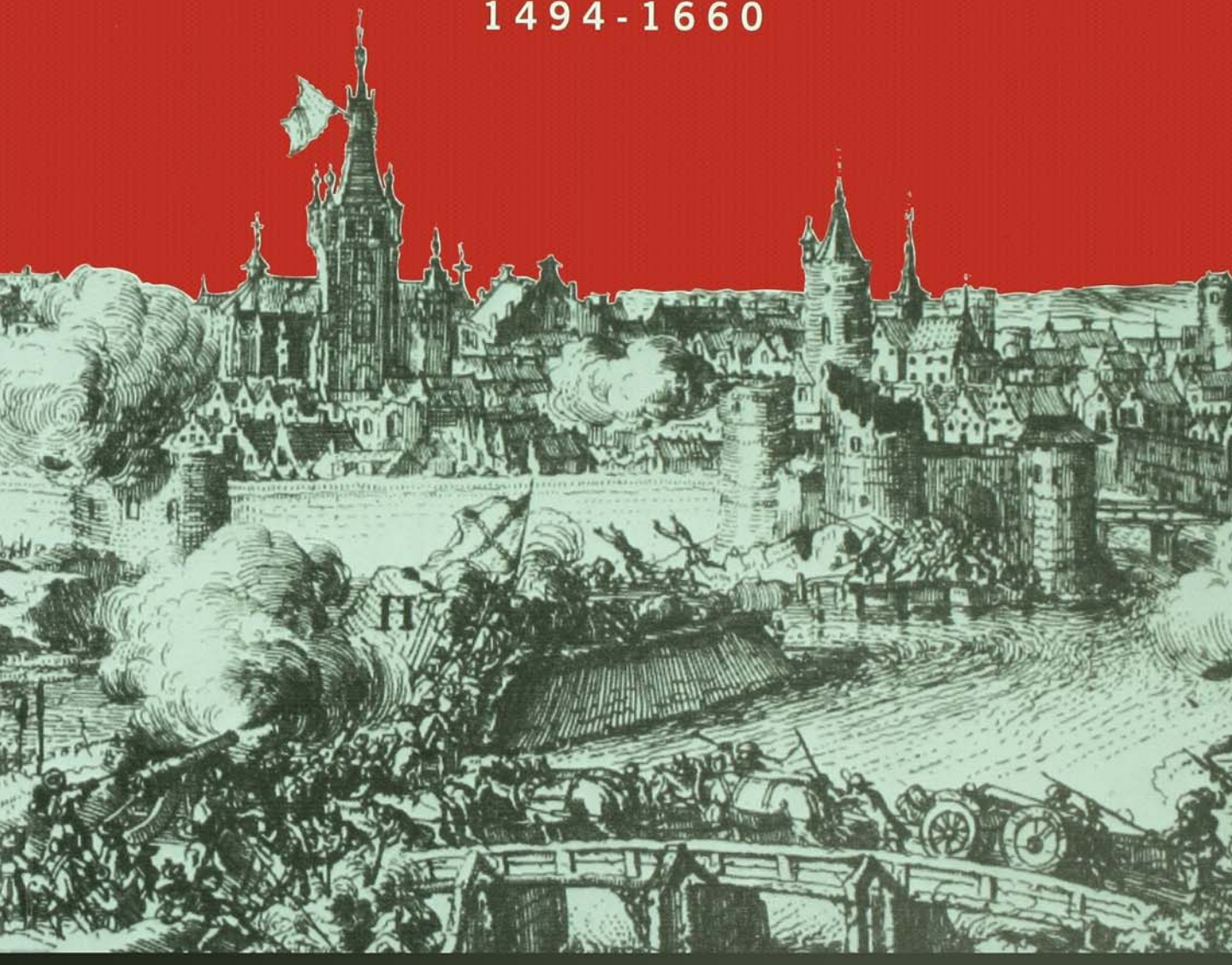
Siege Warfare

The Fortress in the Early Modern World

1494-1660



CHRISTOPHER DUFFY

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The Fortress in the Early Modern World 1494-1660

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Preface

Many solemn ventures of mankind are impelled by impulses which are more trivial than the voyagers would care to admit – the rationalisations are often left until later. It so happens that the present work, for all the pomposity of its title, was inspired by nothing more exalted than the sight of a traffic-island of turf and stone in my native Blackheath.

Fortunately it was not difficult to find ample justification for writing a book about the fascinating and still very little known subject of artillery fortification. Fifteen years ago, when I first began work, the darkness was complete. Most people who were interested in the history of war or architecture would have agreed with the man who said that 'nothing is more conspicuously lacking in the field of military studies than a well-illustrated history of the arts of fortification and siegecraft' (Guerlac, 1944). There was certainly a plethora of studies on 'Crusader Castles' and the like, but when we inquired about fortresses of the artillery age the authorities took us on a gentle guided tour of sixteenth-century Italy and seventeenth-century France, and ushered us out again with the inevitable reference to Sterne's Uncle Toby.

In recent years things have changed for the better. Not only have we had good technical overviews of fortification from Quentin Hughes and Ian Hogg, but the military history of the early modern period has 'come alive' in a remarkable fashion, as you can see from our bibliography.

However, there is still a need for a reasonably concise and readable commentary on the far-reaching ways in which fortress warfare has influenced statecraft, strategy, architecture and ordinary human affairs. A study of this kind ought to range beyond Western Europe and tell us something of how the Scandinavians, Russians and Asians went about their business. In span of time we should be allowed to travel over the centuries from the date of the appearance of the first truly mobile siege artillery, in the later fifteenth century, and go on to see (in further studies) how fortification has been transformed by seventeenth-century absolutism, and the advent of the 'heavy' Industrial Revolution of the nineteenth century and the 'light' Industrial Revolution of the twentieth.

Most important of all we should bear in mind that the phenomenon of fortress warfare is not explicable in purely technical terms. Fortresses rose on particular sites because of certain strategic or economic considerations; they were defended and attacked by living engineers and armies; they were usually peopled by civilian urban communities; their successful resistance or fall could well determine the preponderance of one state over another. An examination of walls and trenches would be a valuable exercise, to be sure, but by itself it would be as deficient as a history of religion which drew its evidence exclusively from ecclesiastical architecture.

These considerations have determined the form of the present work. We shall hear more about policies, strategies and the lives of soldiers than about the technicalities of the thousands of 'systems' of fortification, of which only a few were ever borne

in mind by the serious engineer, and which even then were carried out in a radically simplified shape.

I could not have entertained the thought of writing this book without the help of the London Library and the Army Department Library of the Ministry of Defence. I also owe a great deal to Lt.-Col. Alan Shepperd MBE, who has built the Library of the RMA Sandhurst into one of the finest collections of its kind in the country.

Quite recently I expressed some very gloomy sentiments about the historical and physical neglect of some of the architectural gems of fortification (*Fire and Stone*, 1975, p. 198). I would not write in the same unreservedly pessimistic tone today. In Britain my friends Quentin Hughes and Anthony Kemp of the Fortress Study Group have helped to create an atmosphere in which it is possible to enthuse about artillery fortification without being thought a complete lunatic. Valiant work is also being done on the Continent by the French Inspection du Génie, and organisations like the Stichting Menno van Coehoorn (Holland) and the Stichting Simon Stevin (Belgium). The beneficial results of their concern are already evident. On the far side of the Atlantic the membership of the Council for Abandoned Military Posts is numbered in the thousands, and many impressive works of restoration have been carried out by the national parks services of Canada and the United States.

Prologue The Earliest Artillery Fortification

A small dog, chased by a larger one, will sometimes take refuge beneath a nearby thicket, so forcing his enemy to fight at a disadvantage or go away. For centuries military engineers have sought to attain the same end as our canine tactician: that is, to arrange obstacles that will enable a weaker power to withstand the attacks of a stronger one.

In medieval times the architects came close to achieving their aim, for as long as muscle-power and gravity offered the only propulsive force for missiles, the soaring walls of castle and city were capable of keeping out any enemy who was not prepared to devote weeks or perhaps months to the work of reducing them.

Historians argue about the origins of gunpowder. Some claim that it came from China, others that it was concocted nearer to home in Arabic North Africa or in Europe itself. There are those who would agree with Marshal de Tavannes when he wrote that, along with Lutheranism and other evil inventions, it was the sort of thing which naturally originated among the Germans, for 'the coldness of the climate keeps them shut up seven months on end in their chambers, where they have ample leisure to dream up these fantasies' (Tavannes, 1850, 97).

The cannon first appears in European iconography as an urn-like object which is represented in an English manuscript of 1326. In the fifteenth century gunpowder artillery came to play a regular, but (outside France) only occasionally decisive, part in fortress warfare. If cannon cracked open Harfleur in 1415, Constantinople in 1453, and Krems in 1477, there was still not much evidence to show that artillery favoured the attack very much more than the defence.

In an age when pieces were judged more by their intended malice than by their proven efficacy, a sovereign of any standing felt himself bound to have in his arsenal at least a quantity of monster cannon ranging in calibre from twelve to thirty-two inches or even more.

The 'great gonnes' held a special fascination for late-medieval and Renaissance sovereigns, who were almost the only people who could afford the vast expense of artillery. Monarchs like John II of Portugal, Charles VIII of France, Henry VIII of England, and the emperors Maximilian and Charles V, were all renowned as enthusiastic cultivators of ordnance and gunners. These costly habits inevitably drew them into collaboration with the great towns of Europe, with their resources of finance, bell-founders, smiths, carriage workers and hired gunners. Well into the sixteenth century the emperor still looked to the cities of Austria and Germany for help in making up the siege train for his Italian and French wars. A nineteenth-century gunner historian was driven to the 'inescapable conclusion that city walls were the cradle of artillery and that the citizens were its solicitous foster-parents. Artillery remains even today a weapon proper to the middle classes' (Dolleczek, 1887, 53).

The independent, faction-ridden nobility was unable to keep up in the technical race. Already in the early fifteenth century Elector Frederick I of

Brandenburg was able to consolidate the power of the house of Hohenzollern by bringing up his cannon against the castles of the Quitzow clan, battering them down one by one. Thus the development of artillery contributed powerfully to the consolidation of state power in the early modern period. Also the new style in fortifications – low and sprawling – demanded garrisons of a size which only states, cities and towns could provide. It had been easier in the old days, when many a castle had been held effectively by a handful of men.

Independent bourgeois military power too was ultimately doomed, though 'it is quite clear that at least until the middle of the seventeenth century subjects were still capable of successfully resisting their princes and, if necessary, overthrowing them by armed force. Neither artillery nor the new fortifications, whatever their cost, worked unequivocally to the prince's advantage' (I. A. Thompson, 1976, 2).

With the help of hindsight, we may put forward a number of basic requirements for fortifications which were fitted to withstand, as well as employ, muzzle-loading smooth-bore artillery:

1 A rampart that was spacious and low-lying enough to provide a stable platform for artillery, and to evade or resist the blows of the enemy shot.

2 A ditch and a wall that were sufficiently formidable to deter escalade.

3 A trace (ground plan) so arranged as to leave no dead ground by which an enemy might reach the rampart unscathed.

To satisfy more than one of these requirements was not an easy task for the medieval architect. Small wonder is it that serious attempts to meet all three were postponed until after the full power of a mobile, state-owned artillery was first revealed to military men in 1494. The earlier, partial solutions may be summed up in the term the 'reinforced castle'.

Until at least the end of the sixteenth century, the majority of strongholds which came under siege dated from the times before gunpowder. Fortifications of this kind could be trimmed, expanded, razed or bolstered up by engineers in a variety of more or less drastic ways. The passive resistance of a tower could be readily enhanced if you removed the pointed cap or roof, cut down the masonry to a height little more than that of the adjacent curtain, and filled the resulting stump with earth. Even with this heroic treatment, the cramped ground plan of a medieval tower seldom allowed you to install more than two or three cannon inside.

The main business of the active defence was accordingly transferred to the curtain wall, the gangway of which could be transformed into an effective platform if you heaped up a wide bank of earth behind, a process called 'rampiring'. Unfortunately for the defenders, the new earthen rampart exerted a heavy pressure against the masonry wall in front. That was why Duke Philip of Cleves complained at the end of the fifteenth century that 'whenever the guns batter the wall, the earth tumbles down with the masonry, which makes it all the easier for the enemy to climb the breach' (Louis-Napoléon Bonaparte, 1851, II, 104).

The fact that a rampired wall tended to collapse outwards was particularly unwelcome to the bowmen and gun-crews who were defending any work which you might have improvised in the space between the foot of the wall and the edge of the ditch. The most fashionable fortification of this kind was the fausse-braye: a low outer wall of masonry, timber or sods, packed up behind with rammed earth, which served to defend the ditch which could now scarcely be seen, let alone commanded, from the thickened curtains and truncated towers.

All of these were essentially improvised expedients. When it came to building a new reinforced castle from the ground upwards, the military architects abandoned angular towers in favour of tub-like cylindrical constructions, which offered a glancing surface to cannon shot. In some castles the towers were built flush with the curtain walls, so as to facilitate the movement of men and guns. The base of the towers and curtains usually flared outwards, again in the interests of presenting an inclined surface, and the crenellations along the top were replaced by curved or bevelled parapets. The walls as a whole were thickened up, and furnished with embrasures and vaulted casemates for cannon. These developments were most evident in fifteenth-century France, and were to be seen in varying degrees in works like the Bastille, and the towers or

1 Late medieval fortification in picturesque decay (Sarzanello, *c.* 1377)

castles at Tarascon, Coucy, Langres, Toulon, Nantes and Saint-Malo. The results were impressive enough to look at, but they remained mere adaptations of medieval motifs.

Other nations were still less adventurous. The English were content to pierce their city and castle walls with little gun ports, while as late as 1450 the Italians could run up a construction like the lofty Sforza Castle at Milan, furnished with towers that were more useful for the views they commanded over the neighbourhood than for the mounting of artillery. This is not to deny that as late as 1601 the sheer bulk of the place had the power to impress an authority like Busca. Only in the second half of the century do we find architects of Tuscany and the Papal States exploring the style of the reinforced castle with assurance (Volterra *c.* 1472, the rocca of Senigallia 1480, Sarzana 1487, etc.), producing works that are of real beauty, and (to our eyes at least) full of a sense of impending change. However, the Italians clung on surprisingly long to devices like machicolations, and the coastal fortresses as a whole were decidedly old-fashioned. Such was the stronghold of Civitavecchia, designed by Antonio da Sangallo the Younger, or his uncle Giuliano's triangular castle at Ostia. These works have high bare curtain walls, tub-like towers, and an inner *maestio* or keep.

Altogether in Europe up to the later 1480s we see no convincing evidence that military architects

appreciated that artillery had the power to transform the active defence of fortresses, from the principle of merely dropping things on people, to the one of hitting them hard and low with missiles impelled by gunpowder.

The story of the reinforced castle comes to a fitting end in the discussion by Albrecht Dürer (1471–1528) in his *Etliche Underricht zur Befestigung der Stett Schloss und Flecken*, which was printed in Nuremberg in 1527. In the *Etliche Underricht*, as elsewhere in his artistic work, much of the fascination of Dürer's achievement derives from his blend of Gothic and Renaissance motifs. He is known to have travelled to Italy in 1494 and 1505, but he was denied contact with the most advanced military engineering of his time because he failed to venture as far as Florence or Rome. Hence his military architecture remains an isolated, North European attempt to meet the challenge of problems that were already finding more convincing solutions in Italy.

The most interesting and original sections of Dürer's book relate to a projected town fortification, where the walls are dominated by massive and squat semi-circular 'roundels', or towers. In the first of Dürer's manners, the casemated roundels rise to a height of seventy feet above the ditch, and twenty-nine feet above the level of the surrounding country. Dürer certainly provides us with a stable gun-platform, but the sprawling obesity of his dimensions only serves to render the problem of close-range defence more difficult than ever. In particular the curve of the ground plan of the roundel is so gentle that no gun is capable of directing a flanking fire along the ditch, which leaves the besieger free to plant his ladders and begin his mines in dead ground at the salient of the adjacent roundel.

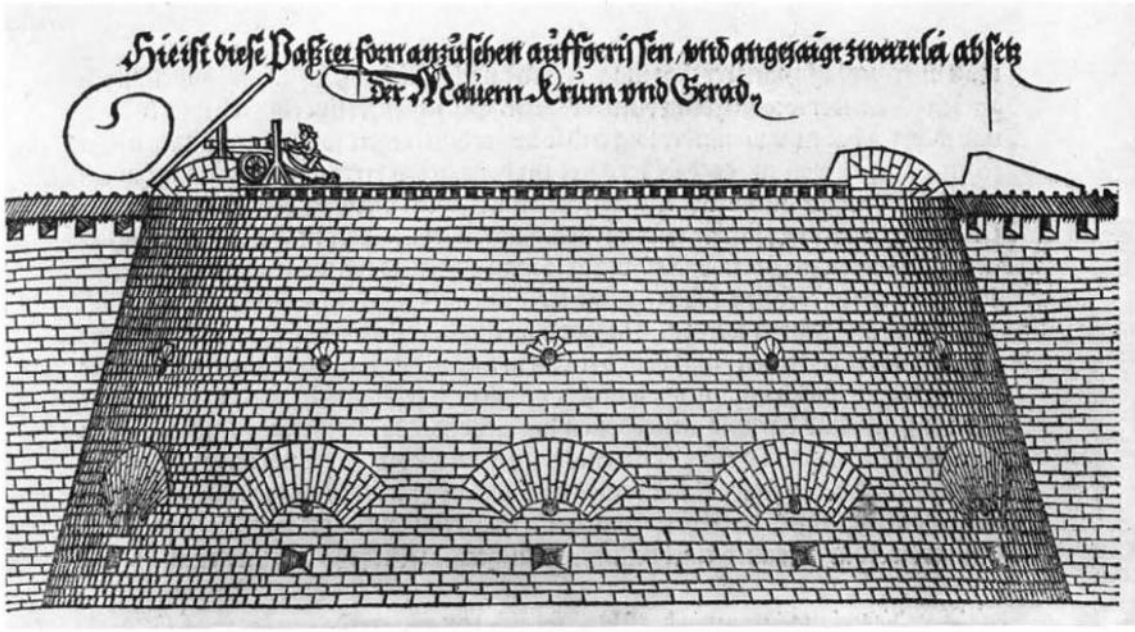
Dürer's work was ignored in his native Nuremberg, and we may gauge his influence only through the handful of North European fortresses which appear to reflect his notions: the roundels at the Kronenburger and Roseneck Gates at Strasbourg, perhaps, or the vast and stately Munot tower which rose at Schaffhausen between 1563 and 1582. Oddly enough it was England, almost the least advanced of European states in artillery fortification, which chose to build not just a single fortress but a whole system of national defence which closely parallel Dürer's ideas.

The impulse for the English fortress-building was given by the anti-heretical alliance of Francis I of France and the Emperor in 1538. The English king Henry VIII was something of an engineer in his own right, but he stood in urgent need of advice on the programme of coastal defence he was setting in train, and thus he came under German influence through the channel of the Bohemian architect Stevan v. Haschenperg, who is known to have worked on Sandgate Castle and the Citadel of Carlisle. Certainly the cockles of Dürer's heart would have warmed at the sight of the forts which sprang up along the south coast of England in the following years, and which found their most elaborate expression at Deal and St Mawes. The Henrician fort is on a much more modest scale than Dürer's designs, but it skilfully adapts some of his motifs to the circumstances of a small self-contained coastal work. The whole has an air at once sturdy and festive, rather like a squashed wedding cake.

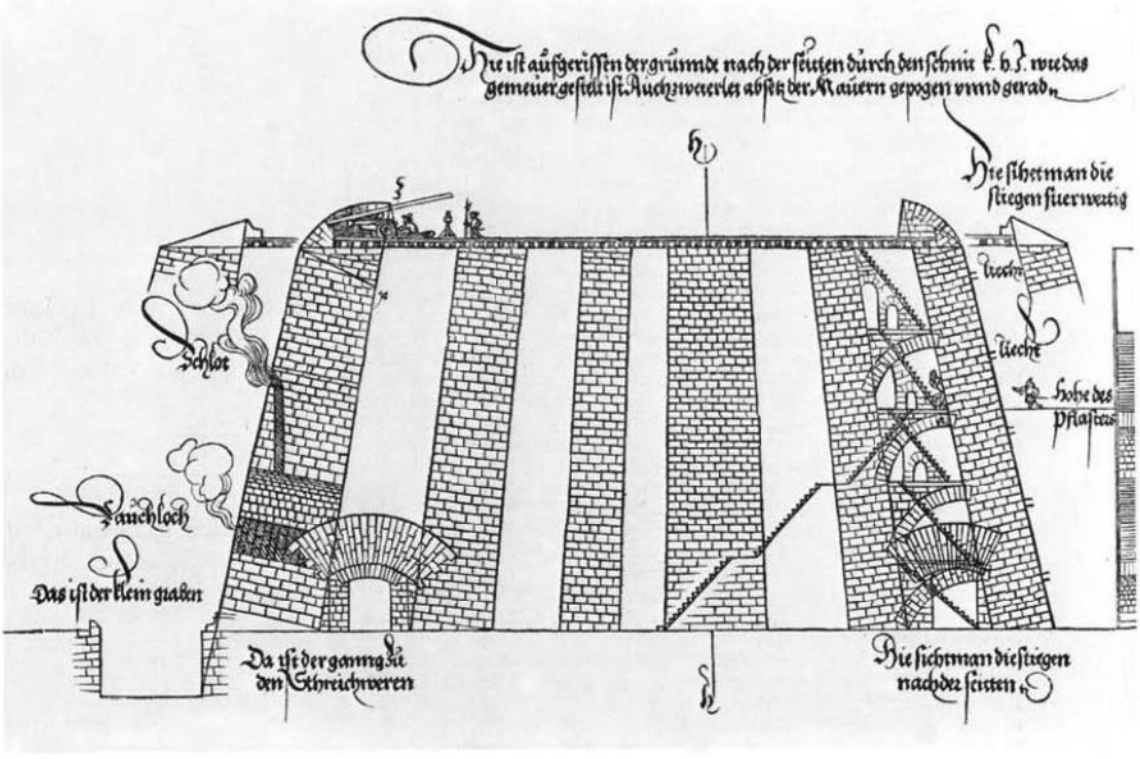
Dürer's designs look mostly to the past, and their influence on actual construction is limited and indirect. All the same, the *Etliche Underricht* is of unique significance because it was the first printed work on the subject of permanent fortification.

Books of this kind held a tremendous appeal. Practical soldiers were eager for information on specialities like engineering and gunnery, where knowledge of the most advanced techniques was difficult to obtain by personal experience. Civilians in their turn came to see fortification as one of the elements of a gentleman's education, along with architecture and mathematics; and the study-bound scholar derived much satisfaction from devising elegant and seemingly faultless solutions to military problems by means of pen, ruler and compasses.

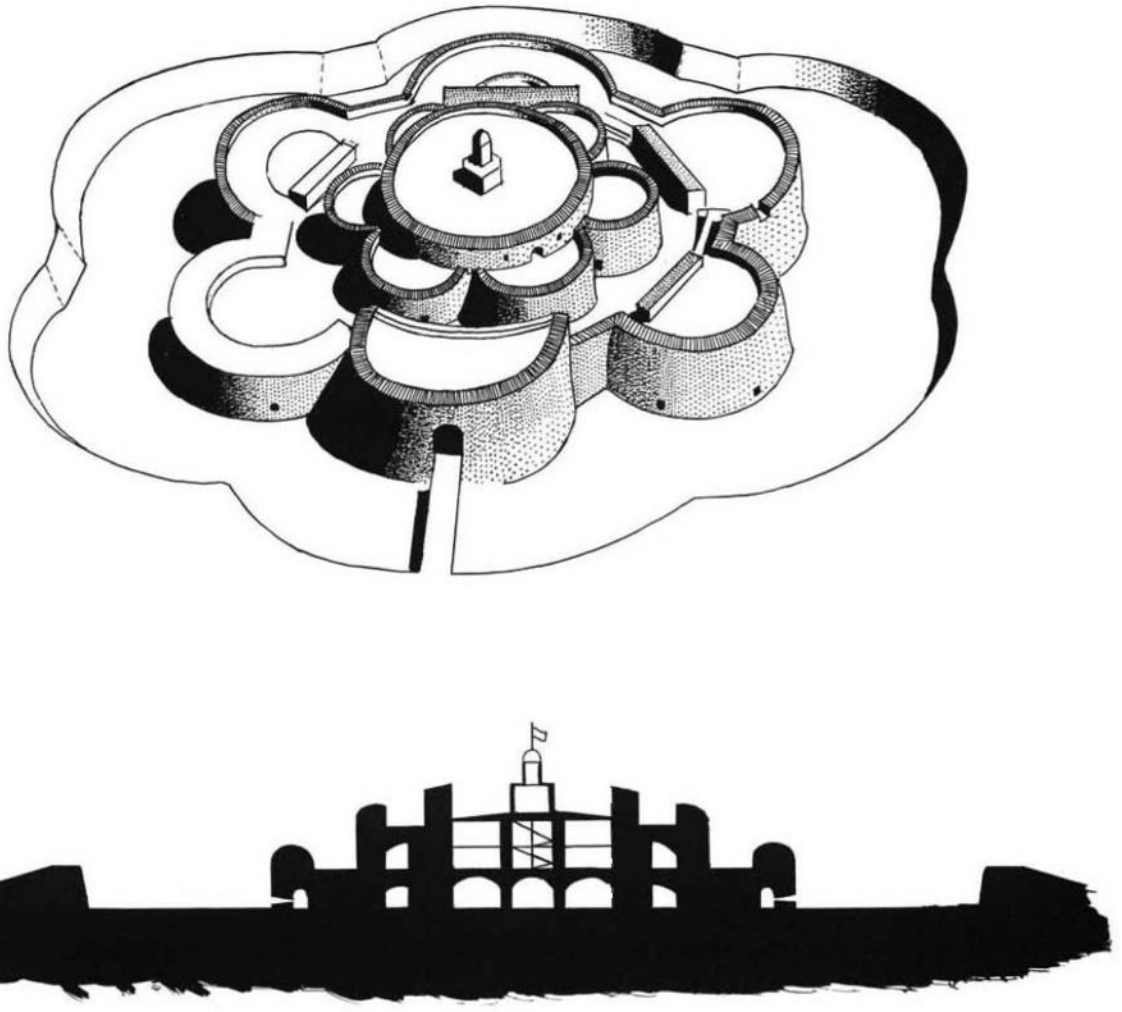
The *Etliche Underricht* therefore had hundreds if not thousands of successors. Not all of these works were of equal value. Indeed Dürer himself must be held partly responsible for having infected the literature of fortification with some of its most persistent diseases. Rather than content himself with postulating some basic principles which could have been applied, with appropriate modifications, to any site, he preferred to set up four separate manners or



2 Exterior view of one of Dürer's roundels



3 Section of one of Dürer's roundels



4 Deal Castle. In the event of a siege, the parapets would have been crowned with baskets packed with earth (gabions). The walls are massive, but the roof is very thin, and therefore vulnerable to mortar fire

systems, a number which was inflated a few decades later by a sensible person like Marchi to no less than 161.

Then again, Dürer and his successors pay little heed to the cost of their plans, though he at least tries to justify such an enormous investment: 'If people say that all of this work will cost a great deal of money, they should remember that we are expending very little compared with the great sums that the Pharaoh of Egypt devoted to the Pyramids, which were a useless expense, whereas our money is very usefully invested' – not, perhaps, the most happy of illustrations.

For all its internal turmoil, the Germany of Dürer's century was free from major foreign invasion. To find truly significant developments in fortress warfare we have to turn to Italy, where decades of peace had just come to an end.

One Fortress Warfare in Renaissance Italy

The offensive on the rampage 1494–1503

Charles VIII and the advent of mobile siege artillery

In military affairs, the events of 1494 did much to bring the Middle Ages to an end. In that year King Charles VIII of France led his army across the Mont-Genèvre Pass into Italy, and marched across the Lombard plain and the Apennines to the port of La Spezia, where he picked up the forty or so siege guns with which he intended to make good his claim to the Kingdom of Naples.

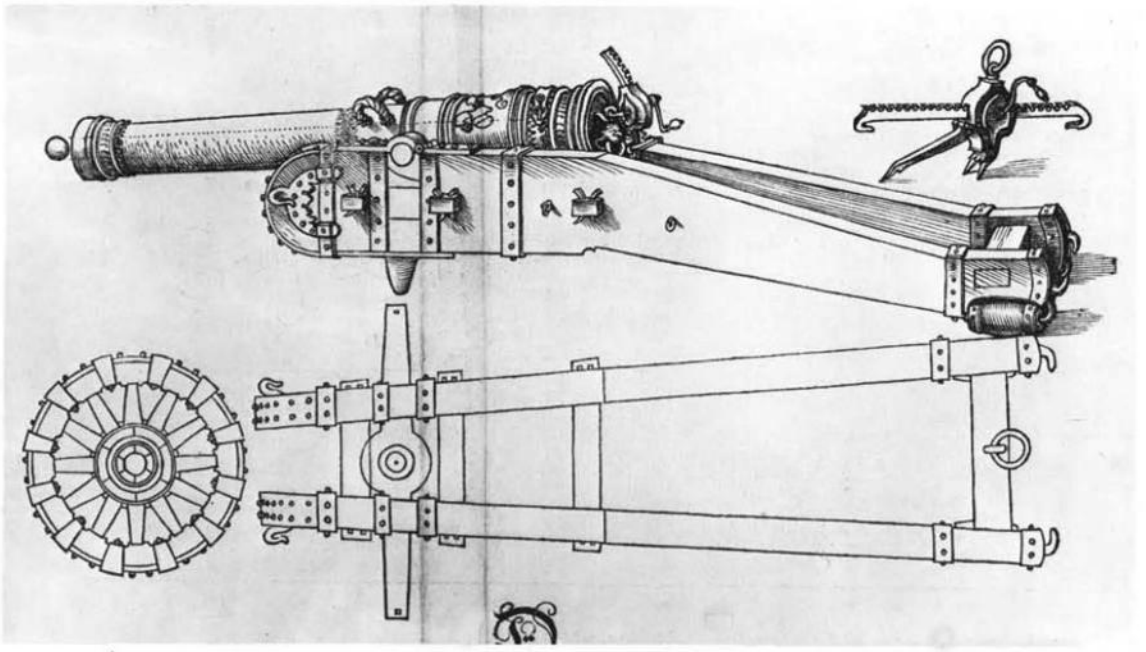
These guns were the lineal descendants of the state-owned artillery which had enabled the French to burst open the English strongholds in Normandy and Guyenne in the middle of the century. Craftsmen and bell-founders worked tirelessly to improve the weapon, and by the 1490s they had evolved a cannon that was recognisably the same creature that was going to decide battles and sieges for nearly four hundred years to come.

The medieval bombard was a massive pipe of wrought-iron rods or bronze, designed specifically to throw a large but relatively light ball of stone. The weapon was by no means without its virtues. In relation to muzzle velocity, the stone ball required only one-half the weight of powder as an iron shot of the same calibre, and it exercised a considerable smashing effect on targets like walls, siege towers, ships and trenches full of men. At the same time the bombard and its ammunition were undeniably bulky. The gun was usually fired from a solid block of wood, which rested directly on the earth; it put up a valiant fight against any gunners who threatened to disturb its repose. For transport, the bombard had to be lifted bodily onto an ox waggon running on disc-like wheels which, whenever the cart was canted over to one side, threatened to collapse and deposit the whole load gently back to earth again.

Another disadvantage concerned the manufacture of the missiles. Whereas the casting or forging of an iron cannon ball was a hot but satisfying business, skilled stonemasons had to be paid highly if they were to address themselves to the laborious and frustrating work of carving a stone ball that was just going to be fired from a gun.

In the train of Charles VIII, however, the bombard had been largely supplanted by cannon with homogeneous bronze barrels no more than eight feet long. These pieces could be transported and loaded with ease, and they discharged wrought-iron balls which could compete in range and accuracy with stone-firing bombards of at least three times their calibre. The barrel of the French cannon was readily elevated or depressed around the fulcrum formed by two trunnions (prongs). These were cast into the barrel just forward of the centre of gravity, and rested almost over the axle of the two-wheeled gun carriage beneath. For traversing, the trail of the carriage was lifted from the ground and swung to right or left.

The numerous and well-trained French gunners knew how to take advantage of their new weapon, and an Italian contemporary (Guicciardini, 1562, Bk I) wrote that the cannon were



5 Renaissance cannon (Dürer, 1527)

planted against the walls of a town with such speed, the space between the shots was so brief, and the balls flew so speedily, and were driven with such force, that as much execution was inflicted in a few hours as used to be done in Italy over the same number of days.

The enhanced mobility of the French guns was, if possible, still more important than their fire-power. Over long distances the heavier of the barrels still had to be loaded onto separate waggons, as before, but gun carriages and waggons alike were now drawn by strong and trained horses, and travelled on 'dished' wheels which stood up stoutly to the strains imposed upon them by fifteenth-century roads.

By all reasonable calculations Charles should have been stopped short by one of the Florentine or papal fortresses long before he could reach his goal of Naples. Unfortunately for Italy, the French and their artillery were not reasonable opponents. Charles directed his march down the western side of the Apennines against the northern frontier of the state of Florence, the first obstacle in his path. Florence was on the verge of one of its bouts of puritanical, patriotic republicanism, and the poor Duke Piero de' Medici, already insecure at home, threw himself on the mercy of Charles as soon as he learnt that the little fortress of Fivizzano had fallen to the French. Sarzana, Sarzanello, Pietra Santa and the citadels of Pisa and Leghorn, all were delivered up without resistance, and on 17 November the pale little French king made his triumphal entry into Florence, lance balanced on thigh. The terrified Pope Alexander VI followed Piero's example, and hastened to place his strongholds at the disposal of the French.

There was nothing to stand between Charles and the kingdom of Naples. The small Neapolitan citadel of Monte Fortino capitulated as soon as the cannon were planted against it; and the French took a mere eight hours for the business of breaching the important frontier stronghold of Monte San Giovanni and massacring its garrison. The place had once withstood a siege of seven years. With horrifying consistency the French later used the same cruelty at Capua in 1501, Pavia in 1527, and Melfi in 1528.

In the short term the impact of the new French methods was devastating, and on 22 February 1495

Italy in the early sixteenth century: political

Charles was able to ride into the city of Naples in the same style as he had entered Florence.

The French successes had conjured up a hostile league of Venice, the Pope, Milan and Spain. Charles accordingly retraced his steps and smashed open his communications back to France. The king thereafter lost interest in his new conquests, and over the course of 1496 his negligence and cowardice permitted the Spanish to starve into submission all the strongholds in Naples – an episode which indicated that it was nowadays far easier to conquer a kingdom than to hold it.

The Spanish counter-attack and the gunpowder mine

Objections may be made to the choice of the year 1494 to mark the beginning of early modern fortress warfare. Italian military technology had not been entirely static and, as we shall see, the all-important device of the angle bastion was invented seven years before Charles VIII burst into Italy. Then again, the occasions on which the French needed to plant their cannon were surprisingly few, because fortresses tended to surrender at the very wind of their coming. However, Macchiavelli, Guicciardini and almost all the people who have written since about Renaissance warfare are surely right to stress the revolutionary impact of the French and their new artillery. What the authorities are talking about was essentially a *Blitzkrieg*, which depended as much for its effect upon speed, energy and the potential for destruction, as the actual scale of physical damage. Warfare was prosecuted with a new urgency and tempo, and, no less importantly, big-power politics intruded on Italian affairs.

The newly-revealed power of the offensive fired the ambition of all the hungry southern princes, and upset the equilibrium which had reigned among the major Italian states since the middle of the fifteenth century. In 1502 the French and Spaniards came to blows over the possession of Naples. Acting with admirable energy, the Spanish defeated the French field army twice over, then proceeded to mop up the isolated enemy garrisons all over Naples.

Out of all the doomed strongholds, the Castle of Uovo (by the city of Naples) was certainly the one that was taken in the most spectacular fashion. Cannon alone were powerless to reduce the place, situated as it was on a narrow peninsula separated from the mainland by a deep ditch. The Spaniards, however, had in their ranks one Pedro Navarro, 'a thin little man', who had perfected the gunpowder mine, the one weapon capable of blasting the French from their rocky retreat.

Gunpowder mines had figured in the treatises of Taccola, Mariano of Siena, and Francesco di Giorgio Martini, but it seems that they were first used in actual warfare in 1439, when the Italian-educated John Vrano used a countermine in his defence of Belgrade against Sultan Amurath. Under the direction of Martini, the Genoese used gunpowder below ground in their attack on the Florentine-held fortress of Sarzanello in 1487. The effect on this occasion was small, for the gallery had not been driven far enough under the foundations. Pedro Navarro, who is said to have witnessed the experiment as a private soldier, went on to remedy this effect at the siege of the Turkish fortress of San Giorgio on the island of Cephalonia in 1500. On that occasion Navarro tunnelled out long galleries beneath the citadel rock, stuffed them with gunpowder 'to excite the flames', and produced a devastating flare-up.

The wording of the descriptions of these early mines leaves open the possibility that the powder charges were not primarily explosive in character, but rather intended to hasten the burning of the props which supported the undermined masonry. No such doubt attaches to Navarro's device at the Castle of Uovo in 1503. He piled his men and tools into covered boats, brought them unknown to the French to the side of the cliff facing Pizzafalcone, and laboured for three weeks to drive a gallery through the rock. On 26 June the Spanish touched off the charge, and part of the rock sprang into the air. The governor and his council were at debate in the chapel above, and despite their misuse of these sacred precincts they were propelled heavenwards with greater force than all the saints of Christianity. Thus Navarro 'gained great credit at this siege, and struck a terror into everybody' (Guicciardini, 1562, Bk I).

For a time the older and newer methods of mining co-existed. As late as 1537 the Spaniards attacked

Saint-Pol by cutting a gash in the salient of a tower, supporting the masonry by timber, and then burning away the props. In the main, however, besiegers avidly seized on the possibility of wrecking a wall by an explosion, rather than effecting its tame subsidence by the 'burnt-prop' method. The explosive mine furthered the work of the cannon in wiping from the strategic map the hosts of small medieval castles which had disrupted and bedevilled so many offensive campaigns in the past. Only a good wet ditch, or a deep and well-flanked dry one was capable of deterring the enemy from 'attaching the miner' to the scarp.

The political and strategic consequences

The Italian theatre of war

The events of 1494 and the following years shook the colourful patchwork of Italian politics into a disorganised kaleidoscope, in which the main states – Milan, Venice, Florence, the Papal States and Naples – were slow to arrange themselves into any recognisable pattern. Militarily, the Italian scene was dominated for a few months each year by whatever power could first raise a field army. All the same, the ascendancy of the offensive was such that any conquests made in that period could seldom be maintained long into the next year: allies were unreliable, and still less reliable were your own indisciplined and improvident garrisons. The city of Milan, the prize of so many campaigns, was notoriously taken and lost with equal ease, for the walls were weak in themselves, and the suburbs crowded close in front.

Hardly anywhere do we find people observing 'modern' strategic principles. Victories were left unexploited, mountain barriers undefended, and a fat conquest like the Netherlands disregarded in favour of exhausting campaigns in the remote and rocky Abruzzi. Above the turmoil of immediate events, however, we can already make out the lineaments of future centuries of warfare in Italy.

In the early sixteenth century, just as in later times, the plain of Lombardy was virtually indefensible. An individual fortress, however strong (and some in the sixteenth century were not particularly strong), could be by-passed easily enough. Also, the wide, slow-marching Po offered the aggressor a natural carriageway for his heavy siege trains. The rivers that ran into the Po were treacherous friends for the defender, for they were liable to fall in level without warning, and at all times they could be readily forced by anyone who was ready to go to the trouble of making an outflanking movement, whether on the south bank as by the Austrian general Browne in 1746, or along the Alpine foothills as by Suvorov in 1799.

As far as France and Austria were concerned, they needed to have a foothold beyond the Alps in order to be able to take the field in Lombardy in the first place. The French had two modes of entry into Italy: they could either make agreements with north Italian rulers (the Duke of Milan in 1494, and the Duke of Savoy until 1536 and in various later periods), or they could cling on to one or more fortresses beyond the watershed (among other places, Asti and Turin in the sixteenth century; Casale, Pinerolo and Exilles in the seventeenth century, and Alessandria in Napoleonic times). In this the French had the advantage over the Austrians, whose access to the plain was impeded by the hostility or neutrality of the Venetians. In the eighteenth century the fortress of Mantua offered the Austrians a single and inadequate toehold beyond the Brenner, and only after they had taken over Napoleon's creation of the Quadrilateral did they have an adequate footing in the plain.

Once a power had won the upper hand in Lombardy, it was faced with the problem of how to exploit its success. None of the alternatives was really profitable. In 1524, 1536, 1707 and 1746–7 the Imperialists pursued the alluring prospect of invading France by way of Provence, but on every occasion they were chasing a mirage. The theatre was too remote from the vulnerable heart of France, the country was too barren, supply by sea was too uncertain, and the tracks running along the coastline were too long and difficult.

Both the French (1494, 1525, 1527–8, 1552–3, 1557 and 1799) and the Austrians (1527, 1708 and 1744) were tempted south into misguided ventures in central Italy or Naples, only to withdraw again when frustrated by the inconstancy of the people or

an unfavourable turn of events in Lombardy. The Spanish could get to Naples more easily than either of these two powers, as long as the sea was free from hostile squadrons.

The cannon of Charles VIII had therefore won for the French generations of direct involvement in the concerns of Italy, a state of affairs which people like Branthôme and Tavannes began to regret when they looked back over the course of the sixteenth century (Branthôme, 1858–78, book I, part 2; Tavannes, 1850, 7). Tavannes suggested that France would have been better advised to have set up a series of powerful city republics which would favour French interests in Italy. The same notion – that of arranging the politics of independent Italian states to the advantage of France – was revived in the eighteenth century by the statesman d'Argenson.

The Austrian and Spanish potential

All of this was small comfort to states less fitted than France to come to terms with the changes wrought by gunpowder. As we shall see, there was singularly little in the conduct of Emperor Maximilian of Germany to show that he regarded himself as the standard-bearer of any crusade of Habsburg against Valois. This development had to wait until the royal line of Spain died out, and Austria and Spain were united in the common Imperial inheritance of Charles V in 1519.

Maximilian's means of waging fortress warfare or any other kind of warfare were severely limited. He was never able to catch up with the half-century of artillery development which had been undertaken in France, and as a result the Imperial artillery of the early sixteenth century became an extraordinary mixture of ancient bombards, modern pieces after the French model, and trunnionless cannon fixed rigidly to two-wheeled 'block' carriages. Another failing was the lack of draught animals; that was why the transport of the park of 136 pieces against Padua in 1509 had to be arranged in two instalments. Maximilian's gunners were, however, a match for the French, and when a French observer watched the Imperial and French artillery working side by side at a siege in 1510 he had to admit 'that the Emperor's guns kept up a heavier fire than those of the king of France' (Fleurange, 1850, 20).

The heavy calibre and rapid fire of the Imperial cannon were capable of making extensive breaches in two days, as happened at Mézières in 1521 and Péronne in 1536, but the low velocity of the shot and the frequent employment of stone balls tended to bring down the masonry in large fragments, which were more difficult to scale than the débris produced by the smaller-calibre iron shot.

The Emperor's Venetian campaigns were unpopular in Germany, on account of the disruption which his wars caused to trade. Since he was consequently forced to maintain his adventures from the resources of Austria alone, the Imperial expeditions were short-winded and liable to end in an ignominious scuttle back across the Alps, as in 1496, 1509 and 1516.

When the Emperor attempted to create a reliable native infantry, in the shape of the mercenary landsknechts, he merely added a new element of calamitous unpredictability to fortress warfare. Other sovereigns could have told him how useless they were. Their indisciplined champing and guzzling ran through the provisions of Thérouanne (1513) and Yvoy (1552), and threatened to do the same at Naples in 1528, 'so that', wrote the Abbé Branthôme, 'I have heard great captains affirm that it is not a good idea to shut up landsknechts in a fortress – they are ill-disciplined and think only of their bellies' (Branthôme, 1858–78, book I, part 1). At Siena in 1554 Montluc deliberately let his landsknechts go in the middle of the defence.

Germans as a whole came to be despised as incapable of exercising intelligence or self-restraint. Marshal de Vieilleville was agreeably surprised in 1552 to discover a German who managed to bring him back a detailed and accurate report of the enemy fortifications at Thionville; he had not thought the nation up to such a task. The Swiss were likewise considered to be 'people who were not at all suitable for holding a fortress, for they were naturally inclined to fight in the open field' (Bellay, 1569, 25). They at least were honest enough to recognise their shortcomings, and there was a touching simplicity in the way they left open the gates of Novara in 1513 and invited the French to come in and fight.

Fortunately for the Habsburgs, the union with

Spain in 1519 gave them the services of the Spanish infantry, the finest in Europe: hardy, versatile and enterprising, both in attack and defence, and led by a hungry military aristocracy of the kind that was going to make Prussia so formidable in the eighteenth century. Guicciardini (1562, Bk XI) notes that as early as 1512 the Spaniards were 'of ancient renown ... for their agility and dexterity in besieging and storming towns'. Moreover, Spanish governors were notably severe in keeping their garrisons under control.

The potential of the Italian states

Few of the Italian powers could more than approximate to France and Spain in ferocity and efficiency. Two of the weaklings succumbed early in the century: Naples was gobbled up by the Spanish in 1503, while Milan underwent intermittent periods of French overlordship until the Spanish installed the last of the Sforzas as puppet, and finally established their own Prince Philip as open ruler in 1546.

The Venetians, being better-organised, managed to hang on to the mainland territories they had filched over the course of the last century. The Signoria summoned an effective mixed army of levies and well-paid condottieri, and employed talented and devoted native engineers like the Sanmichelis. The artillery too was taken in hand, and in 1526 the Venetians established a higher artillery school which became a model for the rest of Europe. Their guns were short and light, and less encrusted with ornament than was the fashion at the time.

Just as the past misdeeds of Venice cast that Republic in the role of a defender in the early sixteenth century, so the weakness of the papacy in earlier times inevitably made Alexander VI, Julius II and their successors appear in the light of aggressors when they tried to re-establish the old papal suzerainty over Bologna, Ferrara and other cities on the northern fringes of their dominions.

Papal commanders were on the whole competent and enterprising, and the architects and engineers the most skilled that money could hire. Some of the Popes themselves took a direct part in siege warfare, an interest which reached indecent proportions in the case of Julius II, and which was pursued with scarcely less avidity by Clement VII in his siege of Florence in 1529. Where the papacy fell short was not so much in the building as in the defence of its fortresses. Guicciardini (1562, Bk XI) remarks concerning the citadel of Bologna in 1511 that it was 'spacious and strong, but provided as badly as the fortresses of the Church usually are – the garrison consisted of just a few infantry, who had scanty victuals and hardly any ammunition'.

Nobody doubted the capacity of the Dukes of Ferrara to look after themselves, sandwiched though they were between Venice and the Papal States. Ercole, then (from 1505) Alfonso, improvised fortifications of immense strength, and built up an artillery which was fully equal to the French, and superior to any other in Europe. Duke Alfonso in particular attracted the notice of Bayard and other contemporaries, Fleurange (1850, 25) describing him as 'a gentle prince, and a warrior who was bold and of ready understanding. He devoted all his time to casting artillery, and strengthening and building fortresses'. Alfonso looked to France to help him to maintain his independence, and in return he offered his Gallic friends an avenue into eastern central Italy, and the loan of whatever great guns they chose to pick.

In contrast to Ferrara, the state of Florence displayed the political and military vices of Renaissance Italy to the point of exaggeration. Internally it was riven by feuds between the republican and Medici factions, while its main achievement in the military field was to withdraw on two occasions from the wider theatre of Italian events in order to pursue muddled (if finally successful) campaigns against Pisa at the beginning of the century, and against the Republic of Siena fifty years later. Florence's uniquely talented engineers did some of their best work for other masters, but the state's record of siege warfare on its own account is marked by feebleness and incompetence.

Altogether the survival of Florence presents something of a mystery. It owned desirable seaports like Leghorn, and lay between Lombardy and the Papal States athwart the path of conquest down the western side of the Apennines. Perhaps the answer

lies in its very state of internal division, for an enemy always had one Florentine faction or another at his command, and he found it easier to install a native protégé rather than to attempt an outright annexation.

Provisional artillery fortification and the return to equilibrium 1503–30

The sieges of Pisa and Padua

The stories of the development of fortress warfare and permanent fortification had begun to diverge by 1500, and they were not going to join up again for the best part of a hundred years. Just as happened again in the nineteenth century, men were confronted by a sudden advance in the power of artillery, an advance which shattered all conceptions of the shape of permanent works and compelled the defenders to resort to various kinds of field fortification.

Thus the qualities of leadership and improvisation came to the fore. The great exponents of fortress warfare in the sixteenth century are field commanders like Pitigliano or Guise, who have significantly less in common with 'classical' engineers of the stamp of Vauban than they have with those nineteenth-century soldier-sappers Totleben and Osman Pasha, who also had to adapt their ways to a time of revolutionary technical change.

There were two episodes in the first decade of the sixteenth century which established the new pattern of fortress warfare, and went far towards swinging the balance back in favour of the defensive. These were the sieges of Pisa in 1500 and of Padua in 1509.

The city of Pisa had taken advantage of the excitements of 1494 in order to break away from the heavy-handed rule of Florence. The Florentines were slow and clumsy in their attempts to subdue the rebel city, and in 1500 they had to call on the French for help.

The French proceeded to batter the walls on behalf of their friends, and on 30 June they surged forward for the assault. The assailants got over the wall, but they were halted at a ditch and a free-standing rampart which the Pisans had made behind. The morale of the French was shattered, and shortly afterwards the allies gave up the siege.

The Pisans had at once thwarted the Franco-Florentine campaign of 1500, and arrived at a means to stay the course of the offensive in warfare which had raged unchecked since 1494. Their device was simple enough, but the important fact was that the improvised interior rampart did not press directly against the masonry wall, like the medieval 'rampire', but was separated from it by a wide ditch. Thus, when the wall was breached, it gradually subsided into a heap of jagged stones, unmixed with earth, and served as an outer barrier to the interior ditch and the intact earthen rampart behind.

This *retirata*, or 'double Pisan rampart', as we may term it, was itself going to be surpassed by the more systematic and extensive works which the Venetians built at Padua in 1509. Macchiavelli explains that the Pisans built their interior ditches and ramparts at the last moment and only where danger threatened, 'since their walls were good enough to resist for some time, and the earth was solid and suitable for raising into ramparts. Without these advantages they would have been lost' (Macchiavelli, 1520, book VII). Still, the 'double Pisan rampart' remained the foundation for some of the most famous defences of the century, not just at Padua, but also at Brescia in 1515, Parma in 1521, Marseilles in 1524, Metz in 1552, Siena in 1552–3, Saint-Quentin in 1557, Poitiers in 1569, and Haarlem and La Rochelle in 1573.

The Florentines made another unsuccessful siege of Pisa in 1505. They therefore resorted to blockade and by this unheroic means they finally compelled the city to submit in 1509.

If the tiny state of Pisa, using the double rampart, was able to hold out for so long, it was small wonder that the wealthy and unified republic of Venice, employing the same means, was able to defy the best part of Europe.

Venice was compelled to take to arms in 1508, when Maximilian tried to force his way through Venetian territory in order to get at the French forces in Milan. This brought about a general scramble of the powers to dismember Venice. Louis XII of France conveniently forgot about the original cause of the upset, and allied himself with Maximilian against the Venetians.

The Republic, in its turn, poured men and

resources into Padua, its most important foothold on the mainland. The Captain General Pitigliano was accordingly able to make an interior rampart of great solidity, which ran behind the whole perimeter of the walls except where he knew that the enemy could not bring their guns to bear.

In the second half of September 1509 an allied army of 35,000 troops raged impotently against the defences. Repeated assaults were thrown back, and following a particularly spectacular repulse on 29 September Maximilian was forced to ask the armoured French and German nobility to join in one final storm.

The three-mile circuit of the allied camp was buzzing with rumours of the impending assault when La Palice, the commander of the French knights, read out Maximilian's letter to the nobles.

When they had heard what he had to say, they all looked around grinning, to see who would be the first to speak up. 'Monseigneur', said the Seigneur d'Ymbercourt, 'we are brooding altogether too much. Tell the Emperor that we are all ready. I am tired of living in the fields – the nights are getting cold, and we are running out of decent wine' (Mailles, n.d., 118).

To tease his companions La Palice for a time remained silent and picked his teeth, but he finally reported to Maximilian the sense of the meeting, namely that the French nobility were prepared to join in the assault on foot, if the Germans did the same.

Maximilian's request met with a very different reception among the nobles of Germany and the Netherlands:

When the Emperor had finished talking, there arose amongst the Germans a most extraordinary noise, which lasted half an hour before it died down. Then one of the nobles, who had been instructed to reply on everyone's behalf, announced that it was below their dignity to dismount or storm a breach, and that their true calling was to fight like gentlemen, on horseback (ibid., 120).

The assault and with it the whole siege was abandoned, and by the evening of 3 October Padua was free of the enemy.

Already in the following month the Venetians began work on fortifying Treviso, as a further base from which they could reconquer the mainland. The work was entrusted to a man of God, Fra Giocondo, who energetically razed all the buildings which obstructed the field of fire, and built a low-lying enceinte of curtain walls and semi-circular artillery platforms, with ample space left behind for the construction of *retirate*.

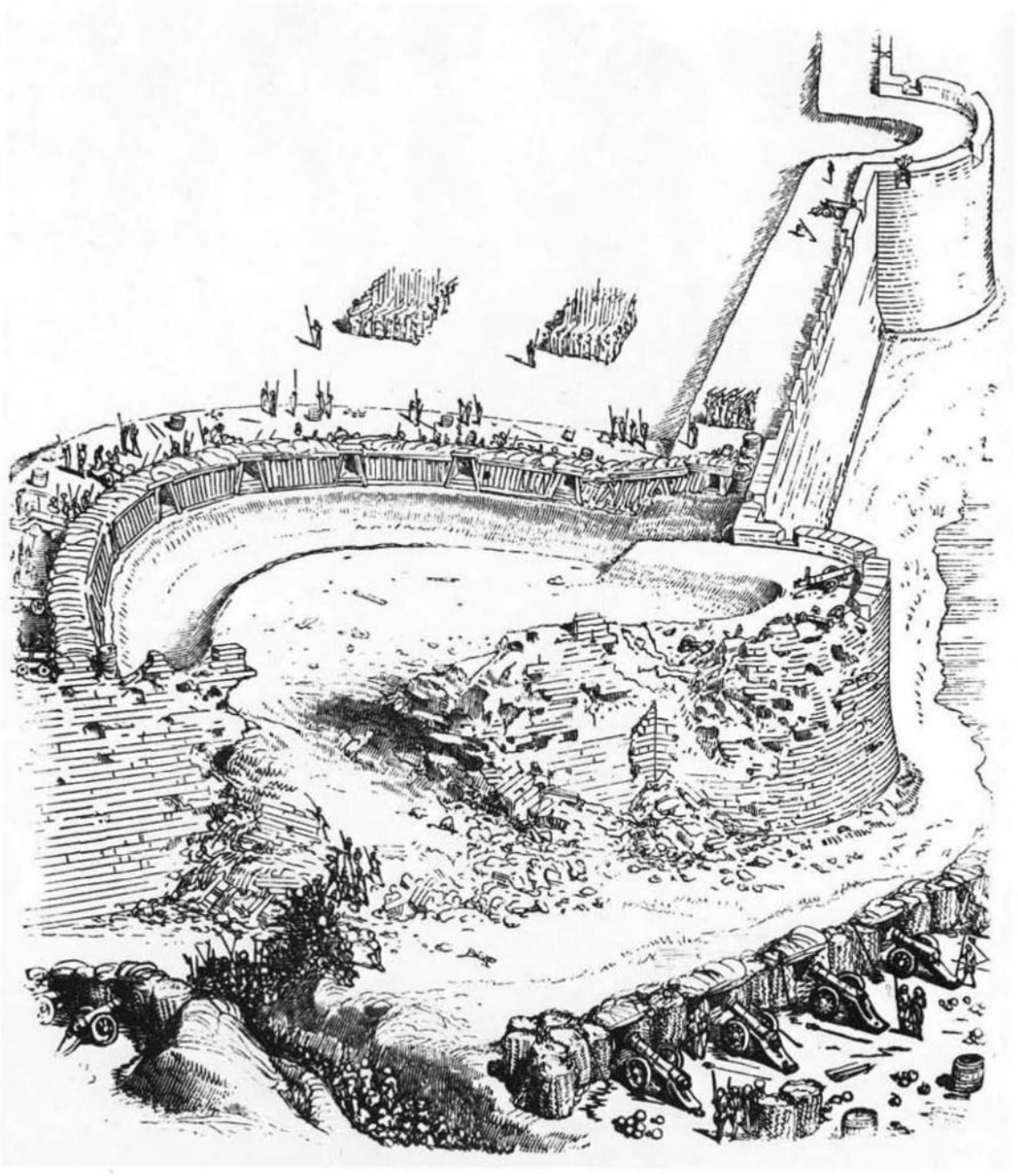
The Holy Alliance and its wars

The further survival of Venice was due partly to the way in which the hostile alliance broke up. The warlike Pope Julius II severed himself from the French in 1510, and in the following year he took a personal hand in the reduction of Mirandola, one of the outer bulwarks of Ferrara, 'regardless of the fact that it was unseemly and unworthy of the dignity of his high office, for a Roman pontiff to lead armies in person against Christian towns' (Guicciardini, 1562, Bk IX).

After this success, Julius brought the Spanish over to his side, and early in 1512 the joint Hispano-papal host of 19,400 men turned against the French garrison in Bologna. Pedro Navarro accompanied the allied army, and he 'attached' a mine near the Castiglione Gate in the hope of repeating his success against the Castle of Uovo in 1503. But this time the defenders knew what was in store for them: having established the precise whereabouts of the tunnellers by placing rattles and bells along the walls, the French sank a shaft into the mine chamber with the object of dissipating the force of the explosion. Thus, when Navarro sprang his mine, the wall was severely shaken but remained intact. The garrison continued to resist until a French army broke through to their relief, leaving the allies with no alternative but to raise the siege.

The success of the countermine at Bologna in 1512 showed that defenders were now capable of resisting the attack in every dimension. The offensive mine had now met its match, in the same way as the siege artillery had been frustrated at Padua three years before.

The Pope won the Imperialists over to his side in



6 Defence of a breach at Siena, showing a *retirata* (Viollet-le-Duc)

1512, which added marvellously to the efficacy, if not the sanctity of the Holy Alliance. The French were therefore compelled to pull out of Italy, but in 1515 they returned in force under the command of the ambitious young king Francis I. Francis reduced the Castle of Milan with the help of Pedro Navarro (who had abandoned his former masters), and in the following year the French gained a peace which confirmed them in undisputed possession of the Duchy of Milan.

War broke out again in 1521. This time Francis was not faced by one of the usual shifting coalitions of Italian princes, but by a constant and deadly enemy in the form of the youthful emperor Charles V, who had received Spain and the Netherlands from the extinct house of Spain, and combined them with his Austrian patrimony to form an immense power-block.

Charles regarded the expulsion of the French from Italy as just the first step towards uniting Europe under the House of Habsburg. What was more, he had the means of putting his intentions into effect. He had inherited fifty calibres of artillery from the Spanish and Austrian arsenals (as opposed to the seventeen which had been bequeathed to Francis), which impelled him to combine all the artillery of the Habsburg lands under a single *General-Zeugmeister*, and hire Netherlandish and Italian experts to simplify and modernise the whole range of guns.

Although the regulations of 1552 still specified fourteen varieties of cannon, from the 98-pounder double cannon down to the one-pounder miniature falconet, Charles's favourite piece was probably the 48-pounder single cannon (Nuremberg weight), a gun which could fire the captured shot of the French 42-pounder cannon (Paris weight), and therefore did not need to be replenished constantly from the distant Imperial arsenals.

The Imperialists eagerly joined in a revived Holy League, and in 1521 the allied army set about besieging Parma, which was the first fortress on the eastern frontier of the Duchy of Milan. The allies, however, proceeded to make a number of mis-calculations, and rather than continue their muddled siege any longer they decided to call off the operation and face the French in the open country. Finding himself the sole object of attention, the French commander Lautrec scattered his troops among a multitude of fortresses, and sedulously kept out of the way of the allies. Thereafter until the peace of 1529, the hold of the Imperialists on North Italy was going to be disturbed only by a series of isolated French incursions, each more disastrous than the last.

Utterly unmemorable at first sight, the campaign of 1521 has an important place in military history, for it saw the first employment of the musket, a six-foot-long hand-gun of one-inch bore, which was levelled on a forked rest for firing, an altogether more formidable weapon than the relatively light arquebus which had preceded it. Although on this occasion the musket was first employed by the Spaniards in the opening stages of their siege of Milan, from now onwards the increasing efficiency of hand-guns in general caused them to be numbered among the most valuable weapons of the defensive. Both the musket and arquebus were equipped with the new inventions of the priming pan and the serpentine match-holder, which meant that the infantryman could devote rather more attention to his aim than to making sure that his gun went off in the first place.

Hand-gunners acquitted themselves very well in defending the breaches at Cremona in 1523 and Marseilles in 1524, and besiegers came to hate and fear the well-aimed musket shot. Thus in 1537 the Imperial commander Del Vasto determined to exact vengeance from the garrison of Carmagnola for the death of the Marquis of Saluzzo, who had been drilled by a sniper during the siege:

> When the defenders came out, Marquis Del Vasto praised them for having fulfilled their duty so well, and asked to be shown the soldier who had fired to such good effect from a certain window over the castle gate. The soldier in question, who did not know the identity of the personage he had shot down, declared that he was the one who had been firing from there. On hearing this, the Marquis disregarded his promises, and had the man seized and strung up from the self same window (Bellay, 1569, 456).

Early in 1522 Lautrec descended into the plain to

do something to help his isolated Italian fortresses. The allied commander Prospero Colonna should now have followed established custom, and abandoned his siege of the Castle of Milan rather than undergo the danger of being attacked in the rear by the relieving army. Instead he stood his ground, heaping up mock ramparts of snow to divert the garrison's attention, and casting up an outer perimeter of lines and strong points facing Lautrec and the open country. Colonna hereby revived a medieval siege procedure which was going to become routine over the next centuries, when the earthworks confronting the fortress went under the name of the 'lines of countervallation', and the ones facing outwards as the 'lines of circumvallation'.

In order to avert an imminent mutiny among his Swiss troops, Lautrec on 27 April launched an assault against one of Colonna's strongpoints, the fortified park of Bicocca about four miles north of Milan. Over one thousand Swiss were cut down by the Imperial artillery before the troops so much as reached the ditch. The bellicose independent spirit of the Swiss was broken for ever, and Lautrec had to lead the French away to shelter among their Venetian allies.

The Swiss heretic Zwingli had been a horrified witness of the slaughter of his countrymen, which only served to intensify his spiritual crisis. It so happened that this was the very time when a certain Spanish nobleman, Ignatius of Loyola, was moved to turn his thoughts to religion while he was nursing a leg which had been shattered at the defence of Pamplona. Such was the contribution of fortress warfare to the respective histories of the Reformation and Counter-Reformation.

There was no saving the French garrisons in Lombardy, after the reverse at Bicocca. The Imperialists proceeded to eliminate the isolated strongholds one by one, and in the summer of 1524 they carried the war into France, advancing through Provence until they were checked at Marseilles.

King Francis believed that the opportunity had come for some dramatic counter-blow. He was weary of the commanders who had led successive armies to their defeat in Italy, but instead of drawing the natural lesson – which was to stay out of that country altogether – he once more led an army across the Alps in person. He was still besieging the fortress of Pavia when the Imperialists combined their forces and bore down on him. Taken between the fortress and the hostile army, Francis was finally routed on 23–24 February 1525.

His army killed or captured, Francis was carried off to Spain as a prisoner. He gave his word – for what little it was worth – never to revive his claims on Italy. This calamity served to confirm military men in their growing belief that truly professional warfare was an affair of cautiously-conducted sieges. As late as the 1550s an able commander like the Marshal de Brissac was prepared to spin out campaign after campaign making minor sieges, and justified himself by recalling the terrible battle of Pavia and the disasters which were liable to overtake people who hazarded everything on a field action.

The Imperialists conducted themselves after the victory of Pavia with a callous arrogance which Europe had already begun to recognise as typically Spanish. The Italian powers accordingly gathered together in a revived Holy League which was directed against the Imperialists, and not, as before, against the French. The French were in no fit state to re-enter Italy, and so for nearly two years the Imperialists were free to exact their vengeance on the individual Italian members of the League. They cleared the Duchy of Milan of the troops of Ludovico Sforza and his allies in 1526, and early in the next year Charles V sent the renegade Constable of Bourbon south with an army to settle accounts with the Pope.

Bourbon's plunder-bent army struck down the central spine of the Apennines, and came before Rome early in May 1527. He split his force into three columns, in order to launch an open escalade of the walls, a kind of attack which had fallen out of fashion since siege artillery had been perfected. He really had no alternative, for his guns were hundreds of miles away by rocky roads.

The assault went in early on the foggy morning of 6 May. Bourbon was killed at the outset of the attack, but his infuriated troops fought their way over the walls and into the city to a chant of '*Carne! Carne! Sangre! Sangre! Cierra! Cierra! Bourbon! Bourbon!*' The Pope and over four thousand of his troops and clergy fled into the Castel Sant'Angelo and

raised the drawbridge in all haste. Those that were left outside had to be pulled up to safety in a basket – St Pauls in reverse. Pope Clement finally capitulated on 6 June, on condition that he ordered all the other papal fortresses to surrender.

Meanwhile, undeterred by the disaster at Pavia, Francis returned from Spanish captivity and made ready to dispatch yet another army into Italy. The French invasion force penetrated as far as the walls of the city of Naples in the spring of 1528, only to be destroyed by the plague and the gathering Imperialists. Out of the original thirty thousand men of the army, scarcely five thousand survivors of this sixteenth-century Stalingrad found their way back to France.

The Neapolitan disaster, taken with some French reverses in northern Italy, sufficed to damp the ebullience even of King Francis. At Cambrai in August 1529 he renewed his renunciation of all the French conquests in Italy.

The allies of France were left to make what terms they could. The Pope eventually went so far as to lend a contingent of troops to the Imperialists, but the Florentine Republic was determined to continue the struggle, with the result that on 24 October the city of Florence found the Prince of Orange with an Imperial army on its doorstep.

The siege of Florence lasted from October 1529 until August 1530. It made no political stir outside Tuscany, and its feeble motions are of only the slightest military significance. At the same time it had a fascination of its own: it concerned the most culturally fertile city of the Renaissance, and it presented Michelangelo with an opportunity of demonstrating just how far he matched the ideal of the Renaissance superman.

Florence had been in a state of excitement ever since the city had expelled the ruling Medici family and restored the republican constitution in May 1527. Michelangelo, as the most accomplished draftsman in the place, was appointed Commissary General of Fortifications, and over the next two years he furnished Florence with a comprehensive system of works. Amongst other enterprises he canalised the Mugnone stream to act as an outer defence, and threw up earthen bastions to protect the gates. He devoted his chief cares, however, to the work of defending the dominating hill of San Miniato outside the city, 'for if it fell to the enemy, the city was lost' (Vasari, 1550, part III). He spent six months surrounding the hill with bastions of earth and fascines, which he supported by timber frameworks and courses of roughly-made bricks of tow and dung.

Michelangelo certainly took his duties as a patriot very seriously, but he never allowed them to interfere with his higher obligations to his art. Thus he travelled to Ferrara with the nominal purpose of inspecting the famous fortifications, and ended up by being persuaded by the duke to paint a magnificent Leda in tempera. All the time he was celebrating the memory of the enemies of the Republic by working in secret on the Medici tomb, with its figures of Dawn and Night and the Dukes Lorenzo and Giuliano.

Considering the labour devoted by great minds to the preparations for the siege, the actual event comes as something of an anti-climax. After making a futile cannonade of a new campanile on the San Miniato hill, the Imperialists settled down into a blockade which lasted the best part of a year until, on 2 August 1530, the lack of provisions persuaded the Florentine commander to capitulate. Michelangelo himself had slipped unheroically away during the investment, but he had been overcome by twinges of conscience and returned while the siege was still in progress.

The Medici were restored to Florence in the person of Duke Alessandro. As one of the most deeply-implicated rebels, Michelangelo prudently stayed in hiding until his former patron Pope Clement VII sought him out and promised that no more would be said of the matter. Michelangelo accompanied the Pope to Rome, and could never quite bring himself to trust the sincerity of Duke Alessandro de' Medici, who invited him in vain to return to his native Florence and help him to choose a site for a new citadel.

Provisional fortification

Over the course of thirty years the defensive had adapted itself with considerable success to withstand the new weapons of the attack. At the beginning