22 Ibid. i. 193.
23 Ibid. ii. 19-20.
24 For example, the importation of fuller's earth into Ireland was prohibited in 1636, (*Cal. S. P. Ire.*, 1633-47, p. 136) but this was not a completely new measure, since it went back to a decision of the English privy council in 1623.
25 A cloth manufacture near Dublin had been set up by Sir Thomas Roper and was in existence in 1622. *Cal. S. P., Ire.* 1615-25, p.361.
26 Wadsworth and Mann, *Cotton trade and Industrial Lancashire*, 1600-1780, pp. 14-25.
27 'Thomas Cave's instructions for customs officers . . .' T.C.D. M.S.F. 3.1.17.
28 Steele, *Tudor and Stuart proclam.*, ii. 32, no. 310.
29 P.R.O. S.P. 63/259/f.220. They begin in 1635 because it was in that year that Wentworth took over the customs farm and began to incorporate the linen and wine monopolies into it.
30 A pack = 4 cwt. 1 cwt. = 120 lb.
31 Rushworth, *Trial*, p. 67. article xiii.
32 Ibid. p. 422.

Gustavus Adolphus and the Art of War

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UNTIL VERY RECENT TIMES it has been a sound generalization that no offensive action can be won by missile weapons alone. It is a generalization which may well be invalid today; but there can be no doubt that it is substantially accurate for the Middle Ages. The art of war in medieval Europe was essentially a hand-to-hand business, and it was no less essentially offensive, since the arms and equipment of the medieval knight left no other course open to him save attack. And because feudal chivalry was by its nature committed to the offensive, the defensive-offensive tactics of Crécy and Poitiers became a possibility—though even here the swords of the men-at-arms were needed to clinch a victory which the arrow-shower had only begun. But this was a method of fighting which could hardly be repeated indefinitely, since it depended for its success upon the rashness of the enemy, and upon the calculation that the opposing commander would prove incapable of tactical improvisations; and the time came when neither of these presuppositions proved true any longer. The really decisive overthrow of the heavy-armed cavalry, therefore, came not from bowmen, and still less from hand-gunners, but from the bringing to bear of a shock and mass greater and more tightly organized than that provided by a charge of men-at-arms. Such a shock, and such a mass, made its appearance first in the Swiss column, and then in the Landsknechts and the Spanish *tercio*.

From the point of view of battle-tactics, the invention of firearms was at first of very minor importance. Indeed, it represented, for close on two centuries, a decidedly retrograde step. Firearms in battle attempted to repeat the tactics of Crécy with instruments which were ludicrously inapt for the purpose. Their weight, their unreliability, their inaccuracy, their painfully slow rate of fire, made the early hand-guns, arquebuses and muskets inferior, in every respect save one, to the cross-bows and longbows they superseded. The arquebus possibly, the musket more probably, could claim a higher penetrative power;[1] but this advantage could not offset the countervailing defects. The period of military history which extends from Charles the Bold to Tilly is marked above all by a catastrophic diminution in the firepower of the infantry arm.[2]

The commanders of the early sixteenth century seem to have cared little for this aspect of the question. The pike was now the 'queen of the battlefield'; and the Swiss column, luckily for itself, never came up against massed English archers. In the first quarter of the century arquebus and musket made good their footing on the Continent,[3] and for the next hundred years or more provided military theorists with the very difficult

problem of deciding how to make the best use of them. What proportion were missile weapons to bear to *l'arme blanche*? And how was the most effective combination of the two to be secured?

By about 1580, the influence of portable firearms had succeeded in diverting the art of war into two exceptionally blind alleys. It had, in the first place, completed that demoralization of heavy cavalry which the English and the Swiss had begun. The man-at-arms, outweighted by the Swiss column, his lance outranged by the eighteen-foot pike, had found that the musketeers could not be relied upon to make a practicable breach in the ranks of the enemy into which cavalry could charge. Direct assault with lance and sword became increasingly suicidal. But then came the invention (about 1520)[4] of the wheel-lock pistol; and the discomfited cavaliers were not slow to adopt it. In theory, the pistol enabled the cavalryman to blow holes in the pike-hedge, independently of infantry assistance. In fact, it provided him with a pretext for doing nothing, while seeming to do much. The effective range of the cavalry pistol being something under ten yards,[5] cavalry made use of it by advancing in very deep formations to within that distance of the enemy, and discharging their weapons by successive ranks in an intricate manoeuvre known as the caracole, or *limaçon*.[6] To this evolution there could have been no objection, if the firing of the pistols had been followed by an attack with the sword or lance. But the pistoleers, outranged by opposing muskets, frequently fired at too great a distance for their shots to be effective, and increasingly neglected to follow up their volley with a charge. The essential of cavalry tactics—the utilization of the impact of man and horse to disrupt the enemy's formation—was thus wholly lost, except in Poland;[7] and cavalry became a debilitated arm, fit only to snap its pistols at other horsemen as debilitated as themselves.

In these circumstances, the decisive, battle-winning element in the armies of the mid-century remained the infantry—or, more specifically, the pikemen; and the most illustrious exponent of the supremacy of the foot was the Spanish *tercio*. The *tercio*, three thousand strong, with its girdle of shot wholly surrounding a massive square of pikes and halberds, and its four rectangular 'sleeves' of shot at each corner, represented the first serious attempt at tactical combination of firearms with pikes: the shot would shatter the enemy's ranks to make an opening for the pike-thrust; the pikes would provide a rampart, or even a hollow square, behind or within which the shot could take refuge—if it were quick enough.[8] But though this was, indeed, a conscious effort at combination of weapons, it was a singularly clumsy one. The great mass of the *tercio* endowed it with inertia to resist, and momentum in attack (provided the musketeers had got out of its way at the moment of impact); but it was extraordinarily wasteful of manpower: the inner ranks and files of a *tercio* contributed little beyond their weight to the issue of the combat, and could scarcely be said to earn their pay. And it was no less wasteful of firepower. The slowness of the musket's rate of discharge was such, that a steady fire could be maintained only by having musketeers at least ten deep, and training them to fire by successive ranks—an evolution known as the countermarch.[9] But in *tercio* formation this was possible only to the 'sleeves', to the forlorn, and perhaps to the musketeers stationed immediately to the *tercio's* front. The musketeers lining the *tercio's* flanks could give only sporadic and ineffectual fire; while those posted at its rear could not fire at all, unless the *tercio* were actually

surrounded. Thus the close attachment of shot to pikes, so far from producing a fruitful collaboration between them, succeeded only in inhibiting the characteristic qualities of each.

Moreover, the parts played by musketeers and pikemen tended by the middle of the century to become inverted. As had happened with the cavalry, there arose in the foot an increasing disposition to shrink from close action (by which alone a tactical *decision* could be secured), and an increasing preference for long-range musketry duels: the first example of the new style is perhaps to be seen in the early stages of the battle of Cerisole in 1544. The proportion of musketeers to pikes steadily rose: by the end of the century it reached approximate equality, by the 1620's it might be as two to one;[10] the 'sleeves' became stronger, and their front more extended; and the rear of the *tercio* was on occasion denuded of protecting shot.[11] At the same time the pike declined as an offensive weapon, and from being the principal battle-winner sank slowly to being a mere stiffener of the shot, a kind of barbed-wire hedge behind which fugitive musketeers might in an emergency take shelter, a weapon derided by the more advanced of contemporary theorists.[12] And as a consequence of these developments battles became more difficult to win, disillusioningly resultless when won, and unjustifiably extravagant in the expensive article of mercenaries. Commanders, therefore, turned their attention for choice to siege-warfare. Here, and here only, the coming of gunpowder had meant increased efficiency; here Tartaglia's ballistics, Italian and Dutch military architecture, and other applications of emergent sciences, could show positive results.[13] Battle became the mark of the incompetent or unfortunate commander, to be justified (if at all) only as clearing the way for further siege-operations;[14] strategy aimed at occupation of territory, rather than at annihilation; and the general preference for mercenary armies (for whom a clear-cut decision might mean unemployment) reinforced the current trend.

Thus by the last decade of the sixteenth century the natural military qualities of horse, shot, and pike had become almost totally perverted; and the art of war was stiffening into immobility. Neither cavalry nor infantry was anxious for close action; and commanders looked for victory to missile weapons whose original inefficiency had neither been overcome, nor offset by tactical ingenuity. The sheer bulk of the *tercio*, though since the 1580's considerably diminished, made it unamenable to manoeuvring and costive in action; while its organic nature made its subdivision not merely impracticable, but self-contradictory. Minor tactics, in consequence, were reduced to a primitive level, and strategic thinking scarcely existed at all.[15]

The reforms of Maurice of Orange and his cousins, conceived and executed in the years between 1590 and 1610, at all events offered a new approach to these problems, and a possible exit from one of the blind alleys. Maurice's inspiration was classical: it came from Vegetius, Aelian, and Leo VI, reinforced by the neo-stoicism of Justus Lipsius, and the mathematical talents of Simon Stevin.[16] In thus looking to Rome for his models Maurice was by no means singular: the tactical maxims of Vegetius and Aelian were commonplaces to the military writers of the age, from Machiavelli to Schwendi, Londono and de la Noue. Nor can it be said that while others merely talked of Roman principles, Maurice was the first to act on them:[17] the first commander to do this was not Maurice, but Erik XIV of Sweden,

who forestalled some of Maurice's most celebrated innovations by as much as thirty years.[18] Nevertheless, Maurice's reputation as a military reformer is natural, and it is deserved. Unlike Erik, whose brief career was confined to the inner Baltic, and peripheral to the main current of European affairs, Maurice was a protagonist in the great central struggle upon which the fate of Europe hung; and in the very heat of battle he took the enormous risk of radically transforming his system of tactics, administration and training. His new infantry unit, the battalion, was consciously modelled on the cohort, and numbered only five hundred and fifty men; it was drawn up as a wide, shallow formation, only ten deep on a front of forty-nine; and the units were ranged, *quincunx*-wise, as a *duplex acies* with proper provision for a tactical reserve. By these means Maurice secured a much more efficient and economical use of manpower, a greatly increased capacity for manoeuvre, and an abundant supply of tactical small change: whereas a Spanish army of twelve thousand men would have four tactical units, a Dutch army of the same size would have twenty-four.[19]

Maurice's revival of linear tactics entailed consequences which extended far beyond the art of war. For it meant a great increase in the number of subalterns and N.C.O.'s; and, as a necessary consequence of the emergence of what were in effect platoon-commanders and section-leaders, a sharp raising of the educational standard of those grades. It meant also a revolutionary advance in the matter of discipline and drill: it is thanks to Maurice that the words of command of most European armies, even today, re-echo the language of Aelian.[20] And this advance was possible, in a wholly mercenary army, only because the prosperity of the Dutch enabled them—alone of all European states—to pay their armies with reasonable punctuality.

In the early decades of the seventeenth century the Dutch system was generally adopted by Protestant armies on the Continent. The Catholic powers remained sceptical; and not without reason. Battle experience could not be said to pronounce unequivocally in Maurice's favour: Turnhout was a minor engagement; Nieuwpoort came at an early stage of the reforms; while such Protestant commanders as fought battles on the Maurician system during the early years of the Thirty Years' War generally lost them. And in truth the Dutch method had very serious defects. It was a stiff and inflexible system: within the framework of the battle-line the pieces could readily be interchanged, but the framework itself was fixed and rigid. Tactically, it was essentially passive, reacting predictably to a challenge, but not apt for the offensive. The large number of small units, disposed so as to cover and support each other, the excellent scope for musketry fire, the ease with which a threatened sector of the line could be reinforced, the provision of a proper reserve, all gave to the Dutch line a respectable strength in defence; though even in defence it seems doubtful whether it was sufficiently adaptable to be able rapidly to form front to a flank. But those graceful chequers which patterned the flats of Holland or the rolling open country of Brabant, though they might make the strongest appeal to the aesthetic sense of Major-Generals, were by no means convincing as battle-winners. They had sacrificed the mass of the Spanish system without acquiring adequate compensation in hitting-power; and in the matter of the combination of arms they showed little advance upon the more modern and disencumbered type of *tercio*. And despite the claims that have been made for Maurice, it seems clear that he never really succeeded in maintaining a stable correlation

between the administrative and tactical units of his armies.[21] His cavalry, moreover, was of the most vicious sort: caracoling pistoleers one and all; for Maurice formally prohibited the lance in 1597.[22] Above all, Maurice's reforms were in great measure stultified by his stolid and conventional strategy. He had no ambition whatever to fight battles; and for a quarter of a century after Nieuwpoort he contrived, with the aid of skill, geography and the truce, to avoid them. Of an offensive tactic he had little idea; of a campaign culminating in annihilating victory, none at all. It was entirely characteristic and proper that his reputation as a commander should rest largely on his conduct of siege-operations.

The Spanish school, meanwhile, had been gradually reforming itself. It still depended for its effect upon the impact or inertia of massed infantry; but since the 'eighties the *tercio* had been fixed at sixteen hundred men, in place of the former three thousand. These new, smaller *tercios*, moreover, were increasingly coming to be arranged on the battlefield in groups of three, in arrow-head formation, or sometimes in groups of four, diamond-wise; the fourth *tercio* in such case being held in reserve. When this formation was adopted, and several battle-groups of *tercios* were ranged side by side, a Spanish order of battle might take on a delusive appearance of linear arrangement. But in one sense, at least, the new *tercios* were more adaptable than Maurice's battle-line, for the battle-group was not disturbed by attack in flank, since it could meet it by a simple left or right turn. And if the *tercio*, with all its admitted disadvantages, had been as completely outmoded as some writers have supposed, it is difficult to account for its invariable success in Germany until 1631. It would be rash to attribute its victories entirely to the ineptitude of the Protestant commanders, or the brilliance of Tilly, or the steadiness of the Spanish infantry. The tactical form itself possessed some assets, and its later exponents—Tilly and Spinola in particular—knew well how to make the most of them. It is important to recognize this fact, for it was to have some influence on the tactics of Gustavus Adolphus in their final phase.

Maurice's career, therefore, inaugurated a tactical controversy, but failed to decide it. And it left the great military problems still unsolved. It still remained for an enterprising commander to restore, both to horse and foot, the capacity for the battle-winning tactical offensive; it still remained for a military genius to liberate strategy from the tenacious mud of the Netherlands; and it still remained for a great administrator to fulfil and perfect those lines of development in organization, discipline and drill, which Maurice and his cousins had been the first to chalk out. In each of these fields the career of Gustavus Adolphus was of decisive importance; and though as an administrator he may perhaps have been, as Delbrück called him, the 'perfecter' of Maurice's reforms,[23] in tactics he was the innovator who succeeded in solving the problems which Maurice had failed to solve, while in strategy he dealt with problems of which Maurice had really no conception.

The military education of Gustavus Adolphus had fitted him to appreciate the merits of both the Dutch and the Spanish schools. After a firm grounding in the classical authorities on the military art—Aelian, Frontinus, Vegetius—he had been directed by his tutor, Johan Skytte, to the study of contemporary models. Both the Spanish and the Dutch methods were familiar to him. Special attention was paid to the art of 'embattling' an

army, so that he should know 'how to form expeditiously some thousand men into a square, a triangle, a circle, an arrow-head, or any other geometrical figure'.[24] The effect of this training is perhaps to be perceived in the highly artificial and geometrical battle-orders to which he clung in the earlier phases of the Polish war. Circumstance and religious sympathy, however, inclined him from the start to prefer the methods of Maurice, and in 1608 he had the advantage of two months' intensive training in their use from Jakob de la Gardie, who had himself been schooled in the Netherlands tradition. This short course was the only formal instruction in the miltiary art at the hands of a professional soldier that he was ever to receive; and he was at that time not quite fifteen years old. As a soldier, therefore, he was to be a great extent an autodidact. His constant study was to improve himself; and he expected his officers to imitate his example, for he did not believe that the military art can be acquired simply by experience in the field. He would have agreed with Monro, that 'It is not time, or number of yeares that makes a brave soldier, but the continual meditation of exercise and practice.'[25] He was never tired of insisting on the importance of theoretical knowledge, of the study of the campaigns of the great commanders, and above all of mathematics.[26] His own military contacts were mainly with the Netherlands school, and its influence may have been strengthened by his discussions with John of Nassau-Siegen at Heidelberg in 1620.[27] But he was not on that account blind to the weaknesses of Maurice's methods, and he seems to have studied the theorists who were concentrating upon improving and modernizing the *tercio*: at all events, the Swedish brigade, as he eventually developed it, shows traces of the influence of that three-*tercio* battle-group which was characteristic of later Spanish practice under Tilly. And it is clear that he was never a blind imitator of Netherlands tactics—for which, indeed, the Swedish army was at first unfitted by the imperfect state of its armaments, the nature of the attacks it had to meet, and the kind of country it was condemned to fight in. Gustavus Adolphus' formal tactics are from the beginning a matter of free adaptation and variation, and this refusal to allow himself to set hard in a mould fashioned for other needs and in other lands is not the least of his merits as a soldier.

The foundations of Gustavus' victories in Germany were laid by his work in the field of military organization and administration. He started with some advantages, which were denied to Maurice, and indeed to all other military reformers of his day. First, and most important, the Swedish army was a national army: not national as the *tercios* were national (for they were mostly manned by native Spanish volunteers serving in the army as a career), but national in that military service was an almost universal obligation upon male Swedes between the ages of sixteen and sixty. This system of conscription (*utskrivning*) dated from 1544: Gustavus overhauled it, reformed it, and by 1830 had established upon a permanent basis the first national standing army of conscripts in Europe.[28] Contemporary military writers, on the whole, were not in favour of militias and conscripts, until Breitenfeld modified their ideas;[29] but there is no doubt that (apart from all questions of superior morale)[30] the Swedish system had real administrative advantages. It did much to ease the difficulty of paying the troops (which so often hamstrung Continental generals), for Gustavus was able to pay his native levies in kind, in revenue-assignments, or by allotting farms to

their support.[31] And since the relationship between the general and his army was not a contractual one, but rather that of sovereign to subject, the more intractable problems of discipline were also avoided. Moreover, the king was in a position to impose some degree of uniformity and standardization in the matter of armaments, as Maurice or Henry IV were not; and he was also able to determine, on purely military grounds, the proportion which (for instance) muskets were to bear to pikes. This was an important consideration, for the commander of a mercenary army was compelled, to some extent, to acquiesce in the arms and equipment which his men were prepared to bear; and this meant, in practice, that too often there would be an undue preponderance of musketeers. Again, Gustavus was not obstructed by the antique pretensions of half-dead feudal dignitaries: no Constable, Admiral or Marshal impeded logical administrative reform; for Sweden had never been a feudal country.[32] He could rely too (at least after 1630) on a native armaments industry capable of supplying most of his needs at relatively inconsiderable cost.[33] And he was able, from about the same period, to divide military finance from the ordinary budget so effectively,[34] that the burden of participation in the German war was much less onerous than in any other belligerent country.

These advantages do something towards explaining the remarkable administrative reforms carried through between 1617 and 1630: the recruiting system revised and tightened; a code of discipline promulgated which, if it had many identifiable ancestors, was none the less better than any of them, and was of lasting importance abroad, not least in Brandenburg-Prussia;[35] increasing standardization of arms and equipment; organization of the pay and supply services; and finally the emergence about 1630 of a War Office (*Krigsrätt*) which was not merely a council of state, but a true centre of administration using highly efficient business methods.[36] Meanwhile, throughout the 'twenties, there had been constant experiments designed to find the best administrative and tactical units; until at last, in 1624, the two aspects coalesced in the regiment of two squadrons or eight companies.[37] The identification of the tactical with the administrative unit, which Maurice had failed to secure, was thus for the first time achieved upon a permanent basis by Gustavus Adolphus: there is no need to insist on the importance of the reform. Lastly, the king proved himself fully the equal of Maurice as a drillmaster and trainer of troops.[38] It is difficult to resist the impression that Gustavus, if he had failed to achieve fame in other fields, might without difficulty have stolen the reputation of those possibly overrated military reformers, Le Tellier and Louvois.

The infantry squadrons of the armies of Gustavus were small units—rather smaller than the Dutch battalion;[39] and they differed from the battalion also in their constitution. For they included a *higher* proportion of pikes to muskets—and not a lower, as is so often stated—than was the rule in Maurice's units.[40] The formation was also shallower than Maurice's: pikes and shot were alike only six deep, for the king held that in deeper formations the rear ranks would not hear the word of command—a consideration which, significantly enough, had not weighed with the Spanish school. The army was drawn up, as the Dutch armies were, in two distinct lines, each line having its own reserve; and cavalry was placed on the wings. Officers and N.C.O.'s were even more numerous than in the Dutch armies, and it is plain that they were trained to use their initiative. The diminished depth of

all formations might have been expected, perhaps, to lead to a reduction of firepower; for it took so long to let off a musket that a steady fire could hardly be maintained by a countermarch of less than ten ranks. But in fact the change had the opposite effect. Gustavus did not aim at a steady fire: he aimed at missile shock. At first the Swedish musketeers practised a form of the countermarch, in which two ranks fired simultaneously, instead of only one at a time;[41] but by the time of Breitenfeld, the king was using the salvo, a technique of which he was the inventor and first exponent. For the salvo, the musketeers doubled their ranks, so that they were but three deep; and thus (to quote Sir James Turner):

> . . . you pour as much lead in your enemies bosom at one time as you do the other way at two severall times, and thereby you do them more mischief, you quail, daunt, and astonish them three times more, for one long and continuated crack of thunder is more terrible and dreadful to mortals than ten interrupted and several ones.[42]

But if the salvo thus provided a concentration and severity of fire such as small arms had never before achieved, it entailed as a consequence the accentuation and prolongation of that critical period in which the musketeer, having discharged his piece, became both innocuous and defenceless until the tedious operation of reloading had been completed. At this moment he needed strong protection, and only pikes could give it to him. Gustavus' insistence on the value of pikemen, and the increased proportion of pikemen in his infantry units, were therefore necessary corollaries of the steadily intensifying fire-discipline which was to culminate in the salvo. But they were much more than that. The pikes were not envisaged by Gustavus (as they seem to have been by Maurice) mainly as a passive force, offering protection to muskets behind which they might take cover while reloading. On the contrary, Gustavus made his pikes charge the enemy. After the salvo had shattered his ranks, the pikes pushed into the ruins and increased the disorder; and when they retired, the musketeers were ready with the next salvo. Thus he devised for his infantry a method of delivering blows alternately at a distance and in close action, of attack by alternating charge and discharge; he rehabilitated the pike as a battle-winning weapon; he transformed the whole nature of infantry-fighting from something essentially defensive to something essentially aggressive; and he solved the problem which had baffled all his predecessors, of how to combine shot and pike without sacrificing the essential military characteristics of each.

Before the Polish war had come to an end, experience had convinced Gustavus Adolphus of the need for a higher tactical unit than the infantry squadron; and in the course of the battles at Dirschau on 7 and 8 August 1627, the first attempt was made to provide such a unit. The foot was ranged in battle-groups of three squadrons; and from this innovation there developed in the following years the celebrated Swedish brigade, of four squadrons (or two field-regiments), which was to be the king's normal order of battle in Germany.[43] The new brigade-tactics, which by 1630 had been perfected and standardized, resemble in some respects the grouping of three or four *tercios* under the later Spanish system. There is the same wedge-shaped or arrow-head formation, with the fourth squadron initially held in reserve. On the other hand the brigade could also be viewed as a simplification of the more formalized and extensive arrow-heads of the orders of battle of the king's middle period.[44] The brigade, in fact,

represents a blending of elements of both the Spanish and the Dutch schools. With its nine or twelve light guns, its musketeers carefully disposed for an advantageous field of fire, its very numerous officers and N.C.O.'s, its precise subdivisions and articulations, it was equally effective in attack and defence. It could move as a unit; but its constituent parts were capable of acting on their own. Its numerical strength (fifteen hundred to two thousand, according to whether it comprised three or four squadrons) made it numerically fully the equal of the *tercio*; while in flexibility and mobility it was if anything superior to the Dutch battalion-group. In firepower it was greatly superior to either.

It was not so easy to find a satisfactory solution for the cavalry. Gustavus did indeed deal radically with current perversions: the depth of formations was reduced to six ranks, and at Lutzen to three;[45] the caracole was abandoned, at least by native Swedish horse; cavalry advanced at the trot, the front rank (and the front rank only) discharging one pistol at suitable range; and the attack was made with the sword. But the firing of one cavalry pistol was more a concession to ingrained habit than an effective preliminary to the *mêlée*: the horseman, no less than the pikeman, needed a salvo, or something like it, to open a lane in the enemy's ranks, if his attack were to make its full effect. Gustavus tried to provide this missile aid by attaching platoons of musketeers to cavalry units, to act in close concert with them. Monro tells us how it was done:

> the Horsemen on both wings charged furiously one another, our Horsemen with a resolution, abiding unloosing a Pistoll, till the enemy had discharged first, and then at a neere distance our Musketiers meeting them with a *Salve*; then our horsemen discharged their Pistolls, and then charged through them with swords; and at their return the Musketiers were ready again to give the second *Salve* of Musket amongst them.[46]

It was the same system as that devised for the foot; and at Breitenfeld it was sufficiently effective to confound even Pappenheim. But inevitably it suffered from the differing pace of man and horse. The musketeer, heavily laden with musket, pouch, and fork, had no chance of keeping up with a cavalry horse at the trot; and it was therefore necessary for cavalry to advance, until the last fifty yards or so, at a pace which cannot have been much better than a walk. Thus in order to be sure of adequate firepower, Gustavus was constrained to make heavy sacrifices of speed and shock. And even at the sober pace at which his horsemen proceeded the musketeers would have had difficulty in keeping up, if Gustavus had not helped them by reducing the weight of their weapon. We do not know just how, or how much, he lightened it; but we do know that he did *not* lighten it sufficiently to allow the musketeer to dispense with the fork (although historians very generally have asserted the contrary): the fork continued to be used by Swedish musketeers as late as the reign of Charles X.[47]

As to cavalry, then, it may be said that the king's attempt to develop a combination of shock and firepower entailed disadvantages which partly offset his liberation of the horsemen from the enchantments of the caracole.[48] His solution was an imperfect solution: the dilemma—speed or firepower—remained unresolved, and perhaps remains so still; but it was at all events a solution better than that which it superseded.

The last element in Gustavus' new tactics was provided by a reformed artillery.[49] The king devoted much personal attention to this branch of the service, and was himself a skilled gunner.[50] As a result of his interest,

what had been a semi-civilian craft or mystery was placed upon a regular basis: the first independent artillery unit dates from 1621; the first artillery regiment from 1629.[51] On the technical side, the process of simplification and standardization of calibres and types, begun long ago by Maximilian I and Henry II, was now carried a stage further. But his main achievements in this field were, first, to have produced a really mobile field artillery; and, secondly, to have introduced the light gun as a standard regimental weapon. Until his time, artillery had been virtually static in battle—as Tilly's was at Breitenfeld, for instance—and its tactical importance had been very limited. Gustavus contrived to make his guns mobile: at Lützen, for instance, they were shifted more than once in the course of the battle; and thirteen years later it was the astonishing mobility of the Swedish artillery that played the major part in winning Torstensson's great victory at Jankow.[52] And it was the king's search for a satisfactory combination of mobility and firepower that produced, after numerous experiments (of which the too-famous, but quite ephemeral 'leather gun' was the best remembered) the so-called 'regiment-piece' of 1629. The regiment-piece was a three-pounder which (thanks to an improved gun-carriage) could be manhandled; it was designed for anti-personnel service at relatively short ranges, and was therefore usually charged with canister or grape; and it was relatively quick-firing, since its ammunition was provided with an attached cartridge.[53] It was designed expressly for collaboration with infantry and cavalry, and played a part similar to that played by 'commanded' musketeers in the foot: like them, the light guns could be sent anywhere, and used on all occasions.[54] It was produced, after 1629, as a high-priority weapon; and with such success that by the time of Breitenfeld every infantry squadron had two or three of these guns attached to it. It served much the same purpose as was served in recent times by the Lewis and Bren guns; and its effect, combined with the new fire-tactic of the salvo, was to make deep formations impossible for many years to come. The doom of the *tercio* was announced at Breitenfeld; it was accomplished—by Swedish tactics—at Rocroi.[55]

The combined effect of these administrative changes and tactical reforms was to provide Sweden by 1630 with an army far better equipped than any other of that age in the matter of firepower and shock; while at the same time the flexibility and elasticity of the battle-formations, the high degree of training and initiative in officers and men, and the effective combination of arms in defence as well as in attack, enabled its shallow formations to sustain and repel an onslaught by forces fighting in the old style, even though they might be considerably superior in numbers. But it took a full decade of constant effort before this stage was reached; and until it had been reached the king could make few important innovations in his conduct of operations. During the early 'twenties he was compelled to concentrate on the defensive aspect, for the weakness of his cavalry (particularly when matched against the Poles) made it impossible to take risks. The battle-plans of this period, therefore, are on the Dutch model; indeed, they are more formalized, more complex, more geometrical, less capable of rapid modification even than their exemplars, and resemble nothing so much as the fanciful structures built from a child's box of bricks.[56] After the victories at Wallhof and Mewe (1626), which had demonstrated the ability of the Swedish infantry to hold its own against the best cavalry in Europe, they became less rigid, though still mainly defensive; but with the victories at Dirschau (1627)—which

proved the new Swedish horse to be equal to any that Poland could put in the field—defensive formations were gradually abandoned, and the typical Gustavian battle-line made its appearance. By 1630 the instrument was tempered for the hand of the master; and at Breitenfeld it responded to every call that he made upon it. At the climax of that battle, Horn, on his own initiative, and without delay or confusion, formed a new front to the flank exposed by the flight of the Saxons, called reserves to his assistance, and by prompt attaek with all arms, defeated an enemy perhaps five times as numerous as himself; while on the other wing the Swedish cavalry—which at Burgstall and Werben had already proved its superiority to any caracoling enemy—was equally successful against Pappenheim, whose cavalry tactics were strongly influenced by Koniecpolski and the Polish school.[57]

Breitenfeld marked an epoch; but contemporaries were almost more startled by the audacity of the assaults at the Lech and the Alte Feste: no other commander of that age would have taken such risks. And it is significant that the attack on the Alte Feste failed mainly because the terrain did not permit regiment-pieces to be manhandled, and because it was unfavourable to pikes, so that two essential ingredients in the Swedish tactic were not able to make their full effect.[58] So too at Lützen—which showed, incidentally, that Wallenstein was beginning to use Swedish methods—it was the shortage of pikes (and the famous November mists) which were responsible for the failure of the Swedes to clinch their tactical advantage, though it could not prevent them from winning a strategic victory.[59]

These tactical developments are reflected, at all events after Breitenfeld, in Gustavus' strategy. After Breitenfeld, he does not merely seek battle on every favourable occasion; he sees a decision by battle as the logical and consciously-designed end to the strategic perspective, and hence as a prime factor influencing the choice of means. In this last phase of his career his strategy was indeed (*pace* Clausewitz[60]), designed to be *Vernichtungsstrategie*. Now this was something wholly alien to the spirit of Maurice, on the one hand, and Spinola, on the other. Yet at the same time it is clear that Gustavus was equally an exponent of *Ermattungsstrategie:* the great Swedish concentration at Nuremberg in 1632 was primarily designed, not so much as a grouping for battle, but rather as an attempt to isolate the Imperialists from their sources of supply.[61] Gustavus, indeed, was capable both of the strategic vivacity of Banér, and the strategic canniness of Wallenstein. But his historical importance as a strategist rests on other grounds than these. It rests upon his methodical consolidation of one base-area after another, adding one to one until the whole built up to a vast strategic design; and upon a strategic vision which for magnitude and complexity has no parallel in European warfare before the age of Napoleon and mass-armies.[62]

The original Swedish base in Germany was a narrow strip of Pomeranian coast between the Oder and the Peene. Gradually it was expanded; until by the time Gustavus established his camp at Werben, a year after the landing, it had been extended to cover an area bounded by the Oder, the Spree, the Havel, and the Elbe. The victory at Breitenfeld brought a sudden leap forward to the Main and the Rhine; but Gustavus took care that the new base-area in Franconia and the Rhineland was solidly integrated with the old: with Banér in Magdeburg, Horn around Bamberg, and William of Weimar in the great bastion at Erfurt, the Thuringian bottleneck was firmly

secured. In the spring of 1632 came an extension of the new Rhenish-Franconian base down the Rhine towards Coblenz, and up the Rhine and the Neckar towards Heidelberg and Baden; and in the summer Gustavus undertook the creation of his last main base-area in the triangle between the Lech, the Alps, and the Danube: it was from this base that the final attack on Vienna was to be launched in 1633. Throughout the whole process of expansion, there was systematic exploitation of riverlines, and a systematic establishment of strong-points and magazines (usually protected by extensive new fortifications of the most modern type) at the critical points within the areas under Swedish control: Frankfurt-on-Oder, Crossen, Spandau, Havelburg, Rathenow, Erfurt, Würzburg, Nuremberg, Augsburg, Ulm, and above all Mainz, which he transformed into a stronghold of the first order.[63] Each successive base-area was organized as an independent defensible unit; and each formed an element in a broad strategic design covering the whole of Germany. Using the Saxon bastion and the Silesian armies as a pivot, Gustavus was making a vast right-handed sweep designed to sever the Imperialists from their sources of supply and reinforcement. The advance to the Elbe isolated their forces in Mecklenburg, menaced Christian IV in rear if he should be tempted to meddle, and began the cutting-off of the Imperialist strongholds in the Lower Saxon Circle. The advance to the Rhine completed (in intention, though not, unhappily, in fact) the isolation of the Lower Saxon Circle. The Rhenish campaigns, the invasion of Alsace, the French operations against Lorraine, and the occupation of Ehrenbreitstein—these blocked the way to any help from Brussels, Nancy, or the Hapsburg lands in Alsace. The final base in Suabia would prevent any assistance coming over the Alps from Italy or Spain. The whole plan—which had taken shape in the king's mind already by the close of 1630—was conceived as one huge operation, in which seven armies acted in co-ordination on a sickle-shaped front extending from the Vistula to the Brenner, from Glogau to Lake Constance.

It was, no doubt, territorial strategy, and on a majestic scale; but it could hardly be otherwise in the conditions of the Thirty Years' War. *Bellum se ipsum alet* was a principle to which both sides perforce subscribed; and almost the first of military objectives must be to fix the *sedes belli* in hostile territory.[64] As the area of conquest expanded, the drain of troops for garrisons increased; fresh recruits had therefore to be found, for armies of unprecedented dimensions; and hence more territory must be occupied to serve as recruiting-ground, or at least to deny its manpower-resources to the enemy. Moreover, an adversary starved of recruits and supplies might well be driven by desperation to fight a battle, as Tilly is said to have been driven to invade Saxony in September 1631.[65] Thus a territorial strategy of this sort was complementary, rather than antagonistic, to a strategy of annihilation.

In the event, the design of Gustavus was only partially successful. In part this was because his grip on the Lower Saxon Circle, and on Suabia, had not been made really secure by the time of his death; but perhaps also because the still primitive logistics of that age made a prolonged and effective military occupation of so great an expanse of country almost impossible to maintain. Had Gustavus survived the battle of Lützen, had he pacified the Lower Saxon Circle (as, on the eve of Lützen, he had made up his mind to do), had he made good his foothold on the Alps, it is probably still true to say that the campaign of 1633 would have needed to be short

and sharp, and the victory decisive, if the vast military-administrative structure were not to crack under its own weight.

What Gustavus at the height of his power had failed to make good, his successors never came near to accomplishing. Banér as a tactician was the equal of Gustavus, and perhaps his superior; Wittstock is one of the classic victories, to be compared with Cannae or The Wilderness;[66] but the later stages of the Thirty Years' War were not propitious to large-scale strategic designs. The exhaustion of Germany cut down the size of armies, and made a methodical and systematic conduct of operations almost impossible. Campaigns became forays, battles became encounters void of strategic significance; and of Gustavus' strategic innovations little or nothing was transmitted to his immediate posterity.

It was otherwise in regard to tactics. Here the king left a great school of commanders behind him: Banér and Torstensson, Bernard of Weimar and Horn, 'those brave Heroicks',[67] were his immediate pupils, trained by him for command; and at one remove came Charles X and Rupert, and the great names of Montecuccoli and Turenne, both of whom were thoroughly permeated with his spirit. These men realized that Gustavus' career had settled the question which Maurice's reforms had left still discutable: linear tactics were now acknowledged to be more effective than the old Spanish system; and no voice was raised henceforward to query that verdict, until the practice of Charles XII, and the theories of Folard, revived the doctrine of mass impact, and inaugurated a debate between line and column which outlasted the eighteenth century.[68] Meanwhile, the Swedish discipline became the model for the training of troops; and the Swedish organization of firepower was generally adopted.[69] A light regimental artillery became universal;[70] and the mobility of the Swedish field-artillery set the standard until the improvements of Frederick the Great and Gribeauval. As for cavalry, the caracole was dead, as Wallenstein had recognized as early as the Alte Feste.[71]

But certain other innovations did not make good their footing. Despite some spirited examples from the Civil Wars, the practice of Gustavus entirely failed to arrest the decline of the pike. The mercenaries of the latter years of the Thirty Years' War disliked this cumbrous weapon, and the body-armour that often went with it; and the enormous marches of Piccolomini or Banér reinforced their objections. Pikemen grew more difficult to come by; and they were also more expensive than shot, since they drew higher pay. Hence the dwindling armies of Gallas or Guébriant tended increasingly to consist mainly of cavalry and musketeers. Gustavus's careful combination of firepower and shock became rarer; the offensive role of infantry became more difficult to sustain; battles came more and more to be decided by actions between opposing cavalry wings (as so often in the Civil Wars, or in Marlborough's campaigns), while the mass of the foot volleyed away at murderously short range, in a style reminiscent of close action at sea, and strove to stand fast as a sort of pivot of manoeuvre for the mounted arm.[72] The elasticity and dynamism of the Gustavian battle-line was lost, and linear tactics became once more rigid and unimaginative. The age of pipeclay was not far ahead. It was not until Vauban perfected the bayonet, in the last years of the century, that infantry was provided with a better means to effect what Gustavus had intended by his combination of pike and musket.

Yet though in some respects the work of the great king bore little fruit

after his death, it was none the less a major military revolution. Fifty years ago, a British tactical theorist wrote: 'The general who first masters the art of bringing the action of each arm into close co-operation, will initiate a new era in the art of War'.[73] Within the limits of contemporary possibility, Gustavus mastered that art; and the new era was not slow to follow.

1 Even this seems doubtful, in view of the astonishing prowess of the longbow.
2 For an estimate of this development in numerical terms, see Otton Laskowski, 'Infantry Tactics and Firing Power in XVI Century', *Teki Historyczne* (London), iv. (1950), 106-115. Elsewhere Laskowski calculates that the firepower of Casimir Jagiellon's infantry (armed with the cross-bow), compared with that of Polish infantry of the mid-sixteenth century (armed with firearms) was as forty to one. Otton Laskowski, 'Uwagi na marginesie nowego wydania Zarysu Historii Wojskowośce w Polsce Generala Mariana Kukiela', *Teki Historyczne*, v. (1951-2), 36.
3 Muskets were used on both sides at Pavia: Hans Delbrück, *Geschichte der Kriegskunst im Rahmen der politischen Geschichte*, (Berlin, 1920), iv. 110.
4 J. Alm, *Eldhandvapen*, (Stockholm, 1933), i. 53, 80: Max Jähns, *Handbuch einer Geschichte des Kriegswesens von der Urzeit bis zur Renaissance*, (Leipzig, 1880), p. 1203, gives the date as 1515.
5 Perhaps as little as five paces: Tavannes wrote 'il faut que le bout [of the pistol] touche': J. W. Wijn, *Het Krijgswezen in den Tijd van Prins Maurits*, (Utrecht, 1934), p. 164. Werner Hahlweg seems to be alone in the view that the range of the pistol was 50-80 paces: Werner Hahlweg, *Die Heeresreform der Oranier und die Antike*, (Berlin, 1941), p. 101, *note* 220.
6 Deep order for cavalry is first noted at St. Quentin: Wijn, *op. cit.*, p. 439; the caracole, at Dreux (1562), though the claim has also been made for Sievershausen (1553): Delbrück, iv. 148; Alm, i. 119. The caracole is well described in Generalstaben, *Sveriges Krig* 1611-1632, (Stockholm, 1938), supplementary vol. ii. 149-51; but authorities are divided as to the true nature of the evolution: contrast Sir James Turner, *Pallas Armata*, (1683), p. 231; O.S.F. Odenrick, *Lantkrigskonstens utveckling, sedd mot bakgrunden av den allmänna teknikens framåtskridande*, (Stockholm, 1933), ii. 49; Wijn, pp. 442-3; and especially E. von Frauenholz, *Das Söldnertum in der Zeit des dreissig jährigen Krieges*, (Munich, 1938), i. 60. M. Jähns (*op. cit.*, p. 1216) offers a solution which covers both views.
7 And possibly in the native French cavalry of Henry of Navarre: General Weygand, *Histoire de l'Armée française* (Paris, 1938), p. 123; Sir Charles Oman, *A History of the Art of War in the Sixteenth Century*, (1937), pp. 466-7. For the Polish cavalry, see Marjan Kukiel, *Zarys historji wojskowości w Polsce* (London, 1949), p. 54; and (for a good example at the battle of Klusino in 1610), T. Korzon, *Dzieje wojen i wojskowości w Polsce*, (Kraköw, 1912), ii. 164 ff.
8 For the *tercio*, see Oman, *op. cit.*, pp. 58-61; R. Altamira y Crevea, *Historia de España y de la Civilización española*, (Barcelona, 1927), iii. 292-5; Sancho de Londoño, *Discurso sobre la forma de reducir la Disciplina militar a mejor y antiguo estado*, new edn. (Madrid, 1943), p. 34; Wijn, pp. 424-6; G. B. C:sson Barkman, *Gustaf II Adolfs regementsorganisation vid det inhemska infanteriet*, (Meddelanden fran Generalstabens krigshistoriska avdelning, i), (Stockholm, 1931), pp. 4-6, 21-4 (with good diagram).
9 Hahlweg (*op. cit.*, pp. 73-4) is mistaken in stating that the countermarch was first used by Maurice of Orange.
10 H. Wertheim, *Der tolle Halberstädter. Herzog Christian von Braunschweig im pfälzischen Kriege*, (Berlin, 1929), i. 116.
11 See, for instance, Verdugo's formation of 1590: Wijn, pp. 427, 432-3; Barkman, *op. cit.*, pp. 51-2.
12 Turner, *Pallas Armata*, p. 178.
13 A good discussion in A. R. Hall, *Ballistics in the Seventeenth Century*, (Cambridge, 1952), *passim*.
14 'Nowadays,' wrote Henri de Rohan, 'one fights more like a fox than like a lion, and war consists far more in sieges than in battles': quoted in E. von Frauenholz, *Das Söldnertum* . . . , i. 49.
15 Contemporary military theorists, with the possible exception of Lazarus von Schwendi, give no consideration to questions of strategy.
16 For Maurice's reforms, see Hahlweg, *op. cit.*; Barkman, *op. cit.*, pp. 33-8; G. Oestreich, 'Der römische Stoizismus und die oranische Heeresreform', *Historische Zeitschr.*, 176 (1953); and above all J. W. Wijn, *Het Krijgswezen in den Tijd van Prins Maurits*.
17 As a contemporary observed, 'Si discute alla romana, ma si continua combattere alla tedesca': Piero Pieri, 'La formazione dottrinale di Raimondo Montecuccoli.' *Révue internationale d'histoire militaire*, 10 (1951), p. 93.

18 Erik's achievement may be collected from Generalstabens krigshistoriska avdelning, *Axtorna. En studie i organisation och taktik*, (Meddelanden från Kungl. Krigsarkivet utg. av Generalstabens krigshist. avd., iv.), (Stockholm, 1926); Generalstaben, *Sveriges Krig* 1611-1632, i; G. B. Casson Barkman, *Svea livgardets historia*, (Stockholm, 1938-9), ii; Ingvar Andersson, *Erik XIV: ett biografi*, (Stockholm, 1948).
19 Barkman, *Gustaf II Adolfs regementsorganisation*, p. 9.
20 Hahlweg, *op. cit.*, pp. 25-93, 103, 110-6; Wijn, *op. cit.*, pp. 74, 138-40, 430.
21 Barkman, *Regementsorganisation*, p. 38: contrast Wijn, p. 437; and Frauenholz, *Söldnertum*, i. 46.
22 Wijn, p. 45; and see *ibid.*, pp. 42-7, 452-3, 514.
23 Delbrück, iv. 199.
24 Barkman, *Regementsorganisation*, p. 69. For Gustavus Adolphus' military education in general, see *ibid.*, pp. 69-73; Generalstaben, *Karl XII på slagfältet. Karolinsk slagledning sedd mot bakgrunden av taktikens utveckling från äldsta tider*, (Stockholm, 1918), i. 75; E. Wrangel, *De Betrekkingen tusschen Zweden en die Nederlanden op het Gebied van Letteren en Wetenschap*, (Leiden, 1901), p. 56. An illuminating study of the general history of military education in Sweden is W. Sjöstrand, *Grunddragen av den militära undervisningens uppkomst- och utvecklingshistoria i Sverige till år* 1792, (Uppsala, 1941).
25 Monro, ii. 175, 196; and *cf.* Sjöstrand, *op. cit.*, pp. 16-8, 78-80.
26 See his essay, 'Om krigsmans plikter', in C. G. Styffe, *Konung Gustaf II Adolfs skrifter*, (Stockholm, 1861), pp. 62 ff.
27 Barkman, *Regementsorganisation*, pp. 92-3.
28 Styffe, *Konung Gustaf II Adolfs skrifter*, pp. 6-25; *Sveriges Krig*, ii. 133-4.
29 Contemporary attempts at national militia forces, and their failure, are dealt with in E. von Frauenholz, *Lazarus von Schwendi. Der erste deutscher Verkünder der allgemeinen Wehrpflicht*, (Hamburg, 1939), pp. 16-21; *id.*, *Die Landesdefension in der Zeit des dreissigjährigen Krieges*, (Munich, 1939), *passim*; H. Wertheim, *Der toller Halberstädter*, i. 67-75; M. Lenz, *Landgraf Moritz von Hessen*, in *Kleine historische Schriften*, (Munich and Berlin, 1920), ii. 128-31; K. C. Rockstroh, *Udviklingen af den nationale haer i Danmark i det* 17. *og* 18. *Aarhundrede*, (Copenhagen, 1909), i. 4-38, 65.
30 For Gustavus' belief in the superior morale of national troops, see Styffe, pp. 4-6; *Peder Galts Depescher*, ed. Nils Ahnlund, (Historiska Handlingar, 26:1), (Stockholm, 1920), p. 22; *Rikskansleren Axel Oxenstiernas skrifter och brefvexling*, (Stockholm, 1896), I. ii. 594 *n.*
31 R. M. Klinckowström and J. Mankell, *Arkiv till upplysning om svenska krigens och krigsinrättningarnes historia*, 1630-1632, (Stockholm, 1861), iii. lx-lxv, 248-254. Whitelocke gives the following description of these methods: 'The manner of maintaining their militia forces in the country was said to be this: A horseman was quartered in the house of a boor, or husbandman; if the man will work himself and his horse with the boor, to help him in his husbandry, then the boor gives the man and his horse entertainment freely, and hath their work for it, which is more worth than their meat, and the boor will give the man perhaps some small sum of money besides. . . . In like manner it is for the foot-soldier.' B. Whitelocke, *A Journal of the Swedish Embassy in the Years* 1653 *and* 1654, ed. Henry Reeve, (1855), ii. 136-7.
32 The offices of Admiral and Marshal existed, but no prescriptive rights attached to them. The office of Constable finally lapsed in France in 1627; but Le Tellier and Louvois had difficulties with other military antiquities as late as the 'sixties and 'seventies: L. André, *Michel Le Tellier et Louvois*, pp. 317-21.
33 For this see, in general, *Sveriges Krig*, supplementary vol. ii; E. W. Dahlgren, *Louis de Geer, 1587-1652. Hans lif och verk*, (Uppsala 1923,), i-ii; E. F. Heckcher, *Sveriges ekonomiska historia från Gustav Vasa*, (Stockholm, 1936), i; and, for a useful summary of sources of supply, L. Hammarskiöld, 'Ur svenska artilleriets hävder', *Artilleri-Tidskrift*, 1941-4, p. 154. (Hammarskiöld's articles appeared as successive supplements to *Artilleri-Tidskrift*, with independent and consecutive pagination).
34 *Arkiv till upplysning om svenska krigens . . . historia*, i. 147, 305-13.
35 Text in J. Schmedeman, *Kungl. Stadgar, Förordningar, Bref och Resolutioner*, (Stockholm, 1706), i. 15 ff.; English version in *The Swedish Discipline*, (1632), i. 39 ff.; Gustavus' own draft in Styffe, pp. 243 ff. For their provenance, peculiarities, and influence, see A. Gierow, *Bidrag till det svenska militärkyrkoväsendets historia*, (Uppsala, 1918), i. 21-79; O. Brusiin, 'Gustav II Adolfs krigsartiklar,' *Tidskrift utgiven av Juridiska Föreningen i Finland*, 79 (1943), 373-93; K. Grönfors, '*Ur det svenska militära rättegångsväsendets historia*,' *Rättshistoriska studier*, II Series, i. 208-43; Wijn, p. 104; Frauenholz, *Söldnertum*, i. 5-6, 23-7.

[36] B. Steckzén, *Krigskollegii historia*, (Stockholm, 1930), i. 1-51; M. Roberts, *Gustavus Adolphus. A History of Sweden, 1611-1632*, (1953), i. 276-7.

[37] Barkman, *Regementsorganisation, passim.*

[38] See, for instance, *Monro his Expedition with the Worthy Scots Regiment* (1637), ii. 141, 187, 190-1; Styffe, pp. 62 ff.; *Peder Galts Depescher*, p. 3; *Sveriges Krig*, ii. 324, 415; iv. 450; supplementary vol. ii 99.

[39] Dutch battalion: 250 pikes, 240 shot—490; 60 shot in forlorn—550. Swedish squadron: 216 pikes, 192 shot—408; 96 commanded musketeers—506.

[40] *cf.* the wholly erroneous comment of so recent a historian as Laskowski: 'Uwagi', p. 51. *A priori* one would expect that the thinner formations of linear tactics would require an increased proportion of pikes if they were to have adequate defensive solidity; and Maurice, like Gustavus, did in fact raise the proportion: Wijn, pp. 173-80.

[41] Monro, ii. 190.

[42] Turner, *Pallas Armata*, p. 237. *The Swedish Intelligencer*, i. 124, thus describes the manoeuvre on what seems to have been its first appearance at Breitenfeld: 'The Scots presently ordering themselves in seuerall small battagliaes, about 6 or 700 in a body, presently now double their rankes, making their files then but 3 deepe. . . This done, the formost ranke falling on their knees; the second stooping forward; and the third ranke standing right vp, and all giuing fire together; they powred so much lead at one instant in amongst the enemies horse, that their ranckes were much broken by it.' For a numerical comparison of firepower as developed by Swedish, Dutch and Spanish methods, see Barkman, *Regementsorganisation*, p. 98.

[43] Lack of manpower, however, frequently necessitated the formation of brigades of only three squadrons.

[44] For this, see *infra*, p. 78.

[45] *Sveriges Krig*, vi. 433.

[46] Monro, ii. 65.

[47] Alm, *Eldhandvapen*, i. 174-5; Barkman, *Regementsorganisation*, p. 14, *note* 6. The mistake may have arisen as a result of Gustavus' abandonment, after 1629, of the 'swine-feather'; for the swine-feather (which was a partisan with a sharpened butt, enabling it to be fixed into a timber balk, or driven into the ground, and so serve as defence against cavalry), had a hook at its forward end which could be used to support a musket: J. Alm, *Blanka vapen och skyddsvapen*, (Stockholm, 1932), pp. 136, 142. Yet if the musket still needed the fork, how did those ranks discharge it who, when a salvo was fired, were either kneeling or stooping? It may be convenient here to list some hardy other errors. Gustavus did not introduce the cartridge for muskets; nor was he the first commander to put troops into uniform (it is a matter of doubt how far his troops were uniformed); nor did he reduce the length of the pike; nor were his light guns invented by Sandy Hamilton. For a representative florilegium of such errors, see Le Menuet de la Jugannière, *Une révolution dans la tactique au XVIIe siècle*, (Le Havre, 1914), pp. 83-90.

[48] *Cf.* the comments of Laskowski ('Uwagi', p. 48): 'it was but a timid compromise between fire-tactics and the tactics of the cavalry charge'; and of Kukiel (*Zarys historji wojskowości w Polsce*, p. 65): 'This was not yet Polish tactics, but it was a step forward under their influence.'

[49] For artillery see, in general, L. Hammarskiöld, 'Ur svenska artilleriets hävder'; and *Sveriges Krig*, supplementary vol. ii.

[50] Hammarskiöld, 'Ur svenska artilleriets hävder', p. 200.

[51] *Ibid.*, p. 142; *Sveriges Krig*, supplementary vol. ii. 295.

[52] For Jankow, see Försvarsstabens krigshistoriska avdelning, *Slaget vid Jankow 1645*, (Stockholm, 1945); or, more succinctly, in Lars Tingsten, *Fältmarskalkarna Johan Baner och Lennart Torstensson såsom härförare*, (Stockholm, 1932), pp. 267-79.

[53] For the 'leather gun' and the regiment-piece, Hammarskiöld, op. cit., pp. 33-4, 147-50; *id.*, 'Om svenskt artilleri i äldre tider', *Historisk Tidskrift*, II Series, iv. (1941), 45; *Sveriges Krig*, ii. 138-9; supplementary vol. ii. 180-3, 191-207, 235-41, 253, 270-2.

[54] On 21 July 1631, for instance, the king led a reconnaissance against Tilly's forces and took with him six light guns: before his time this would hardly have been possible. *Sveriges Krig*, iv. 396.

[55] It was manhandled light artillery of the Swedish type, in conjunction with cavalry, that mowed down the *tercios* at Rocroi: Weygand, *Histoire de l'Armée française*, p. 131; J. Colin and J. Reboul, *Histoire militaire et navale* (*Histoire de la nation française*, ed. G. Hanotaux, vii), (Paris, 1925), i. 316-7.

[56] Compare the orders of battle illustrated in Barkman, *op. cit.*, pp. 82-7, with that of Maurice, illustrated in Wijn, p. 478. For defensive tactics in Poland, G. Petri, *Kungl. första Livgrenadjärregementets historia* (Stockholm, 1926), ii. 105-7; C. Bennedich, *Ur det gamla Gardets öden*, (Stockholm, 1926), pp. 74-5; Barkman, 'Gustaf II Adolf såsom härorganisatör och fältherre', *Kungl. Krigsvetenskaps-Akademiens Handlingar och Tidskrift*, ix (1932), p. 25.

[57] The best accounts of Breitenfeld are now those in *Sveriges Krig*, iv. 487 ff.; *Det svenska svärdet*, ed. N. F. Holm, (Stockholm, 1948); pp. 58-81; and G. Petri, *op. cit.*, ii. 127-140. For the cavalry action at Burgstall, see *Dagbok förd i det svenska fältkansliet*, ed. E. Zeeh and N. Belfrage, (*Historiska Handlingar*, 30:3), (Stockholm, 1940), p. 21. For Koniecpolski's influence on Pappenheim, see Laskowski, 'Uwagi', p. 48.

[58] *Sveriges Krig*, vi. 213-5.

[59] K. Deuticke, *Die Schlacht bei Lützen, 1632*, (Giessen, 1917), can no longer be considered satisfactory: the best accounts are now *Sveriges Krig*, vi; Kungl. Liv-Rustkammaren, *Gustav II Adolf vid Lützen*, ed. R. Cederström, (Stockholm, 1944); G. Nordström, *Wallensteins stridsplan vid Lützen, in Krigshistoriska studier tillägnade Olof Ribbing*, (Stockholm, 1950); and Josef Seidler, *Untersuchungen über die Schlacht bei Lützen, 1632*, (Memmingen, 1954). Gustavus felt the lack of pikes as early as June, 1631: *Schriftstücke von Gustaf Adolf, zumeist an evangelische Fürsten Deutschlands*, ed. G. Droysen, (Stockholm, 1877), p. 134, which shows that it was not his rapid marches that took toll of pikemen, but rather that current military fashions were curtailing the supply of them.

[60] Clausewitz wrote: 'Ein kühner Invasions- und Schlachtfeldherr war Gustav Adolf überall nicht, . . . er liebte mehr den künstlichen manövrirenden, systematischen Krieg'; and again, 'Kurz war er ein gelehrter Feldherr voller vorsichtiger Kombinationen': C. von Clausewitz, 'Strategische Beleuchtung mehrerer Feldzüge' in *Hinterlassene Werke*, (Berlin, 1837), ix. 47, 29.

[61] *Sveriges Krig*, vi. 115-6.

[62] For what follows, Lars Tingsten, 'Några data angående Gustav II Adolfs basering och operationsplaner i Tyskland 1630-1632', *Historisk Tidskrift*, I Series, xlviii, 322-338; *Sveriges Krig*, v. 282-4, 314, 330-8, vi. 7, 16, 33-4, 179, 259.

[63] L. Fröhnhauser, *Gustav Adolf und die Schweden in Mainz und am Rhein*, (Darmstadt, 1894), pp. 149-62.

[64] Gustavus wrote to Oxenstierna in 1628: 'If we cannot say, *bellum se ipsum alet*, then I see no way out of what we have undertaken': Styffe, p. 520; and he told his council in May, 1630: 'the main thing is, that we should have *sedem belli sparsam per totam Germaniam*': *Svenska Riksrådets Protokoll*, ed. N. A. Kullberg, (Stockholm, 1878), ii. 8.

[65] A. Ernstberger, 'Wallensteins Heeressabotage und die Breitenfelder Schlacht', *Hist. Zeitschrift*, 142 (1930), *passim.*

[66] Good accounts of Wittstock in B. Steckzén, *Johan Banér*, (Stockholm, 1939), L. Tingsten, *Fältmarskalkarna Johan Banér och Lennart Torstensson såsom härförare*, pp. 63-75; *Det svenska svärdet*, pp. 106-27.

[67] Monro, ii. 180.

[68] The foot were only six deep, for instance, in the armies on both sides in the Civil Wars; Strafford's cavalry was four deep, most later cavalry three. But the French foot was still eight deep at the Dunes: C. H. Firth, *Cromwell's Army*, (1905), pp. 94-5; Turner, *Pallas Armata*, pp. 215, 234; Weygand, p. 153; Colin and Reboul, p. 411.

[69] Wallenstein used salvoes as early as the Alte Feste, with powerful effect: K. Spannagel, *Konrad von Burgsdorff*, (Berlin, 1907), quoting Burgsdorff's eye-witness account.

[70] Even in Britain: at Newburn fight, Leslie had 'some of his Swedish cannon' placed on the steeple of Newburn church; and a variety of 'leather gun' was also in use in the Scots army: C. S. Terry, *The Life and Campaigns of Alexander Leslie, first Earl of Leven* (1899), pp. 116, 121 *note* 1.

[71] *Sveriges Krig*, vi. 216. In the later years of the war the German cavalry in Swedish service seems to have fought shy of *l'arme blanche*, but they did not revive the caracole (Alm, *Eldhandvapen*, i. 215); and Rupert and Cromwell in England, Condé and Turenne in France, used cavalry as it would have been impossible to use it, if the horsemen of Gustavus had not killed the caracole for ever.

[72] Examples of this kind of battle were Breitenfeld II (1642) and Nördlingen II (1645). Breitenfeld I, indeed, has some claim to be the beginnings of this type of fight: the whole mass of the first line of Swedish foot took virtually no part in the action. But the struggle on the Swedish left, which saved the day, was no mere cavalry fight. On the general trend of tactics in the closing stages of the war, see P. Sörensson, 'Fältherrar, härorganisation och krigföring under trettioåriga krigets senare skede. En orientering.' *Scandia*, iii (1930), *passim.*

[73] G. F. R. Henderson, *The Science of War*, (1906), p. 114.