inability to accept that this would simply not occur against well-disciplined and motivated troops

had a predictable effect both upon »progressive« tactical developments, and upon the efforts of their subsequent apologists.

The prescriptions for the deployment of Swedish cavalry, and their coordination with detached platoons of musketeers[69], were based upon the assumption that pistoleer tactics could be made to work if only the weight of shot were sufficiently increased — the same misapprehension which informed tactical changes for the infantry. It is extremely difficult to see how the new system worked in practice; Professor Roberts himself considers that it may simply have been a trading of disadvantages. To make the musketeers' salvos successful — in terms of the theory — it would be necessary for both the cavalry and the platoons of shot to approach to a distance at which they would be subjected to equally heavy counterfire from the defenders. The cavalry themselves would then be so close that they would find it difficult to build up even the momentum of a rapid trot in the intervening distance, and would leave the defenders time to prepare themselves for the impact. In fact, as horses are not prepared to run straight into obstructions, the cavalry assault would disintegrate some yards away from the reassembled formation. Yet if the advance began out of range of the defenders, the musketeers' salvo would prove (even more) ineffective, and the subsequent cavalry charge stand no chance of success.

The real answer to this battlefield impasse was to encourage the cavalry to seek means of getting around the front of infantry units in order to attack on the flank or from behind. But by attaching groups of shot to the cavalry, and permitting the survival of the caracole, Gustavus Adolphus' reform may have made this type of manoeuvre more difficult by discouraging an essential mobility. It seems that the deployment of musketeers amongst the cavalry quickly lost its original character. At Lützen, Wallenstein made use of small groups of shot with the intention, not that they should assist a cavalry offensive, but simply to stabilise the Imperial front line up to Lützen itself[70]. In reality, even as tactical theory affirmed a direct reliance upon firearms, cavalry engagements on the flanks of the armies had become far too important to be fought in such a limited fashion. The typical cavalry conflict from Lützen onwards was a close quarter engagement in which both swords and firearms were used at point-blank range. Here again, the crucial factor was not »new« tactics but the resolution of the combatants. The cavalry who defeated their opponents would then have an opportunity to break into the flank or rear of the enemy centre, making outright victory a possibility. At Lützen, the death of Pappenheim and the rout of the Imperial cavalry was, in tactical terms, almost as great a setback as the death of Gustavus Adolphus for the Swedes[71]. Even if the cavalry engagement began with an exchange of shot, or with the discharges of some supporting infantry, this would serve only as a prelude to the all-important hand-to-hand engagement on which the outcome of battles after 1632 almost invariably depended. The Swedish cavalry was no different from its enemies in its rapid *de facto* resumption of a fighting style which owed more to individual commitment and training than tactical reforms.

The developments in artillery in this period should not be isolated from these problems. What would have revolutionized the battlefield stalemate was the development of a light and highly mobile field artillery, the horse artillery of a later age, capable of the same degree of mobility as cavalry. The vaunted reforms of Gustavus Adolphus produced nothing capable of approaching this requirement. The Swedish king devised a three pound cannon, with an effective range of 300 yards, which required a crew of only two gunners and could be manoeuvred with the aid of one horse. The guns were produced in very substantial numbers, and attached to individual infantry squadrons. At Breitenfeld, the Swedes had at least 75 cannon, mainly of this three pound type, against 26 on the Imperial side[72]. Yet to all practical purposes, the guns were still sta-

tionary during a battle — or rather they were not mobile as a matter of course. The teams of good-quality horses and individual, portable supplies of ammunition did not exist to make mobility straightforward; it remained possible only as the result of specific, large-scale operations. This was the case at Jankow, where a large part of the Swedish military effort consisted in getting cannon up to a position, overlooking the flank of the Imperial army, that had earlier been taken by the cavalry[73].
In contrast to this, Gustavus Adolphus considered it too difficult and dangerous to despatch infantry and artillery support to Saxe-Weimar, who had captured a vantage point overlooking Wallenstein's camp on the Alte Veste[74]. Professor Roberts' contention that it was artillery of the Swedish type, in conjunction with cavalry, that accounted for the destruction of the Spanish *tercios* at Rocroi, is misleading. It was the arrival of a couple of French field pieces which, in conjunction with massed infantry fire, made it possible finally to break open the Spanish square at the fourth assault. However, this success was in marked contrast to the failure of previous assaults without artillery support, during which time the French cannon were being moved painstakingly across a few hundred yards of battlefield[75]. Unable to move with the cavalry to exploit an advantageous flanking attack, the effect of light artillery was to strengthen the already weighty preeminence of defensive tactics, raising the levels of casualties and ensuring the costly failure of any direct assault upon prepared positions.
In the course of this discussion it becomes evident that an unbridgeable gap lies between tactical theory — the supposed resumption of the offensive with the aid of enhanced and redeployed firepower — and the perceived reality of battles characterised by a growing defensive capability and decided by »traditional«, close-quarter cavalry engagements. Whether or not this revision is accepted completely, it must indicate the dangers of relying upon justifications of self-conscious innovators and, in general, of attaching too much importance in any explanation of military success to the effects of tactical changes.

II

Given this overwhelming superiority of the defensive, it might reasonably be asked why pitched battles occurred at all? The post-1621 phase of the war in the Netherlands was marked by the almost total disappearance of set-piece battles in favour of protracted sieges and elaborate manoeuvrings[76]. Yet elsewhere in Europe battles were still sought and waged with a commitment which suggests that they were considered to be of crucial importance. Paradoxically, the explanation for this readiness to commit armies to potentially decisive engagements lies not in a positive conception of the role of battle in an overall strategy, but in the failure of such strategy to provide any escape from the constraints of finance and logistics. Because of this failure, army commanders, even after victorious battles, were more likely to be prisoners of circumstances than masters of states.
Professors Roberts and Parker agree in regarding an immense increase in the size of armies over the period 1500—1700 as clear evidence of some type of revolution. It is perhaps necessary to draw a distinction between military and, broadly speaking, political factors in accounting for this expansion. In aggregate, armies increased at least ten-fold, from the forces of 25—30,000 men employed by the powers involved in the Italian Wars of the early sixteenth century[77], to the 387,520 troops theoretically maintained in the armies and garrisons of France in 1690[78]. Yet such figures suggest a steady increase in the size of armies which is misleading. The forces involved in specific battles in the 1640's/50's were individually no larger than those of the previous century[79]. Even in the more prosperous 1630's, battles involving substantially more

than 20,000 troops were rare. Breitenfeld, with 41,000 Swedes and Saxons set against Tilly's 31,000 troops, was unique down to the 1660's[80]. Indeed, the wars of Louis XIV were the first occasion of a real increase in the forces involved in battles.

This disparity between the overall size of the forces raised by the European powers, and those actually involved on the battlefield, deserves some attention. Professor Parker argues that the increase in the size of armies was due, in the first instance, to the development of fortification techniques — above all to the *trace italienne* — which required many more troops, especially relatively cheap infantry, to enforce an effective blockade[81]. However, overlapping with this, and increasingly taking over from it at the beginning of the seventeenth century, was a more obviously political conception of the role of military force.

Charles V does not appear to have thought beyond individual victories in the field towards a permanent military solution to the political challenge of the German protestant princes; Mühlberg was not followed by any systematic employment of military coercion. The contrast with the use of the Imperial and Bavarian armies in the 1620's is striking. The threat or reality of military pressure was here being used to enforce substantial political and religious change. From the expansion of the Army of Flanders in the 1570's, it seems clear that armies were perceived as a means to place pressure upon entire states and populations by their simple presence, as much as instruments for winning a specific military advantage. The imposition of the Edict of Restitution in a situation where the Catholic armies were unchallenged in Germany provides the clearest example of this conception of the use of military force.

To this political intention must be added the incontestable fact that the inflationary process was both cumulative and irreversible. Given that substantial numerical inferiority was a handicap that no strategic or tactical innovations could overcome, it became incumbent upon major states to raise the largest armies possible. Even if Gustavus Adolphus and Richelieu accepted neither the political nor technical justifications for military expansion, the established size of the Habsburg war machine by the 1630's made a comparable effort to raise unprecedented armies inevitable.

None of this seems particularly contentious; what does require more substantial modification is the assumption made by both Roberts and Parker that the expansion of armies was dependent upon the fulfilment of certain administrative and financial preconditions in the state. Both consider that »there had to be governments capable of organising and controlling large forces«, and capable of mobilising and expanding the financial resources of society[82]. While this was undoubtedly the case in the later seventeenth century — evidenced in Brandenburg-Prussia, Sweden, the Cromwellian Protectorate and, above all, France[83], it was certainly not the case amongst the protagonists of the Thirty Years' War.

The period of substantial military expansion, above all, the 1620's/30's, coincided with the apogee of the military enterpriser, the colonel or »General Contractor« who offered to undertake the administrative and (immediate) financial burdens of raising a regiment or an entire army for their overlords[84]. It seems paradoxical that monarchs, increasingly concerned to assert the theory of absolute sovereignty, should have had to rely upon armies raised and maintained by private contractors. Yet this is less contradictory than it appears, since the greatly inflated armies of this period were forced by external political circumstances upon states whose administrative structures were not able to cope with this expansion. Indeed, without the administrative and above all, credit facilities of the enterpriser, even the great powers of the early seventeenth century would have proved unable to raise the armies of 50,000—100,000 characteristic of this period. Even where, as in Holland, the capacity to fund the army through state channels existed, the enterprise system was still adopted to avoid the administrative

burden and »opportunity cost« of recruiting a directly levied militia in the Provinces[85].

In most cases, however, the principal reason was financial incapacity — the broadening gulf between the revenues available to the state and the cost of the armies that it felt obliged to maintain. Not merely were the revenues inadequate overall, but the primitive mechanisms of tax extraction rendered it impossible to collect large sums at the crucial points in the military year: spring recruitment, initial campaign expenses, autumn disbandment or winter quarters. The entrepreneur could make good these inadequacies through his (comparatively stronger) credit facilities — the ability to mobilise a host of avaricious subcontractors, and his relationship with pure financiers who had access to the international money market[86].

Yet all of this was ultimately sleight of hand; at some point the state had to pay for the army mobilised through the efforts of its entrepreneur-subjects. Merely to keep the credit-system running, Wallenstein stipulated that he required »ein par Million alle Jahr«[87]. Beyond this, however, any substantial payment of the entrepreneurs' expenses would be outside the resources of the government. The »solution« was the notorious *Kontributionssystem* — licence to exact cash payments from enemy, neutral and ultimately, friendly territory at well above the rates required for the basic subsistence of the army[88]. The difference would be employed to reimburse the colonels, captains and other subcontractors for a portion of their initial outlay, and to satisfy the most pressing demands of the financiers and suppliers.

The inherent problem of such a system was that, especially when combined with the general, illegal depradations of the soldiery, it would rapidly exhaust the economic potential of whole areas of the campaign theatre. This process was accelerated by the reluctance of the civilian populations to submit willingly to repeated, crippling exactions in money and kind. Contributions therefore had to be extracted under continuous military pressure. Wallenstein suggested that he could support an army of 50,000 men in Germany, but not one of 20,000[89]. The armies expanded for yet another non-military reason: to facilitate the levy of Contributions which, by their very scale, inevitably rendered this method of supporting the forces increasingly unreliable.

What were the alternatives? In this period it seems clear that there were none. France provides an illuminating example of a state which rejected a purely entrepreneurial model for its army. The experience of civil war and weak, regency government characteristic of most of the period 1560—1629, rendered the French crown implacably opposed to the principle of delegating military authority under any form of overt entrepreneurship[90]. Yet the resources available to the French crown were no more capable of supporting its military commitment. Officers and overall commanders were informally expected to contribute to the costs of their units or armies, but under various formulae which ruled out any claim to reciprocal entrepreneurial rights. The officer had no control over the disbandment or reformation of his unit, and could expect no compensation for any costs incurred during the command. Even if killed on active service, he had no guarantee that the unit would subsequently be transferred to one of his relatives, rather than to a fresh petitioner. The crown, attempting to sustain a military effort beyond its accessible resources, played upon the enthusiasm for military office amongst the wealthy groups of French society, and the subsequent threat to disband their units, as a means to obtain the additional credit that elsewhere was mobilised by an acknowledged, contracted entrepreneurial system. The price paid in terms of the absenteeism, insubordination and corruption of the French officer-corps was entirely disproportionate. Had an effective military administration existed as it was to do in the 1660's/70's, it might have proved possible to minimize the worst effects of this system. In fact, the financial inadequacy which pushed the government towards

such dangerous expedients was matched by a complete failure of the existing administration to meet the challenge of controlling the army, or of disciplining and restraining the corruption of the officer-corps. Far from leading to rationalisation and development, large-scale warfare pushed this administration into an increasingly all-pervasive inadequacy. Together with the related inability to develop a permanent, professional officer-corps, this failure does much to explain the outstandingly poor performance of the French army during Richelieu's ministry.

Both entrepreneurship and this inadequate blend of central direction and unreciprocated credit-exploitation, imposed constraints upon army commanders. The general of an army made up of entrepreneur colonels and their regiments had to deploy his forces primarily to facilitate the extraction of Contributions, and had to maintain a sufficient number of troops under arms to coerce the payment of these by reluctant civil populations. Equally, the French commander was constantly faced by the realities of inherently inadequate central funding. A Contribution system was not (at least legally) authorised, and the compensatory mobilisation of the officers' resources confirmed their view of themselves as privileged volunteers, serving at personal convenience rather than under enforceable contracts.

It is the presence of these constraints which renders discussion of developments, or a revolution, in strategy largely unconvincing. The overriding need to pay and supply armies inflated beyond the capacities of their states, reduced strategy to a crude concern with territorial occupation or its denial to the enemy. Inadequate administration, or the limited Contribution-potential of the main campaign theatres sharply constrained the commanders' freedom of action. Large-scale transport of supplies — despite the establishment of rudimentary frontier magazines — was beyond the capacities of the early modern state, which could raise troops but not the horses, waggons and food supplies required to support them on an extended campaign. The constant penalty for failure to exact finance and supplies, or for the non-cooperation of *trésoriers,* financiers or *munitionnaires*[91], was the dissolution of the army. Troops who had not received a basic subsistence in money or kind would desert. (Mutiny, although equally destructive, was the prerogative of elite forces, confident of their central importance to the war-effort[92].) Mass desertion, facilitated by the corruption or absenteeism of the unit officers, could destroy the military capacity of the state far more effectively than enemy action[93]. The French army which attempted to invade Flanders in 1635 was fairly reliably calculated at 22,000 infantry and 4,500 cavalry[94]. By mid-June, supply problems had reduced this to 13,000 foot and 4,000 horse, while by the end of the campaign the army numbered fewer than 8,000 infantry and 2,000 cavalry, despite having received reinforcements from Picardy in July[95]. This wastage rate of between 50 and 75% was typical, striking only in that the French obligations to the Dutch ensured that the army began the campaign with an exceptionally high effective strength. In most cases the armies entered the campaigns significantly under strength. Large-scale desertion before and during the campaigns rendered calculations of army size meaningless, and suggests that the forces of 150—200,000 troops customarily ascribed to Richelieu's war effort overestimates the reality by at least 50%[96]. While the uniquely unsatisfactory relationship between the administration and the officer corps may have aggravated the problem of mass desertion in the French case, there can be no doubt that it was the common experience of all the armies of the period. Gustavus Adolphus' army in Bavaria was reduced by at least 50% during the fruitless three-month siege of Wallenstein's camp outside Nuremberg[97].

How could a collapse of army strength be avoided? For the French, or any other army unable to draw upon Contributions, by not outrunning the supply facilities (however inadequate) established in the frontier provinces, and by imposing the most

rigorous constraints upon military action. Attempts to move beyond limited policies simply revealed the extent to which logistical practice lagged behind the scale of armies — with invariably disastrous consequences[98]. Moving across the Rhine and living from a *de facto* Contribution system in competition with enemy forces might appear a solution. In reality the extent of the devastation in these areas, and the tenacity of the Imperial forces, rendered the systematic extraction of support almost impossible. Desertion in the French »armies of Germany« was catastrophic; the simple news that a unit was to move into Germany could reduce it by 50% overnight, according to Richelieu[99]. Where the Contribution system *had* to be made to operate, it was unrealistic to envisage any type of strategy that did not accept this as the fundamental priority. The main issue was whether the Contributions could be gathered from enemy territory — thus imposing additional pressure upon the opponent — or whether the army would be forced to live off neutral or home territory. Campaigns reflected this simple logistical imperative: battles were about the control of territory with supply potential, not the culmination of any overall strategy clearly and directly related to the state's war-aims. In that fatal sense warned of by Clausewitz, warfare had become completely divorced from its political object[100]. Breitenfeld occured, not because Gustavus Adolphus was confident of his capacity to defeat Tilly's veterans and anxious to seek out battle as quickly as possible[101], but because of the need to expand the Contribution-base of his own army and to deny Tilly the opportunity of using Saxony for the same purpose. After Breitenfeld, Gustavus did not use his enhanced army in a direct advance against the Hereditary Lands to try to end the war decisively, but moved into the Rhineland, subjecting the various principalities to systematic Contributions. Given the diplomatic difficulties that this provoked with France, angling as ever to create a Catholic, anti-Habsburg power-bloc in Germany, and the essential strategic pointlessness of the move in terms of Sweden's declared war aims, it must be taken as a clear instance of the influence of logistics upon strategy[102].

In 1632, the duel between Wallenstein and Gustavus Adolphus reflected the same preoccupation. The destruction of half of the Swedish army before Nuremberg owed little to the specific failure to capture Wallenstein's positions, far more to the confinement of 45,000 troops in an area whose supply-potential was quickly exhausted and where the yield from more extended zones of Contribution began to dry up. Having exploited this logistical circumstance to his advantage, Wallenstein, dispersing his army rather than suffering its dissolution through growing supply difficulties, was himself caught by Gustavus at Lützen[103].

This explains the disparity between the size of armies overall and of the forces involved on a specific battlefield. The limitations of the supply system severely restricted the number of troops who could be concentrated in one particular theatre. Gustavus Adolphus' »Great Arc« of seven separate forces advancing across Germany seems less the product of strategic genius[104], more a response to the common knowledge that 175,000 men (or whatever force Sweden *actually* had under arms at this stage) concentrated upon a single front would simply starve. Garrisoning, largely to supervise the extraction of Contributions, and the dispersion of blocks of troops over broad areas of territory, were the unavoidable consequence of sustaining an army of this scale in the absence of effective centralised administration and supply.

I have deliberately chosen examples of strategy determined by logistics from the early 1630's, perhaps the halcyon period of military entrepreneurship. The situation for both *Kontributionssystem* and direct administration had deteriorated significantly by the 1640's. The exhaustion of numerous campaign theatres was compounded by the most notorious aspect of the Thirty Years' War — the systematic ravaging and destruction of whole areas of territory in a bid to deprive the enemy of logistical support

after the »friendly« army had withdrawn. Far from being a product of confessional barbarism, the policy reflected a clear-sighted awareness that the movements of the enemy could be severely restricted by the efficient destruction of local resources. So, however, were the subsequent strategic choices available to the commander who ordered the destruction. The size of the individual armies involved in operations or battles fell drastically: 10—15,000 troops seems to have been the typical size, outside of Franco-Spanish campaigns on the Flanders frontier. Attempts are made to dignify what had degenerated into a struggle almost exclusively concerned with control of territory which might provide temporary relief from the all-pervasive problem of supply and finance. The »new style« of warfare — small armies containing at least 50% cavalry — abandoned systematic Contributions in favour of direct extortion and a *guerre des courses* devoid of strategic significance. The war became one of survival: the series of defeats suffered by the Imperial armies after 1645 did not bring a military solution within sight. They did, however, confirm that the Swedish and French armies controlled the exiguous supply potential of Germany. As long as the war continued the Emperor would be forced to support his shrinking armies from the resources of the Hereditary Lands. Even had he been prepared to accept such an expedient, it is probable that his military entrepreneurs would not. The Peace of Westphalia, with its concern for Swedish indemnities and the consolidation of the Emperor's power within his own territories, is a significant indication of the nature of warfare in the 1640's; victories could consolidate a military advantage but could not precipitate any overall defeat of the enemy state. The continuation of the Franco/Spanish conflict down to 1659 merely emphasised the same situation.

Peace, the return of relative prosperity, and the development of a far more effective military administration, permitted the further expansion of armies from the 1660's — an inflationary process fuelled on this occasion by Louis XIV's France. Yet the vice of logistical constraints was scarcely loosened in its grip upon the formulation and execution of strategy. As G. Perjes proposes:

»If the efficiency of strategy was impaired by the initial trouble, difficulties arising from the low standards of food supply and agrarian techniques, low population density and the backwardness of transportation methods, how much greater was the gulf between the political aims of the war and the strategy destined to realise them, since the inadequacy of state administration and financial difficulties themselves were instrumental in widening this gap.«[105]

The central feature of seventeenth-century warfare was the relative ease with which states could raise large numbers of troops, but in circumstances where it proved impossible to match these forces with adequate or reliable administrative mechanisms. In the first half of the century the problem was above all of inadequate financial resources to pay or supply the armies. The »administrative revolution« of the second half, and the full emergence of the »coercion/extraction« cycle, may have gone some distance towards solving the immediate problem, but this served only to reveal the inherent technological and bureaucratic weaknesses of early modern states confronted with the burden of supporting armies 200—300,000 strong. Throughout the century the penalty for neglecting logistical imperatives — in effect, for pursuing a strategy reflecting political war-aims — remained the collapse of the army through mass-desertion or complete supply failure.

Thus on counts of both tactics and strategy, I have reservations about the concept of a »military revolution« in the period 1560—1660. In the field of tactics there is little evidence to support a division into »progressives« and »conservatives« in matters of unit size and formations. Improvements in weaponry and the methods of combining the three arms merely consolidated the already imposing preeminence of the army drawn up on the defensive. The partial solution to the problem of reestablishing a balance

between offensive and defensive came from a systematic resumption of close-quarter cavalry engagements.

While it might be too sweeping to suggest that commanders in the Thirty Years' War were entirely uninfluenced by strategic considerations, their freedom to act in accordance with any overall strategy was almost completely curtailed. The growing size of armies initially reflected political considerations and ambitions; subsequently it became a necessary response to the commitment of other powers. Forced to increase beyond the resources available to the state, the insoluble problems of pay and supply became progressively all-embracing as the war moved into its final crisis. Tactics and strategy in the Thirty Years' War are perhaps best characterised as being undermined by two persistent failures: in the one case, to break the dominance of the defensive; in the other, to cope with logistical inadequacy.

1 M. Roberts: The Military Revolution, 1560—1660. Belfast 1955, reprinted in id.: Essays in Swedish History. London 1967, pp. 195—225; id.: Gustav Adolf and the Art of War. Belfast 1955, see also in id.: Essays in Swedish History, pp. 56—81. Roberts: Gustavus Adolphus. A History of Sweden 1611—32. Vol. 1.2. London 1953—58, here vol. 2, pp. 169—271.

2 G. Parker: The »Military Revolution«, 1560—1660 — a Myth? In: Journal of Modern History 48 (1976) 195—214, reprinted in id.: Spain and the Netherlands, 1559—1659. Ten Studies. London 1979, pp. 85—103.

3 Parker: Spain and the Netherlands (see Fn. 2), p. 85.

4 Ibid., pp. 88—90.

5 Roberts: Essays in Swedish History (see Fn. 1), pp. 202—204.

6 Parker: Spain and the Netherlands (see Fn. 2), pp. 92—95.

7 Roberts: Essays in Swedish History (see Fn. 1), pp. 60—62, 65—67, 196 f.

8 Parker: Spain and the Netherlands (see Fn. 2), p. 89.

9 R. J. Knecht: Francis I. Cambridge 1982, pp. 246—248; P. G. Daniel: Histoire de la Milice Française. Vol. 1.2. Paris 1721, here vol. 2, pp. 331—333.

10 H. Schneider: Der Langspiess. Wien 1976 (= Schriften des Heeresgeschichtlichen Museums in Wien. Militärwissenschaftliches Institut. Bd 7.), pp. 7—24, p. 14.

11 W. Schaufelberger: Der Alte Schweizer und sein Krieg. Zürich ^{2}1966, pp. 7—24, p. 18.

12 By the second half of the sixteenth century the proportion of halberds had stabilized at around 10% of an infantry unit (J. R. Hale: War and Society in Renaissance Europe, 1450—1620. London 1985, p. 52).

13 Jacobi of Wallhausen stresses that »presque tous les pais ont leur façon de mousquet«, and suggests that although the »musket« shot was meant to weigh 2 ounces, this was rarely the case since it required a weapon too heavy for most soldiers (id.: L'Art Militaire pour l'Infanterie. Paris 1615, p. 35). Jacob de Gheyn's distinction between the musket and the specific, small-calibre »caliver«, fired without a fork, seems more convincing. See the illustrations in The Exercise of Armes for Calivers, Muskettes and Pikes. London (?) 1608. In general I am sceptical of whether the »innovation« of the musket consists in anything more than the adoption of a more fashionable name.

14 Battles of La Bicocca and Pavia (Knecht: Francis I — see Fn. 9 —, pp. 114 f., 169).

15 Parker: Spain and the Netherlands (see Fn. 2), p. 89.

16 Roberts: Gustavus Adolphus (see Fn. 1), vol. 2, p. 184, gives proportions of 300 shot to 250 hand weapons in a Dutch battalion. M. D. Feld: Middle Class Society and the Rise of Military Professionalism: the Dutch Army 1589—1609. In: Armed Forces and Society 1 (1975) 419—442, here p. 426, suggests that a Dutch infantry company of 135 men consisted of 74 men with firearms and 45 with pikes.

17 Jacobi of Wallhausen: L'Art Militaire pour l'Infanterie (see Fn. 13), p. 102.

18 Clear descriptions of this system in J. de Billon: Principes de l'Art Militaire. Paris 1622, pp. 177—179; L. de la Fontaine: Les Devoirs Militaires des Officiers de l'Infanterie et de la Cavalerie. Paris 1675; John Keegan draws attention to the general thesis that the small group of soldiers, existing independently of the formal military structure, is far more important in explaining the success and motivation of troops in combat (id.: Face of Battle. London 1976, pp. 51 f.).

19 J. Chr. Allmayer-Beck, E. Lessing: Die kaiserlichen Kriegsvölker. Von Maximilian I. bis Prinz Eugen 1479—1718. München 1978, p. 116: »Für die angeworbenen kaiserlichen Truppen schien ein besonderes Exerzitium wiederum nicht vonnöten, da diese ja, aus kriegsgeübten Söldnern bestehend, in der Lage sein sollten, unerfahrenen Rekruten das Notwendigste beizubringen.«

20 Roberts: Essays in Swedish History (see Fn. 1), p. 62.

[21] D. H. d'Aumale: Histoire des Princes de Condé pendant les XVIe et XVIIe siècles. Vol. 1—8. Paris 1863—96, here vol. 4, p. 114.

[22] Parker: Spain and the Netherlands (see Fn. 2), p. 89.

[23] De Billon: L'Art Militaire (see Fn. 18), p. 181, implies that *bataillons* were established from the early seventeenth century.

[24] Roberts: Gustavus Adolphus (see Fn. 1), vol. 2, p. 251.

[25] Ibid., vol. 2, pp. 219 f.

[26] Ibid., vol. 2, pp. 250—253.

[27] See for example the Archives des Affaires Etrangères, Mémoires et Documents, France. Vol. 828, fos. 265—286: *états* of army strengths for 1637 — projected.

[28] Exact *revues* of units in the French army have not survived in large numbers, though the Archives des Affaires Etrangères (see Fn. 27) do contain a representative selection: for e.g. Mémoires et Documents, France. Vol. 819, fos. 1—5 — *revues* of units under de La Force and the Cardinal de La Valette, 1635. See also B. Kroener: Die Entwicklung der Truppenstärken in den französischen Armeen zwischen 1635 und 1661. In: Forschungen und Quellen zur Geschichte des Dreissigjährigen Krieges. Münster 1981 (= Schriftenreihe der Vereinigung zur Erforschung der Neueren Geschichte e. V. Bd 12.), pp. 149—220.

[29] H. de Besse: Relation des Campagnes de Rocroi et de Fribourg. Paris 1673, new ed. 1826, p. 98. Numerous other references.

[30] Roberts: Essays in Swedish History (see Fn. 1), p. 65.

[31] Ibid., p. 197.

[32] For example, a letter of Le Tellier, then intendant of the army in Italy, from the early 1640's: printed in N. L. Caron: Michel Le Tellier: son administration comme intendant d'armée en Piémont, 1640—43. Paris 1880, p. 75, 10th June 1641. Also Archives de la Guerre. Vol. A129, fo. 399, 27th September 1636: Typical order for the *réformation* of all units in the army of Italy under 30 strong.

[33] Roberts: Gustavus Adolphus (see Fn. 1), vol. 2, pp. 175 f.

[34] Ibid., vol. 2, pp. 173 f.

[35] De Billon: L'Art Militaire (see Fn. 18), pp. 181, 209; Aurignac: Livre de la Guerre. Paris 1663, ed. Azan. Paris 1904, p. 48. Sir James Turner, inexplicably, reverses the prescriptions, suggesting three paces between defensive pikes, one and a half between those charging: Pallas Armata. London 1670/71, p. 268.

[36] De Gheyn: Exercise of Armes (see Fn. 13); J. of Wallhausen: Künstliche Piquen-Handlung, darinnen schriftlich und mit Figuren dieses Exercitium angewiesen und gelehret wird. Hanau 1617.

[37] Turner: Pallas Armata (see Fn. 35), p. 179.

[38] This deployment seems to have been ignored by historians, though it is clearly indicated in tactical manuals: de Billon: L'Art Militaire (see Fn. 18), p. 168; de la Fontaine: Devoirs Militaires (see Fn. 18), p. 282 et seq. In artists' depictions of the battles — for example, those of Snaeyers — this order of battle is clear. See the sequence in Allmayer-Beck/Lessing: Die kaiserlichen Kriegsvölker (see Fn. 19), pp. 89—104. More accessible is Snaeyers' painting of Imperial infantry at Nördlingen, reproduced on the dust-jacket of Professor Parker's Thirty Years' War. London 1984. It is easy to see how assumptions might be made that these formations were »typical« squares, but careful examination shows this not to have been the case.

[39] The procedure is described by de Billon: L'Art Militaire (see Fn. 18), pp. 196—199, who combines it with the widely established countermarch: »Tout aussi-tot que le premier rang (of shot) fera advancer pour tirer, il faut que le second rang prenne sa place et se remettre a l'esgal du premier rang et front des picquiers.«

[40] Sir Ch. Oman: A History of the Art of War in the Sixteenth Century. London 1937, p. 596.

[41] Aurignac: Livre de la Guerre (see Fn. 35), p. 105, considers that this was the principal reason for Tilly's defeat.

[42] J. Seidler: Untersuchungen über die Schlacht bei Lützen. Memmingen 1954, emphasizes that the two accounts by officers present in the Imperial army — Holk and Diodati — agree upon this as the battle order. This verdict is accepted by Golo Mann in his biography of Wallenstein. Frankfurt a. M., pp. 877—880.

[43] Most fiercely asserted by H. Diemar: Untersuchungen über die Schlacht bei Lützen. Marburg a.d.L. 1890, though this is convincingly attacked by Seidler (see Fn. 42). It has had many exponents, partly, it may be suggested, under the influence of the Merian engraving of the battle, prepared for the Theatrum Europaeum. (Reproduced as the endpiece of Parker's Thirty Years' War — see Fn. 38 —). Yet there seems little reason to take this engraving as a reliable depiction of the battle order; even at the very simplest level, the number of infantry drawn up in the five squares does not approach Wallenstein's force of 8—9,000.

[44] D'Aumale: Histoire des Princes de Condé (see Fn. 21), vol. 4, pp. 82—133; de Besse: Relation des Campagnes de Rocroi et de Fribourg (see Fn. 29), pp. 18—87.

[45] J. of Wallhausen: L'Art Militaire pour l'Infanterie (see Fn. 13), p. 85 et seq.

[46] See H. Eichberg: Geometrie als barocke Verhaltensnorm. Fortifikation und Exerzitien. In: Zeitschrift für Historische Forschung 4 (1977) 17—50.

[47] Turner: Pallas Armata (see Fn. 35), p. 268.

[48] L. de Gaya: L'Art de la Guerre. Paris 1689, p. 171; de la Fontaine: Devoirs Militaires (see Fn. 18), pp. 245—261.
[49] C. v. Clausewitz: On War. (Ed. Paret, Howard, Brodie. Princeton, N. J. 1976), pp. 187—189.
[50] Roberts: Essays in Swedish History (see Fn. 1), pp. 66 f.
[51] Id.: Gustavus Adolphus (see Fn. 1), vol. 2, pp. 264 n. 3.
[52] The Swedish Intelligencer. Vol. 3. London 1634, p. 42. Accounts of Fronmüller: Geschichte Altenberg's und der Alten Veste b. Fürth. Fürth 1860, and H. Mahr: Wallenstein vor Nürnberg 1632: sein Lager bei Zirndorf und die Schlacht an der Alten Veste. Neustadt/Aisch 1982.
[53] Roberts: Essays in Swedish History (see Fn. 1), p. 67.
[54] See John Keegan's account of the French advance at Agincourt: Face of Battle (see Fn. 18), pp. 98—101.
[55] Again, Keegan's account of the substantially more effective British muskets at Waterloo, and the limited effects of their fire even at almost point-blank range (id.: Face of Battle — see Fn. 18 —, pp. 172 f.).
[56] Mahr: Wallenstein vor Nürnberg (see Fn. 52), p. 80 et seq.
[57] E. van der Essen: Le Cardinal-Infant et la politique européenne de l'Espagne, 1609—41. Louvain 1944, p. 419.
[58] G. Priorato: An History of the late Warres and other State Affaires of the best Part of Christendom, beginning with the King of Swethlands Entrance into Germany, and Continuing until 1640, trans. by Earl of Monmouth. London 1648, pp. 131—134.
[59] Oman: Art of War in the Sixteenth Century (see Fn. 40), pp. 592—603; d'Aumale: Histoire des Princes de Condé (see Fn. 21).
[60] I. M. vicomte de Noailles: Bernhard de Saxe-Weimar. Paris 1906.
[61] Priorato (see Fn. 58); Mann: Wallenstein (see Fn. 42), pp. 883—891.
[62] Van der Essen (see Fn. 57), p. 420.
[63] V. Wedgewood: The Thirty Years' War. London 1938, pp. 366 f.
[64] D'Aumale: Histoire des Princes de Condé (see Fn. 21), vol. 4, pp. 114—116.
[65] Though see ibid., vol. 4, pp. 424—440, on Nördlingen II (Allerheim), and K. Ruppert: Die kaiserliche Politik auf dem Westfälischen Friedenskongress, 1643—1648. In: Forschungen und Quellen zur Geschichte des Dreissigjährigen Krieges. Münster 1979 (= Schriftenreihe der Vereinigung zur Erforschung der Neueren Geschichte e. V. Bd 10.), p. 81, on Jankow.
[66] E. v. Frauenholz: Das Heerwesen in der Zeit des freien Söldnertums. München 1936 (= Entwicklungsgeschichte des deutschen Heerwesens. Bd 2, 1.), pp. 104—115.
[67] Oman: Art of War in the Sixteenth Century (see Fn. 40), pp. 562 f., on the battle of Mookheide, where Spanish lancers routed Dutch pistoleers after their first ineffectual discharge.
[68] Roberts: Essays in Swedish History (see Fn. 1), pp. 57 f.
[69] Ibid., pp. 68 f.
[70] Priorato (see Fn. 58), p. 131.
[71] Ibid., p. 134; Mann: Wallenstein (see Fn. 42), pp. 883 f.
[72] Parker: The Thirty Years' War (see Fn. 38), p. 126.
[73] Ruppert: Kaiserliche Politik (see Fn. 65), p. 81.
[74] Fronmüller (see Fn. 52).
[75] Roberts: Essays in Swedish History (see Fn. 1), p. 60 and note 56. Roberts draws upon Weygand and Colin/Reboul, neither of whose accounts of Rocroi are satisfactory.
[76] J. Israel: The Dutch Republic and the Hispanic World. London 1982, pp. 96 f. The one exception was at Kallo in June 1638, when the Army of Flanders inflicted a severe defeat upon the Dutch — ibid., p. 259.
[77] Hale: War and Society in Renaissance Europe (see Fn. 12), p. 62; these are probably »paper« strengths, considerably overestimating the real forces maintained during the campaigns.
[78] A. Corvisier: Louvois. Paris 1983, p. 325.
[79] Freiburg, in 1644, was fought between armies of about 17,000 (d'Aumale: Histoire des Princes de Condé (see Fn. 21), vol. 4, pp. 316—323), while Jankow involved Swedish and Imperial forces of only 15,000 (Ruppert: Kaiserliche Politik — see Fn. 65 —, p. 80). Both of these appear to compare unfavourably with the battles of a hundred years earlier.
[80] Parker: The Thirty Years' War (see Fn. 38), p. 126.
[81] Id.: Spain and the Netherlands (see Fn. 2), p. 97.
[82] Roberts: Essays in Swedish History (see Fn. 1), pp. 205—208; Parker: Spain and the Netherlands (see Fn. 2), pp. 97—102.
[83] Professor Roberts' remark about the »possibly overrated military reformers, Le Tellier and Louvois« (id.: Essays in Swedish History — see Fn. 1 —, p. 65), dubious in itself, could only be sustained by ignoring simultaneous changes in the state which had a far more drastic influence upon the effectiveness of armies than any tactical redefinition could achieve. A comparison of the French armies of the 1660's/70's with those of preceding decades, illustrates this clearly.
[84] See particularly F. Redlich: The German Military Enterpriser and his Work Force. Vol. 1.2. Wiesbaden 1964/65 (= Vierteljahrschrift für Sozial- und Wirtschaftsgeschichte. Beihefte 47. 48.)
[85] Feld: Middle Class Society and the Rise of Military Professionalism (see Fn. 16); G. Oestreich: Neostoicism and the Early Modern State. Cambridge 1982, pp. 76—83.

[86] The supreme example of this being Wallenstein's relationship with his foremost financier — see A. Ernstberger: Hans de Witte — Finanzmann Wallensteins. Wiesbaden 1954 (= Vierteljahrschrift für Sozial- und Wirtschaftsgeschichte. Beih. 38.)

[87] Ibid., p. 166.

[88] M. Ritter: Das Kontributionssystem Wallensteins. In: HZ 90. N. F. 54 (1903) 193—249; F. Redlich: Contributions in the Thirty Years' War. In: Economic History Review. 2nd Ser. 12 (1959/60) 247—254.

[89] Mann: Wallenstein (see Fn. 42), pp. 370 f.

[90] D. Parrott: The Administration of the French Army during the Ministry of Cardinal Richelieu. Oxford, D. Phil. thesis 1985, pp. 161—223.

[91] Paris-based financiers/entrepreneurs who were prepared to make large-scale contracts to supply the armies with the basic bread ration throughout a campaign or the winter months.

[92] G. Parker: Mutiny and Discontent in Spanish Army of Flanders, 1572—1607. In: Spain and the Netherlands (see Fn. 2), pp. 104—121, p. 108.

[93] Richelieu, in his Testament Politique, made the despairing statement that: »Il se trouve en l'histoire beaucoup plus d'armées periés faute de pain et de police que par l'effort des armes ennemies« (ed. André. Paris 1947, p. 280). In this, he was echoing the common experience of all his contemporaries.

[94] A. Aubery: Mémoires pour servir a l'histoire du Cardinal de Richelieu.Vol. 1.2. Paris 1660/61, vol. 1, p. 481.

[95] Richelieu: Mémoires. Vol. 8. (28). Paris 1824, p. 334: Collections des Mémoires relatifs a l'Histoire de France (2nd Ser., ed. Petitot, Monmerqué. Vol. 21—30); G. Avenel: Lettres. Instructions Diplomatiques et Papiers d'Etat du Cardinal de Richelieu. Vol. 1—8. Paris 1843—77, here vol. 5, p. 309, 16th Oct. 1635; vol. 5, p. 73, 28th June 1635.

[96] Kroener: Die Entwicklung der Truppenstärken in den französischen Armeen (see Fn. 28); Parrott: The Administration of the French Army during the Ministry of Cardinal Richelieu (see Fn. 90), pp. 103—118, 142.

[97] Parker: The Thirty Years' War (see Fn. 38), p. 131; Mahr: Wallenstein vor Nürnberg (see Fn. 52), p. 64.

[98] For example, the French advance to Mainz in 1635, which collapsed through supply failure evident from the outset of the campaign — B. Kroener: Les Routes et les Etapes. Die Versorgung der französischen Armeen in Nordostfrankreich (1635—61). Ein Beitrag zur Verwaltungsgeschichte des Ancien Régime. Münster 1980 (= Schriftenreihe der Vereinigung zur Erforschung der Neueren Geschichte e. V. Bd 11.), pp. 83—94.

[99] Archives des Affaires Etrangères (see Fn. 27), vol. 816, fo. 226, undated (1635).

[100] Clausewitz: On War (see Fn. 49), p. 143.

[101] The *Vernichtungsstrategie* held by Professor Roberts to have been the conscious aim of Gustavus Adolphus (id.: Essays in Swedish History — see Fn. 1 —, pp. 71 f.).

[102] M. van Creveld: Supplying War: Logistics from Wallenstein to Patton. Cambridge 1977, p. 14.

[103] Parker: The Thirty Years' War (see Fn. 38), p. 131.

[104] Roberts: Essays in Swedish History (see Fn. 1), p. 73.

[105] G. Perjes: Army Provisioning, Logistics and Strategy in the Second Half of the Seventeenth Century. In: Acta Historica Academiae Scientiarum Hungaricae 16 (1970).