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Weapons, Warfare, Siege Machinery, and Training in Arms

A Overview

Feudal economy and society in the Middle Ages were for a large part organized around mobilizing for, and participating in, warfare. Accordingly, the development and procurement of weapons and armor, the construction and besieging of fortifications, and the realities in training for what was called the “profession of arms” both reflected and affected medieval culture. Weapons, armor, and fortifications were likewise imbued with social, political, and religious significance. In short, to bear arms was to make a statement about one’s place in the world. This reality affected all levels of the social pyramid.

Moreover, how historians have evaluated these realities has been greatly revised in recent years. The military preeminence of the elite armored knight has been questioned, and the role of the common soldier, armed with pole weapons, or, especially, the English longbow, has come to the fore (Bachrach 2006; Rogers, ed., 1995). Rather than pitched battles, it is now obvious that the control of fortified places was key to medieval strategies (Morillo 2003; Gillingham 2004). The stark technological determinism favored by Cold War-era historiography, where military superiority arose from paradigm shifts in weapons technology, has likewise been revised in favor of a nuanced interpretation of gradual evolution of weapons and tactics in conjunction with social factors (Rogers, ed., 1995). Finally, the opinion of fighting techniques of the Middle Ages has been greatly revised, from Egerton Castle’s nineteenth-century opinion that “the rough untutored fighting of the Middle Ages represented faithfully the reign of brute force in social life as well as in politics” (Castle 1885, 6) to acknowledgement of sophisticated military discipline and training in arms. The cultural and sociological implications of these aspects of warfare are significant for our understanding not only of the medieval world, but also of the emergence of modern states and parliamentary democracies.

Furthermore, in the past several decades, the historiography of arms, armor, and their use have come from being mainly an antiquarian interest to a fully invested part of academic discourse. The social-historical turn of the 1960s made clear the importance not just of generalship to the medieval war effort, but also of fundraising, organization, and procurement. Such studies have also made clear the true expense of campaigns. Likewise, scholars of medieval warfare have become increasingly interested in the mentality and culture of the medieval fight-

ing-man. No study of weapons and their use can therefore be undertaken without an understanding of the economics and sociocultural context of war.

We will first address three of the larger historiographical debates—battle-seeking, technological determinism, and the role of infantry—before examining the material aspects of medieval warfare. First amongst these is the feature that defines the landscape, the castle, as well as the weapons designed to counter it, beginning with mechanical devices such as trebuchets and ending with gunpowder. We will then discuss the development of medieval iron smelting and manufacturing technology, and how these technological innovations affected weapons and armor. Finally, we will discuss the culture of training in arms and the cultural context and meaning of bearing weapons in both military and civilian contexts.

I Battle-Seeking

The popular conception of medieval warfare is that of the large, set-piece battle with two opposing armies arrayed on either side of a chosen field—a conception that both reflects our society’s post-Clausewitzian bias and our cinema-influenced imagination. In reality, such occasions were quite rare: Field armies were expensive and difficult to maintain in a world without centralized bureaucratic states, castles and towns were strongpoints and could be defended with relatively few people, or even by women (Eads 2006). This led to one of the essential conundrums of medieval warfare: Sieges were difficult and dangerous, but leaving a manned garrison at one’s rear was strategically unwise (Bradbury 1992).

Yet, since the “wager of battle” was even riskier than a siege—both hinging the fate of an entire campaign on a single hard-to-control event and exposing medieval commanders, who led from the front as their rank demanded, to capture or worse—such events were avoided if at all possible. Rather, sieges and armed raids, or *chevauchées* as they were termed in the Hundred Years’ War, were far more common. The aim in the latter was twofold: to destroy the economic base and shame the foe. As this mode of warfare closely follows the advice given by the fifth-century Roman writer Publius Flavius Vegetius Renatus in his *De Re Militari*, scholars have termed it “Vegetian warfare” (Rogers 2002).

We can most easily see this, in the language of game theory, as a case of “prisoner’s dilemma”: Each commander has the option of seeking or avoiding battle, with the stakes being life and reputation. Should both foolishly rush to battle, both risk disaster and the likely scorn of their peers. Should one seek battle and the other avoid it, then the advantage lies with the battle-avoider in that he can choose his field. This characterizes much of the Hundred Years’ War, such as the campaign of Edward the Black Prince (1330–1376) that culminated in the

Battle of Poitiers in 1356. In this case, the English commander's raid through French territory provoked the French king, John II (1319–1364), to battle; Edward, by dint of being able to choose his ground, emerged with both, while Jean was captured to the detriment of both the French cause and his reputation. If both refrain from battle, both remain fairly safe, even if they do nothing to enhance their standing or reputation. Thus, Vegetian strategy tended to prevail throughout the medieval era, as was recognized by scholars such as R. C. Smail as early as the mid-1950s. As Smail pointed out, the history of the later Crusades was essentially what we would consider "Vegetian," with control of castles and strongpoints key for the relatively outnumbered Europeans (Smail 1956). This conception has since been expanded to most of Europe (Morillo 2003; Gillingham 2004).

Exceptions existed, of course. Civil wars such as the Wars of the Roses tended to seek likewise a definitive end with a minimum of destruction (Morillo 2003). Italian warfare was fully professionalized and likewise tended to limit economic destruction. Also, owing to a relative dearth of fortified strongholds and perhaps cultural factors, set-piece battles were more the norm in Anglo-Saxon England. The fate of England in 1066 was thus settled in two such encounters, Stamford Bridge and Hastings, with William the Conqueror largely completing his conquest within five years. Yet, some of the Normans' first acts were to establish fortifications in the French style.

II Technological Determinism

The Norman adoption of Frankish methodologies highlights an important point: When one speaks of medieval weaponry, what is generally meant is the Frankish way of war—that of the mounted and armored knight. This mode of fighting has lent itself well to various arguments that technological innovation either created this method of fighting (in the Carolingian era) or destroyed it (in the early modern period), with widespread social consequences inevitably ensuing. The most classic and widely cited of these arguments is the idea that the stirrup created feudalism, espoused by Lynn White, Jr. in his Sputnik-era *Medieval Technology and Social Change* (White 1962). In White's words, "Few inventions have been so simple as the stirrup, but few have had so catalytic an influence on history. The requirements of the new mode of warfare which it made possible found expression in a new form of western European society dominated by an aristocracy of warriors endowed with land so that they might fight in a new and highly specialized way" (White 1962, 38). In other words, because mounted warriors could now brace themselves for a charge, a new way of life focused around supporting these new warriors.

This argument was effectively dismantled by Bernard Bachrach, who, in his article “Charles Martel, Mounted Shock Combat, the Stirrup, and Feudalism,” assailed White’s assertions concerning Charles Martel’s organizational changes and seizure of church land in the wake of the supposed adoption of the stirrup (Bachrach 1970). Rather, as Bachrach and others have since argued, the story is not a neat chicken-and-egg situation. Rather, the expense of maintaining armored, mounted soldiers in the absence of a centralized state combined with the legacies of Roman and Germanic culture to give rise to medieval Europe’s unique socioeconomic system (Bachrach 1970; DeVries and Smith 2012). This is not to say that technology had no role in ensuring military supremacy, but technological innovation arises not from a single event, but as part of a network of contingent factors. To return to the stirrup debate, other innovations, such as improved horse breeding, a high-cantled saddle, and horseshoes were also needed to make cavalry more effective. Bachrach thus thoroughly dismissed the most important aspects of White’s thesis.

Likewise, as Alan Williams has pointed out, production of armor and weapons is, in turn, based on iron production ability (Williams 2003). This, in turn, is limited by available technology, labor resources, and infrastructure. As medieval smelting and metalworking technology grew more sophisticated, so, too, did weapons grow more effective. However, the same social factors which allowed an improvement in smelting technology—the ability to raise labor and capital—would also have been advantageous in organizing military campaigns. Similarly, in the debate on efficacy of the longbow, more fully discussed below, one can similarly argue that this is beside the point: The longbow is a relatively simple piece of technology; what is expensive is the training to use it effectively. We could say the English advantage was not a simple curved piece of wood, but a free yeomanry who could be effectively mobilized to use it on the fields of France.

Where technological determinism did certainly have a far-reaching effect was the innovation of gunpowder weapons (albeit one that, as we shall see, was dependent on, and operated in conjunction with, other factors) and in medieval European wars of expansion. While Muslim forces in Iberia or the Middle East enjoyed parity with, or even an advantage over Europeans, the European ability to construct armor, siege engines, crossbows, and other such weapons was a decisive advantage in other places. Robert Bartlett, citing the chronicle of Henry of Livonia, gives the specific example of the Baltic crusades as one place. Other peoples, either those faced with direct confrontation, such as the Scottish, quickly found it to their advantage to adopt the Frankish way of war. The exception to this were such circumstances as Wales, where the terrain and socioeconomic infrastructure were more advantageous to guerilla-style fighting (Bartlett 1993, 71–84).

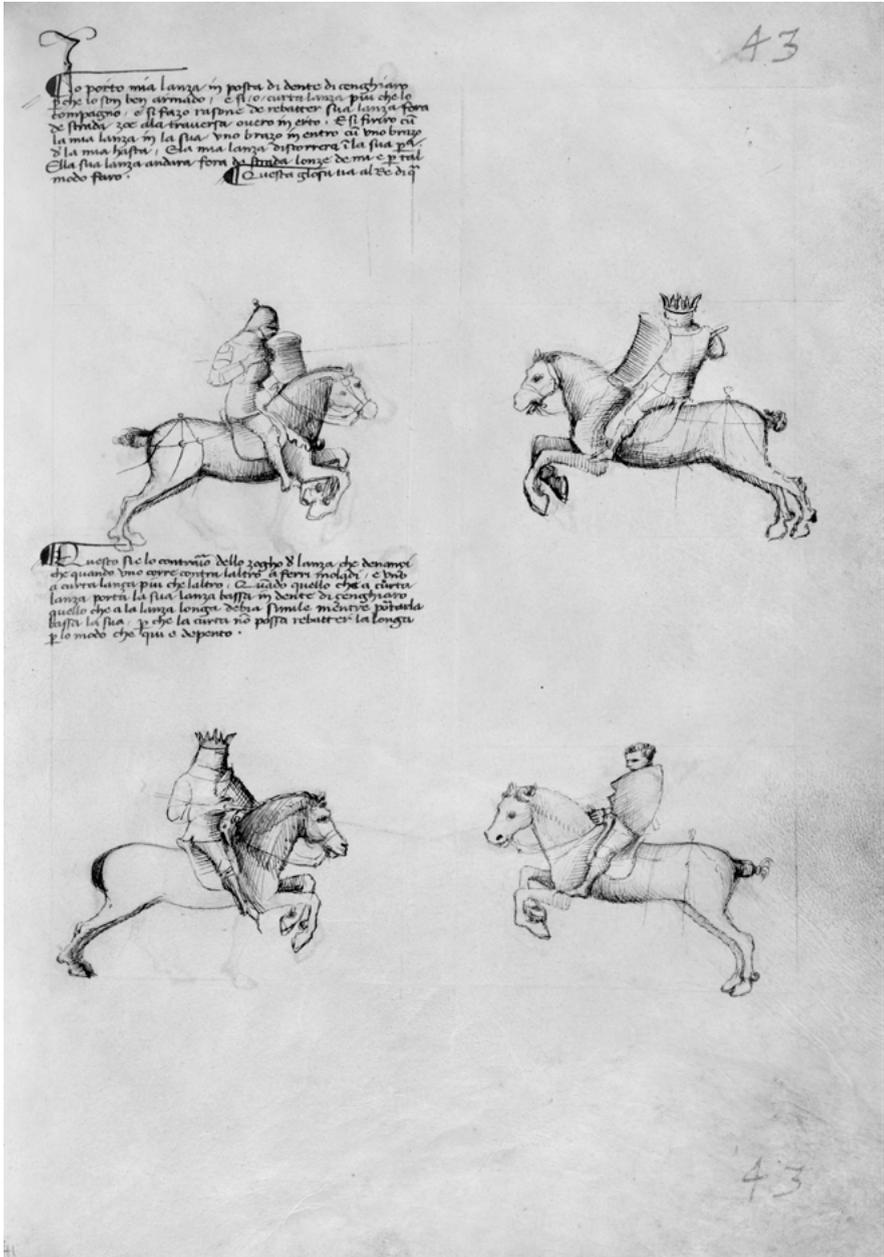


Fig. 1: Equestrian combat from Fiore dei Liberi's Fior di Battaglia (Getty MS Ludwig XV 13), ca. 1410.

III The Role of Infantry

The question of knightly warfare also calls to the fore another question. Victor Davis Hanson, in his controversial *Carnage and Culture: Landmark Battles in the Rise of Western Power* (Hanson 2001), argues that the “Western way of war” is characterized by certain persistent characteristics, including civic militarism and superior technology. This book, much criticized for its reductionist cultural determinacy and emphasis on set-piece battle, nonetheless does raise an important point: The use of infantry in warfare, critical to armies in all periods and all times, is, the astute reader will notice, incompatible with the “Frankish way of war.” The question therefore remains: How important was the infantry?

It is easy to imagine an “invisible infantry,” ignored due to biases of chroniclers drawn from the upper classes and writing for upper-class patrons save for when something remarkable happens. Historians, such as Charles Oman in his classic *History of the Art of War in the Middle Ages* (Oman 1924), seem to have absorbed this bias in repeating the supremacy of the cavalry shock charge, and it has been defended by such scholars as Verbruggen (2005). Against this, DeVries (1996) and Bachrach (2006) have pointed out the centrality of infantry to military policy and operations, while Rogers (1995) has posited a transformation in the fourteenth century. According to the new way of thought, leaders from the Carolingian era to the late Middle Ages and from Western Europe to the Levant, were careful to recruit and efficiently deploy infantry forces.

This is not necessarily a new position: Smail argued for the defensive importance of infantry in the Crusades, though he saw this as “no evidence of professional expertise” (Smail 1956, 119–20). However, it does give a new centrality to the foot soldier even before the military revolution of the sixteenth century. Cavalry cannot garrison a fortress, and foot soldiers from pikemen to archers could not only effectively counter a cavalry charge, but were necessary for taking and holding ground. Crusade chronicles such as the anonymous *Gesta Francorum* and that of Fulcher of Chartres (1059–1127) reveal the defensive role of the infantry; even with allied cavalry repelled, a mass of closely arrayed infantry could still hold the field against Turkish light horsemen. Disciplined, defensive formations of infantry likewise held the field and this won the day in such as the Battle of Poitiers (sometimes called the Battle of Tours) in 732 and the march of the Crusaders in 1096–1097. At the Battle of Courtrai in 1302, well-equipped and disciplined Flemish burghers armed with spears and the spiked mace known as a *goedendag* were able to defeat the flower of French chivalry. Likewise, at Bannockburn in 1314, Scottish troops in disciplined formations were able to repel English cavalry. Crecy, Poitiers, and Agincourt are similarly famous for the English use of archers and dismounted cavalry to defeat French cavalry (DeVries

1996). These remarkable fourteenth-century victories are the reasons why Clifford Rogers has pointed to an “infantry revolution” of the Hundred Years’ War, which, as we shall see below, had far-reaching effects in the political realm (Rogers, ed., 1995).

B Defensive Fortifications

The military significance of castles has already been noted, but in keeping with the interrelation of civil and military power in the medieval milieu, a castle is more than just a fortress: It is also a residence and an assertion of political authority (Bradbury 1992). To place crenellations on a house required royal license in England, and as late as the seventeenth century, part of Richelieu’s plans to centralize monarchical authority in seventeenth-century France included the destruction of the chateaux of the nobility. Thus, a single word encompasses not only both a variety of building styles, but also the intertwined nature of political, legal, and military authority.

While defensive fortifications were known in antiquity—indeed, town walls were the chief obstacle the late Roman Empire placed in the way of invading armies, and arguably remained so through the Carolingian era—the castle in the proper sense began in the ninth and tenth centuries, first as a means of defense against Hungarian and Viking raids and then as a means for local potentates to assert power. Though preceded in some ways by rural barbarian fortresses of late antiquity, so remarkable was this increase in fortification building that in the scholarly literature, to refer to the era of encastellation, is synonymous with the erosion of Carolingian authority. Such rulers as Fulk Nerra, count of Anjou (987–1040) both fortified their own territory and suppressed similar efforts by their rivals (DeVries and Smith 2012, 187–207; Bachrach 1993, 538–60).

These early fortifications often took the form of the motte and bailey castle—a wooden palisade surrounded by a ditch enclosed a courtyard (the bailey), with the tailings heaped into a mound on which a defensible wooden structure was built (the motte). Though vulnerable to fire, they were an effective defense against a hit-and-run raid and could be built fairly rapidly. Owing both to rebuilding on the same site and the perishable nature of the materials, none of these constructions remain today, though they are well attested by archaeology. The date when stone castles became widespread is controversial—Fulk Nerra may have been an early innovator in this regard—but there can be no doubt that by the year 1100, such fortifications, both fortress and residence, was established as a part of the physical and social landscape of northwestern Europe (DeVries and Smith 2012).

While some of the first stone castles were mere rebuildings of the motte and bailey, replacing the wooden motte with a stone counterpart—the so-called “keep and bailey”—tall rectangular tower keeps, such as the White Tower in London, were preferred as more luxurious. Building such thick stone walls required not only the power to purchase or compel labor, but a large degree of architectural know-how. Such buildings were not only defensible, but contained domestic architecture halls, storerooms, kitchens, latrines, bedrooms, and chapels (DeVries and Smith 2012). In this way, the architecture both enclosed and shaped the mechanism of the state apparatus, and domestic terms came to refer to government positions—as can be seen in such terms in the English parliamentary tradition as “privy council” and “cabinet.”

Contact with the Muslim world influenced and improved castle design, and the massive circular Muslim tower keeps along the Catalanian frontier may have been one inspiration for early stone castles. Crusader castles in the Holy Land could resemble the European tower keep, but the form that came to characterize fortifications in the Holy Land, and which influenced later European building, was, rather than a central keep, a complex defended primarily by curtain walls studded by towers. Such complexes, difficult to assault, impressive to the onlooker, and easier and more rapid to construct—but requiring more troops to defend—mirrored the fortified cities of the East. Perhaps the preeminent example of this type is the twelfth-century Krak des Chevaliers in modern Syria (DeVries and Smith 2012).

In its final form, such constructions were nigh-impenetrable fortresses and served to daunt foreign enemies, potential rebels, and restive inhabitants of conquered territories alike. Charles V’s residence at Vincennes, built in the fourteenth century and completed in the fifteenth, exhibits many of the typical features of the medieval castle and will serve as an example. The curtain wall, surrounded by a moat and studded by nine towers that were originally over 40 meters tall, is more than a kilometer long. It has but two entrances: The one a small gate easily defended by pulling up or destroying a narrow bridge, the other defended by an elaborate barbican. The area inside the latter is a veritable killing-ground fronted by murder holes and arrow slits. Within the walls was a wide area for assembly, a chapel, and a keep (*donjon* in French). This donjon, six stories high with towers in each corner, is a fortress in and of itself, with its own defensive wall.

Finally, during the age of gunpowder, the lower, larger *trace italienne* rose in place of the high stone wall. This, with its bastions, ramparts, slopes, ravelins, and overlapping fields of fire, quickly replaced the medieval fortress in the late fifteenth and sixteenth centuries and reached a point of geometrical perfection in the seventeenth. This basic model of fortification remained in use well into the

modern era, when the exploding shell and, finally, air power rendered it altogether obsolete.

C Artillery

Artillery was one of the chief means by which a medieval fortress could be reduced. Such standoff weapons were much less risky to the besieger than a direct assault or mining, and swifter than the process of waiting for hunger and disease to take their toll.

Early medieval armies inherited a variety of devices from the ancient world. While simple tools such as scaling ladders, siege towers, battering rams (and movable galleries to protect their users from attack from above) probably never fell out of favor, artillery was limited to devices that could mechanically propel missiles. This included forms of catapult such as the mangonel or onagers and the ballista, which worked on torsion principles—of a twisted rope in the case of the mangonel or onager (the latter named for the kick such a torsion system's release created), and of a composite bowstaff in the case of a ballista. These are attested in Byzantine sources. The counterweight trebuchet—distinguished from the torsion catapult—first appeared in about the thirteenth century and was a great improvement over its predecessor. In this, a weight mounted on the shorter end of a lever arm is released, accelerating the longer end. At the terminus of the arc, the arm is stopped and the payload propelled to the target by its own inertia.

Of special note is the incendiary weapon known as “Greek fire.” This was a burning liquid, most likely from natural petroleum, combined with a pressurized siphon to project the substance at the adversary (Haldon 2006). This was first attested in about the seventh century c.e. by Byzantine savants, though combining the siphon with the incendiary was really only an improvement on a weapon known since Hellenistic times. The Byzantines kept the technology a closely guarded secret, but the knowledge was lost by the thirteenth century.

Other special ammunition included decapitated heads (as was done by the Crusaders at Nicea) or infected corpses (as was done by the Mongols), which would have an effect on the adversary's morale and/or health. By far, however, the most effective projectile developed in the Middle Ages was the cannon ball. Gunpowder artillery, introduced in the fifteenth century, could reduce an otherwise invulnerable fortress and quickly rendered most forms of defensive architecture obsolete. With the stalemate of Vegetian warfare ended, leaders turned more to the wager of the battle. The age of the castle was over. In this way, Mehmet II's use of cannon to batter a breach in the walls of Constantinople in 1453 was the end of an era in more ways than one.

D The Knight and the Blast Furnace

Before discussing personal weaponry, a brief note on the technological limits of medieval arms industry is appropriate. The prerequisite for a large-scale munitions industry producing is a sufficient supply of iron. To refine iron requires the heating of the iron oxides present in raw ore in a chemically reducing environment at about 1200 degrees centigrade. The earliest form of iron production is *bloomery smelting*, in which a structure of brick or clay is constructed and iron ore and charcoal are heated with a charcoal fire. The structure can then be opened or dismantled to obtain a mass of porous, low-carbon wrought iron with a fairly high slag content, which can be heated and forged to better distribute the slag. Furnaces were small and yields were low: Experimental archaeology has suggested between 3.8 and 6.5 kg of iron per smelt. Williams has concluded from this that while this might be fine for smaller implements such as swords, only relatively small armor plates could possibly be forged.

Obtaining material suitable for weapons involved several further steps beyond such smelting. Steel is nothing more than iron with from 1 to 2% carbon inclusion; however, for the iron to melt and absorb carbon in the smelting process would have resulted in a mass of unworkable pig iron. One could break up and pick out the hardest bits of the bloom, as was done by Japanese swordsmiths, but this is inefficient. The European solution, as will be discussed below, was to add carbon in the process of forging the particular implement, be it sword or armor (Williams 2003, 7).

The blast furnace came about in the thirteenth century (Jockenhövel et al. 1997). This was a vast improvement on bloomery smelting: By using flux (in the form of limestone) and continually pumping in oxygen (by bellows), superior yields could be produced. The process was likely spread by Cistercian monks, who were known as skilled metallurgist technological innovators and capitalists who, for instance, dominated the iron industry in the Champagne region throughout our period. As Williams points out, weights of excavated European blooms increased between the years of 1000 to 1400, representing gradually improving production (Williams 2003, 87–88). At first, these yields were relatively high in slag content, and thus, while able to produce wrought iron, were not as useful for weapons. As the problem of slag content was solved, this, in turn, allowed weapons and armor to be made of larger, more homogeneous, and higher-quality pieces of iron and steel.

Such an industry was vitally dependent on waterpower: Waterwheels could vastly increase production of high-quality iron blooms by powering bellows to improve airflow, and thus yields, for the smelting process, as well as trip-hammers to hammer out the results. It was thus not until the later fourteenth

century when waterpower was (arguably) freed from subsistence-agriculture grain milling in the population-depleted post-Plague environment, that the arming industry really took off and plate armor became commonplace.

E Armor

Without a doubt, metal armor represented a minority of that worn in the period in question—though it undoubtedly became more widespread in the late Middle Ages. Fabric and leather, as well as composites of such organic materials and metal, were inexpensive, easier to construct, and thus more common. Fabric armor known as a gambeson was worn underneath mail throughout the period to protect the wearer, absorb impact, form a secondary layer of defense, and provide a foundation garment to which pieces of armor were tied or “pointed.” After the introduction of full plate armor in the late fourteenth and early fifteenth centuries, a tightly fitting arming doublet provided the same function. In fact, we can easily see the mutual interdependence of the development of fashion and the development of armor, from the long hems and flowing lines of the thirteenth century that can be seen both in Gothic depictions of kings and saints and the mail hauberk of the knight, to the more tightly fitted silhouette of the fourteenth century with small waist and puffed-out chest, to the athletic profile of fifteenth century plate armor, which was tightly fitted to the wearer’s body. Later, in the sixteenth century, armor could even imitate the folds of civilian clothing or, in the case of the fantastic mannerist creations of the Negroli of Milan, reshape its wearer’s body to emulate that of Hercules or another mythological figure.

Other forms of fabric defense included the padded fabric coat called a jupon, which was frequently worn over mail and plate armor as an additional defense in the late fourteenth century. Two long-lived and widely used fabric defenses were the coat of plates or brigandine, which consisted of metal plates riveted to a fabric or leather outer layer, and the jack, or padded coat. Louis XI of France specified in a 1483 ordinance that such a jack ought to have no less than twenty-five layers of linen, and preferably thirty, topped by a stag’s skin. This would have given excellent protection against both hand and missile weapons. Two beautiful examples of jacks, stained with rust from where they were no doubt reinforced with metal plackarts (stomachers), survive in the Holstentor Museum in Lübeck and the *Altmärkisches Museum* in Stendal (both northern Germany).

Organic armors were not, of course, restricted to common soldiers, but could be objects of conspicuous consumption. René of Anjou, for instance, specifies in his *Livre des tournois* (BnF MS Fr. 2695) from ca. 1460 that tournament armor could be of cuir bouilli, that is, hardened leather, and the accompanying illustra-

tion shows a fairly complex, shaped, and decorated piece of equipment. Likewise, the British Museum holds an ornately decorated late fourteenth-century rerebrace, or upper-arm defense, of cuir bouilli (MLA 56,7–1,1665). Owing to its general toughness, lightweight, and the large size of a hide, leather was particularly apt for horse armor. (One rare surviving example is in the holdings of the Metropolitan Museum of Art, accession 26.235.1–3). However, owing to their organic construction, such armors have rarely come down to us, and they did not greatly interest the nineteenth-century collectors whose acquisitions form most modern museum collections. Interpreting their presence and construction from artistic sources is fraught with problems, as medieval art was not naturalistic. Furthermore, since they are easily constructed out of what would have been commonplace materials, they do not represent the progression of medieval materials technology as well as metal armor does. We therefore will largely restrict ourselves to metal armor (Zijlstra-Zweens 1988).

I The Age of Mail

Mail armor consists of iron drawn or hammered into wire, coiled into rings, hammered flat, and then interlinked into a mesh, with the ends of the rings closed by forge-welding or (more commonly) riveting. This mesh is then tailored into a garment. Such armor was ideally suited to early medieval technology: Not only could it be constructed out of whatever heterogeneous scraps of iron were at hand, but the softness of the iron was an asset, as it would deform, rather than snap, under stress (Williams 2003, 29–33; and *passim*). Furthermore, such a flexible armor could be worn by men of different sizes, and thus has a working life longer than that of the individual warrior. Thus, while labor-intensive (Williams estimates 750–1000 man-hours), in a milieu where iron production was limited, it was far more practical and economical than plate armor. Mail is of considerable antiquity; the first known examples date from third century B.C.E. Celtic grave finds, and was quickly adapted by the Romans. To save time, it has been hypothesized that the Romans might have made alternate rows of their armor out of solid pieces punched out of a sheet of metal, but Williams points out that no conclusive evidence exists that constructing such a sheet was feasible with contemporary technology, and it certainly was not with early medieval technology (Williams 2003, 31).

Scale and lamellar armor were also used by the Romans, and may have been popular through the early Middle Ages. Their manufacture continued in Byzantium, to be sure. Early helmets tended to be of the so-called *Spangenhelm* type, with several triangular plates riveted to the iron strapwork that gives the helmet its

name. Like mail armor, this could be made from several pieces of heterogeneous iron. Another was the *Lamellenhelm*, where scale plates, such as those from a lamellar armor, were similarly attached to a framework. Such remained the primary forms of helmet from roughly the third century until the eleventh (Williams 2003, 35).

Mail armor remained the primary defense of the early medieval fighting-man so lucky as to be able to afford such protection. While Bachrach theorizes that some Carolingian troops may have been issued some weapons from a central imperial depot, the expense of horse and armor, which could be as much as the cost of twenty cows, as well the need for extensive training that precluded other economic activity, required the cavalryman to be a full-time soldier who derived his income, and paid for his own equipment, from lands held from his overlord (Verbruggen 1997; Bachrach 2001, 63; 92; 100). Thus were laid the seeds of feudalism.

Helmets began to assume the familiar “barrel” or “pot” shape in the eleventh century. While providing more complete coverage, these were still assembled from several pieces of rather ductile iron. An episode from the life of William the Marshal finds him after a tournament with his head on a blacksmith’s anvil, the smith laboring to remove the helm which had become so deformed with his opponents’ blows that the Marshal’s head was trapped therein.

II The Age of Plate

Mail remained the primary defense well into the fifteenth century (and even later in the New World), though those who could afford to increasingly supplemented it by other sorts of protection. First, in the thirteenth century, this was pieces of iron or cuir bouilli plates riveted to a poncho-like garment and known as a “coat of plates.” During the course of the fourteenth century, as technological ability increased, these plates, such as those forming the coats of plates excavated at Wisby, Gotland, Sweden (which were probably antiquated when they were buried along with their vanquished wearers in 1361) grew larger, eventually becoming a full breastplate and backplate. By the beginning of the fifteenth century, this lost its fabric covering and became known as “white armor,” while the excess mail was discarded in favor of patches sewn to the supporting garment in vulnerable points (Williams 2003, 39–44, 918–19). Similarly, the old-style great helm, riveted together out of several small plates, was replaced by the bascinet raised from a single piece of metal. Even the horses of the elite began to be covered with large, protective plates of metal. However, cloth armored coverings always remained, even if they are rarely represented in museum collections. For instance, tyro

jousters in fifteenth-century Iberia wore “white armor,” while experienced men wore surcoats over their harness (Fallows 2010, 80), while fabric-covered breast-plates are depicted in many examples of fifteenth-century northern European art. Besides its decorative function, this would have kept the wearer cooler in the summer and warmer in the winter, as well as impeded rust.

As noted above, the reason for plate armor superseding mail cannot be attributed solely to an arms race: The transition to armor made of large plates only took place in the wake of the post-Plague reorganization of the medieval economy. Hydropower resources, freed from grinding grain for a teeming population, could power the blast furnaces used to produce the steels used for plate armor. Rather than relying on the soft iron used in mail, powered machinery was now available to hammer out iron ingots and roll them into workable plates. Further, the increased wages found in the post-Black Death economy meant that plate became cheaper to make relative to labor-intensive mail (Williams 2003, 43).

Lombardy was the preeminent center of European armor production. The reasons for this were several: The Cisalpine region, with its network of canals, had ample waterpower and a well-developed milling industry, and indeed, the first mill-powered blast furnace was found in Trent in 1214 (Munro 2002, 20). After the population decline of the Black Death eased the pressure on the grain mills there would have been ample surplus power, and the location had access to both raw materials and markets via the Alpine trade routes. Finally, armorers likely had access to capital both from well-developed moneylending practices and upper-class investment (the Visconti perhaps helped with the start-up costs of Milan’s iron-mills, as Duke Cosimo di Medici attempted to do in order to build a domestic Tuscan armor industry in the sixteenth century), and armorers such as the Missaglia and Negroli surely had access to family networks of credit. Also, armor is a product that, like English wool, was both in high demand and easily transportable. Francesco Datini, for instance, the famous merchant of Prato, carried on a lively trade in armor between Milan and Avignon in the 1360s.

Though various legislation existed commanding freemen to keep arms, the primary consumers of the mill-driven manufacture of high-quality armor was the seigniorial class, who saw their earthly profession as fighting wars, taking part in tournaments, and arming and clothing retainers. While we can perhaps never know how much was spent on armor all over Europe in the period from 1348 on, we can say that the wealth of Europe, extorted through the tax system, was concentrated on buying these goods. In this sense, the growth of industrial mills used for armor production was driven by the seigniorial class—albeit as consumers, not producers. The idea of seigniorial *consumption* driving the growth of medieval industry, however, is an aspect of the debate that is yet to be amply explored.

Williams's survey of the microcrystalline structure of a variety of armors reveals a number of construction methods. Though Augsburg and Innsbruck were important armor-making centers, the pinnacle of the industry was fifteenth-century Milanese armor, which was constructed almost universally from steel (rather than low-carbon iron). Other cities, such as Nuremberg and Augsburg also had thriving armor industries, but the quality of their metal never matched that of Milan. High-end Milanese armor was also hardened and tempered, usually by heating it and then slack quenching in a liquid medium other than water, such as oil, thus producing (provided the right material was used) a steel that was both hard and tough. Lacking accurate gauges of temperature, this would have been done entirely by the color of the heated metal. The exact process and quenching medium would have been a closely guarded craft secret. This industry enabled the Missaglia family of Milan to rise from the merely fabulously wealthy proprietors of a vertically integrated and franchised armor-making empire to the ranks of the minor nobility. The Italian armor industry only fell into decline in the upheavals of the sixteenth century, ceasing to use steel, placing greater emphasis on display than protection, and instead constructing pieces of greater thickness where protection was needed (Williams 2003). Milan was eclipsed by local armor-making centers, such as those at Greenwich, founded by Henry VIII.

F Personal Weapons

I Early Middle Ages

By late Merovingian times, the Franks had by and large abandoned their typical ethnic weapons such as the *francisca* axe and adopted military armaments based on those of the Roman Empire (Bachrach 2001, 84–85). Roman authors distinguished between the *spatha*, or cavalryman's long sword, and the *gladius*, a shorter, thrusting sword for the infantry. Carolingian authors such as Rhabanus Maurus (ca. 780–856), in his paraphrase of Vegetius, likewise used these words for similar post-Roman weapons. Thus, those weapons descended from the wide-bladed, thrusting *sax* or *scramasax* were called *gladii* in the sources, while longer cutting or slashing swords were *spathae* (Bachrach 2001, 90).

The ideal sword (or for that matter, spearhead or other hand weapon) combines several seemingly contradictory characteristics: It must be hard enough to take a sharp edge and damage its intended target, yet flexible enough to withstand the stresses of combat. Iron by itself is too soft to take an edge and will easily bend; a steel sword that is too hard can be made very sharp, but easily snap. These characteristics are best obtained by using a single homogeneous

piece of steel that is then treated by some form of quenching to create the form of crystalline structure known as martensite, making it very hard but brittle, and then tempered to soften and toughen it. Folding and forging a heterogeneous piece steel into a blade is a second-best method, followed by forge-welding two pieces; creating an iron core with steel edges forge-welded on; and creating an iron weapon with edges hardened. Case hardening, in which the outer layers of an iron artifact are heated in the presence of carbon to produce a thin layer of steel, was mentioned by Theophilus around 1100 as an appropriate technique for small tools such as files, but was probably known much earlier (Williams 2003, 2012).

Whereas Roman swords were frequently made of iron with edges hardened by tempering, early medieval swords were made from the second and third methods, that is, pattern welding. Sometimes called “false Damascus,” pattern welding was not unlike the process used by Japanese swordsmiths. To construct a sword with this process was a laborious process. First, the bloom would have to be broken up and picked through for pieces of superior-quality metal. Heterogeneous pieces of metal could be combined into one weapon, or a steel edge would be forge-welded onto a softer core. Though the literature predominantly treats sword blades, these techniques were also used for tools and weapons such as axes and lances (Williams 2003, 2012).

“True” Damascus—wootz, or crucible steel—was made from iron ingots heated with charcoal and allowed to cool slowly, producing a relatively high-carbon steel. This was then forged into sword blades. The forging process both broke up the carbon structure that would have otherwise caused brittleness, and gave the characteristic “watered silk” pattern. Such blades were of superior quality, both strong and capable of taking a keen edge. As their name implies, the technique was predominantly practiced in the Muslim world, though crucible steel was an item of Baltic trade in the Viking era, and Scandinavian swords were made with a variety of methods (Williams 2003, 2012).

The early medieval swordsmith would have been a treasured resource, and such craft knowledge as how to select materials, forge-weld them together, and temper and harden them (done entirely by the color of the metal) would have been closely guarded secrets. In the early ninth-century Carolingian *Capitulare de villis*, for instance, swordsmiths were one of the types of workers stewards were required to make an accounting of. We can easily see such men as providing an archetype for such characters as Wieland the Smith of Anglo-Saxon, Germanic, and Norse legend. Some weapons were even inscribed with makers’ names, such as Ulfbert and Ingelri, as marks of quality. These were, in turn, sometimes counterfeited, much as was done for sixteenth- and seventeenth-centuries swordsmiths such as Andrea Ferrara and Tomás de Ayala.

II High Middle Ages

By the eleventh century iron blooms had reached a size where pattern welding fell out of favor and swords began to be made of more homogeneous pieces of steel (Williams, 2003, 2012). One way in which the typical knightly sword of the high Middle Ages did not differ greatly from its earlier antecedents was its blade geometry, indicating roughly similar methods of use. What did change, however, were the furnishings. While the pommel adapted a “brazil nut” configuration, the quillons became more elongated, giving the weapon a cruciform shape.

This latter change in form, more than anything else, bespeaks the place of the sword in medieval culture: The sword is synonymous with lawful authority and maintaining the order of the world. Roland’s sword in the eponymous *Chanson de Roland* (ca. 1160) is given him by Charlemagne; before dying the paladin remarks that “he who inherits it will say, ‘It was the sword of a noble vassal’”—that is, one who bears authority in the name of the king. This symbolism could be deployed for a variety of purposes: Quite counter to church fathers such as Augustine, who used weapons as relatively negative and pessimistic metaphors, Boniface VIII, in his 1302 bull *Unam Sanctum*, conceived of the authority of the Church as two swords, the spiritual and the temporal. This assertion of papal supremacy was a renovation of statements on the nature of secular and sacred authority by Eugenius III and St. Bernard (in his letter to the former), who were in turn perhaps indebted to Henry IV’s 1076 letter to the Bishops of Germany, and ultimately Christ’s ambiguous statement in Luke 22:38.

This spiritual sense of the sword clearly affected, and might have in face proceeded from, the *milites* themselves. Religious inscriptions are common on such weapons, and the ceremony of knighthood took on many of the aspects of clerical ordination (Kaeuper 2009). Even if the other items in a knight’s panoply did not have the strong symbolism of the sword, they likewise had a powerful place in medieval mentalities and in the shaping of medieval society. A stunning mid-thirteenth century illustration in British Library Harley 3244, inserted as a frontispiece to William Peraldus’ encyclopedia of virtues and vices and explored by Richard Kaeuper in his *Holy Warriors* (2009), gives religious significance to every part of the knight and his equipment: The horse’s loins, which drive him forward on the charge, are “good will”; the saddle is “the Christian religion,” the sword is, as Paul had it, “the word of God”; his spear is “perseverance”; his shield bears the Holy Trinity. The metaphorical meanings of weapons are also deployed by other writers. For instance, a few decades after the composition of Harley 3244, Ramon Llull in his *Llibre de l’orde de cavalleria*, similarly interprets the knight’s sword, lance, and other weapons and armor. Perhaps the best-known example of this genre is the anonymous fourteenth-century *Ordène*

de Chevalerie, in which the protagonist, Hugh of Tabarie, explains to Saladin the meaning of all the gear given to a man during his elevation to knighthood, such as spurs to run to do good, a white belt for chastity, and a two-edged sword to perform both “right and loyalty” (as William Morris’s 1893 translation puts it). In the thirteenth-century *Prose Lancelot*, Arthur forgets to perform the sword-girding part of the ceremony and this task unnaturally falls to Guinevere, thus foreshadowing and arguably predestining their illicit love.

The sword was not the only knightly weapon to be imbued with symbolism. Other such weapons were also given significance. For instance, the protagonist of Getty Museum’s sumptuous manuscript of *Vision of Tondal* (created for Margaret of York, Duchess of Burgundy, ca. 1470) carries a poleaxe (a favored foot weapon of the northern European chivalry) everywhere with him as a symbol of his love of worldly glory. Lances also had significance—most notably the Holy Lance found by Peter Bartholomew in Antioch in 1098, with other examples of the relic similarly appearing in France and Germany.

Weapons could also meet with opprobrium. Knightly equipment being a chance for conspicuous consumption, also drew censure from moralists. St. Bernard in his *De laude novae militiae* excoriated the worldly knights who sported gilded horse tack, and such were forbidden to the military orders. The 29th canon of the Second Lateran Council in 1139 banned slingers and archers from using their art against fellow Christians under penalty of anathematization (it did not, as is commonly held, ban crossbows). This might be speaking only of “friendly” tournaments and sporting events, or a reference to the use of arrows in warfare.

The crossbow itself debuted by the time of the First Crusade; Anna Comnena (1083–1153) describes it as a western invention unknown to the Greeks. It was improved by making the prod of a composite of wood, sinew, and horn, and then in the fifteenth century by tempered steel prods. With increased power came the need for mechanical means of drawing it. Thus, it could be a devastating weapon, but was slow, expensive, and heavy.

The import attached to the English longbow is interesting from both the point of view both of history and historiography. The longbow, maintained uniquely in England while most of the rest of Europe had adopted the crossbow by the twelfth century, has become part of national myth, credited for the victories at Poitiers, at Crecy, and at Agincourt. Yet, the archers at these battles had the advantage of a strong defensive position: At the lesser-known but also significant battles of Verneuil and Patay, the French cavalry inflicted losses before the English could set up their palisade—devastating losses in the latter case.

There is something of a controversy concerning the efficacy of the longbow. Kelly DeVries has taken a revisionist tack, stating that longbowmen “could not

have caused the losses of life attributed to them by historians” and instead holds that harassing fire could force a charge into a fortified defensive infantry formation (DeVries and Smith 2012, 39). Against this, Clifford Rogers has maintained the effectiveness of the longbow as a weapon that could and did seriously wound or kill horses and men (Rogers 1998).

Key to this discussion is draw weight, and thus penetration power, of the English longbow. Wooden artifacts, particularly those in constant use, do not survive their working lives, and so, until fairly recently, the penetration power of the longbow has been reckoned primarily from chronicle sources, such as Gerald of Wales’ account of a shaft penetrating a knight’s armor, thigh, saddle, and horse. The underwater archaeology of the longbows that sank with the *Mary Rose*, the pride of Henry VIII’s fleet, in 1545 provide us with more definite data. The bows so excavated have a variety of estimated draw weights, from 110 lb (45 kg) to about 180 lb (81.5 kg), with most between 150 and 160 lbs (68–72.5 kg)—very heavy for modern archers, but in keeping with what a man who had trained in archery since youth, and who was trained to “lay his body in his bow” (as Hugh Latimer put it), might be able to shoot accurately (Strickland and Hardy 2011, 13–19). This would, at the median range, give a penetration power of 146 joules. According to Alan Williams, this is more than enough energy to penetrate 1.5 mm of mild steel. Actual ability to penetrate medieval armor and reach flesh would, of course, depend on many factors, including the metallurgy of the armor, the angle at which the missile struck a glancing surface, and the presence of a covering layer of fabric armor that could provide additional protection. Williams, taking into account every conceivable factor, concludes that most higher-end armor plate of the early fifteenth century would have been proof against arrows (Williams 2003, 927–49). This, of course does not account for less-protected parts of the body, or the all-important horse, remaining vulnerable.

III Late Middle Ages

The greatest change in the hand weapons of the late Middle Ages was geometrical: The need to defeat plate armor led fighters of the fourteenth and fifteenth centuries to prefer more acute angles in the form of pointed sword blades and penetrating spikes. Sword tempering was further developed, allowing long, thin *estocs* and acutely pointed longswords designed to penetrate the gaps in plate armor—and, eventually, in the latter half of the sixteenth century, the civilian rapier (Williams 2003, 12). The spike-like rondel dagger likewise was designed to punch through the weak points at the neck, shoulder, armpit, and groin where a man-at-arms was protected only by mail.

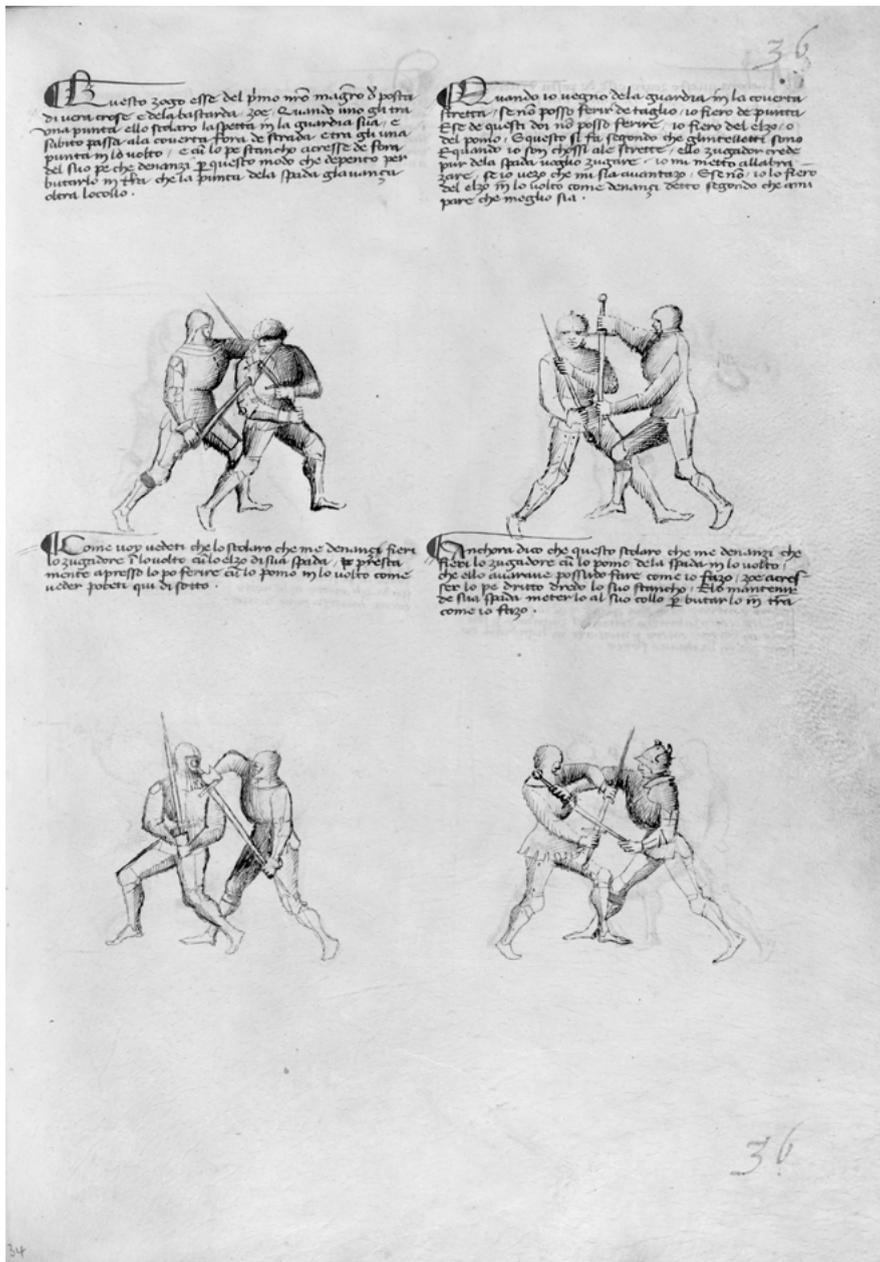


Fig. 2: Fighting with swords in armor from Fiore dei Liberi's *Fior di Battaglia* (Getty MS Ludwig XV 13), ca. 1410.

However, as noted above, by far the greatest single innovation in late medieval warfare was gunpowder. In a very real way, the expense of large standing armies and gunpowder weapons that gave rise to nation-states by necessitating centralized bureaucracy. Williams notes that early handguns could penetrate lower-end contemporary armor (Williams 2003, 927–49). Armorers nonetheless kept pace with these innovations, and were able to offer armor “of proof” (that is, impenetrable to most bullets) into the seventeenth century—though such items could be very heavy, and were reduced in most circumstances to a breastplate and open-faced helmet. Of course, the real way in which gunpowder weaponry made itself felt was in the ability of swiftly reducing a fortress, thus ending medieval “Vegetian warfare” and placing power in the hands of those who could afford a standing army and the bureaucratic apparatus to keep it supplied. This, in turn, led to the consolidation of modern states.

G Personal Weapons and Training in their Use

I Weapons Ownership

Before examining training in arms of weapons, it is appropriate to discuss first the ownership of weapons in medieval society. In the Middle Ages, as now, the ownership of weapons was the subject of legal regulation—with the caveat that we have more documents commanding the ownership of weapons by men of a certain social level than we have restricting weapons ownership entirely. Men of sufficient property from Carolingian times until the end of our period had to own weapons or pay a fine. Weapons are frequently found in middle-class wills and inquisitiones post mortem throughout Europe. English peasants were not forbidden bows, but rather commanded to practice assiduously their archery; prohibitions were only laid upon carrying the weapons into the woods. There can be no doubt that the bearing of weapons—and, we can assume, their use—was ubiquitous for all classes of free men.

Moreover, in a world where bearing arms was synonymous with enfranchisement, weapons were also a fashionable statement of masculinity—a visible sign of readiness and ability to avenge impingement of honor or other insult. Daggers were an everyday dress accessory, while swords would only be worn if traveling or on campaign. “There is no man worth a leke, Be he sturdy, be he meke, but he bear a basilard [type of dagger or short sword],” as one fifteenth-century English rhyme found in Sloane MS 2593 fatuously put it. Chaucer’s miller carries a sword and buckler (the countryman’s weapon up until the late sixteenth century, as Shakespeare and George Silver make clear), and the audience of the fifteenth-

century Robin Hood ballads would have been familiar with the quarterstaves and two-handed swords which the protagonist wielded. Not only do armed assaults and other crimes that make it apparent that weapons were near at hand frequently appear in legal records, but feuds between families and factions were not uncommon (Smail 1996); fencing masters such as Fiore dei Liberi give many techniques for dealing with a sudden attack by a dagger-wielding opponent. The town of London in the fourteenth century did not forbid the carrying of knives, but only that a knight's sword be carried before him by a page who himself would carry no dagger, but only a basilard.

The judicial duel was the ultimate legal sanctioning of violence—a way, in the absence of a strong state, court system, or police force, to confine conflict between factions or parties. Thus, as the judicial duel tended to exist more in situations where the legal system was weak; a late example was the de Carrouges/Le Gris affair in 1386, which was the last criminal duel to be ordered by the Parlement of Paris. However, an entire jurisprudence allowing for such proceedings in civil cases developed late in our period, beginning with Giovanni da Legnano in the late fourteenth century. The last officially sanctioned duel of this sort to occur in France was the Chataigneraie-Jarnac duel in 1547; the twenty-fourth session of the Council of Trent forbade them in 1563, and so the duel remained an extralegal occurrence for settling private conflicts until its final extinction in the mid-twentieth century.

The clergy were not immune to this societal bellicosity. Not only could monks and monasteries also be parties in judicial duels, but Joinville, in his *Life of St. Louis* (ca. 1309), gives the example of a clerk who hunts down and kills three soldiers-turned-robbers, and in turn is drafted by the king into the crusading army. Joinville also boasts that his own priest routed eight Saracens. University students in Oxford and Paris were addicted to sword and buckler fencing, to such a point that the universities had to compose regulations against it, and armed brawls of students against townsmen were not uncommon. (One resulted in the University of Paris strike in 1229 and Gregory IX's issuing of the bull *parens scientiarum* in 1231.) Likewise, the earliest known work of European martial arts literature, the Walpurgis Fechtbuch (Cotton MS I.33, composed in a cathedral school in southern Germany ca. 1320) shows a priest, student, and woman named Walpurgis fencing with sword and buckler.

The sword, as stated previously, was not worn in everyday civilian contexts. This changed in fifteenth-century Spain with the development of the *espada ropera*, or “dress sword.” This fashion quickly spread to the rest of Europe. For instance, in accounts of the Pazzi conspiracy, the fact that the Medici are wearing swords to church is not considered unusual. This would, in turn, influence the development of the rapier, the specifically civilian sword of the Renaissance. The

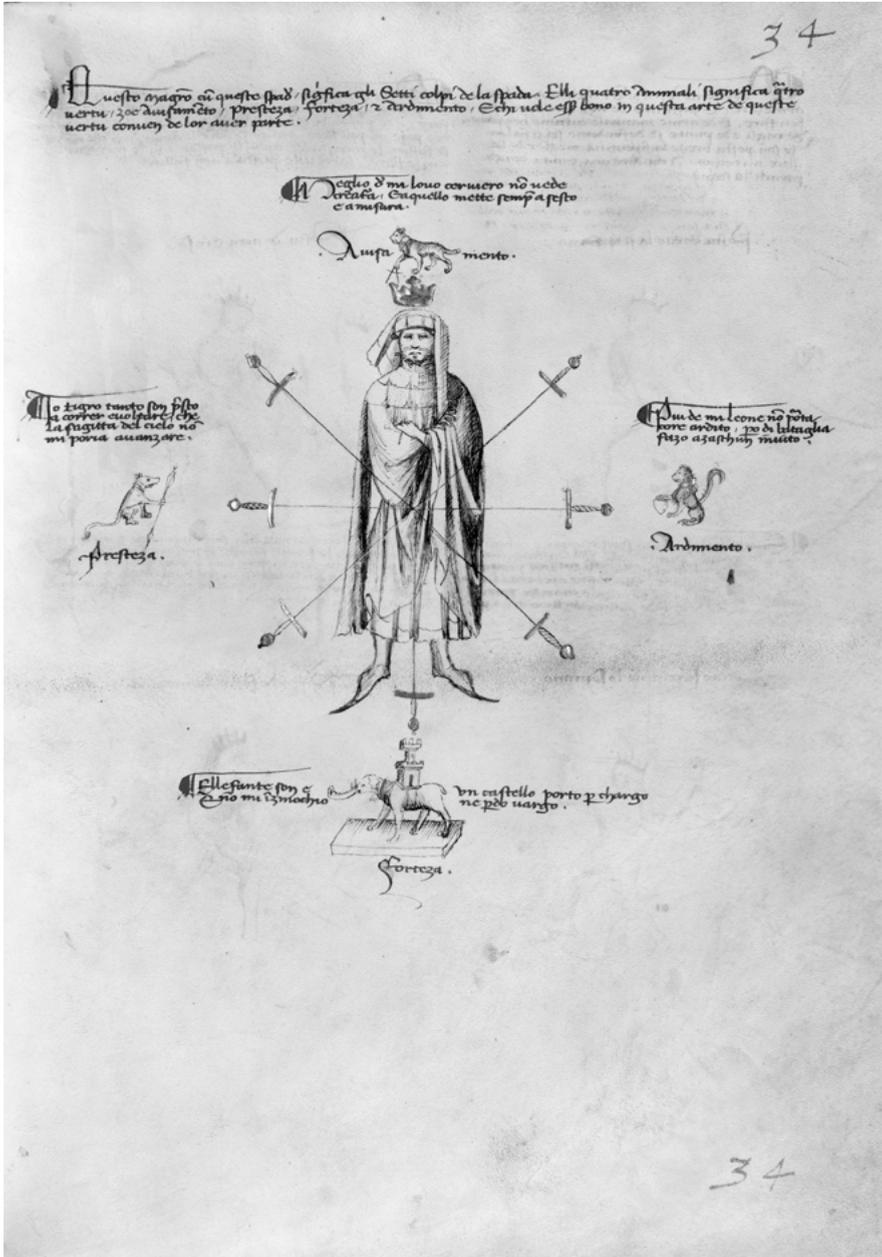


Fig. 3: Mnemonic diagram of cuts with the attributes of a skilled martial artist from Fiore dei Liberi's *Fior di Battaglia* (Getty MS Ludwig XV 13), ca. 1410.

custom of wearing a sword as the visual sign of the gentle class continued until the French Revolution.

II Training in Arms

There can be no doubt that, from wrestling as a country entertainment as depicted in the Robin Hood ballads to the elaborate tournaments of René of Anjou, the practice of martial arts was widespread in the medieval era. However, specifics are hard to come by. The profession of fencing master is documented as early as the thirteenth century, with those appearing in documents such as the tax rolls of Philip Augustus and the Florentine catasto of the fifteenth century. The profession might have originated from, or have been conflated with, that of the professional judicial-duel champion, and evidently had somewhat of a disreputable profession. Not only are there edicts banning fencing schools from municipalities such as London, but it was a profession a Jew could practice, with such documented in medieval Norwich and a wrestling master named Ott serving the princes of Austria in the fifteenth century.

Urban guilds of archers and crossbowmen, first documented in Flanders in the early fourteenth century, had long existed in the Low Countries. These served training, club, trade, confraternal, competitive, urban-defensive, police, and political functions, besides being a tacit statement of the townsmen's autonomy and enfranchisement (Crombie 2011). They were joined in the fifteenth century by the shooters' and fencers' guilds. Part of the function of these organizations was to restrict who could teach the use of arms. In the Holy Roman Empire, Fredrick III granted the Frankfurt-based Brotherhood of St. Mark, or *Marxbruder*, a monopoly on teaching fencing in 1478, and similar organizations came to exist in England, Spain, French towns, and the Italian city-states during the course of the sixteenth century. Along with this professionalization came an elevation of the status of the fencing master. Much as with wearing the sword, to learn to fence remained the sign of the gentleman, culminating ultimately with Louis XIV giving royal imprimatur to the Parisian fencing masters' guild, granting it arms and elevating six of its number to the nobility.

III Women and Weapons

If the bearing and use of weapons was a tacit statement of masculine enfranchisement, then the relationship of women and weaponry was particularly fraught with problems. Tellingly, Joan of Arc's wearing of armor was seen as cross-

dressing, and therefore *prima facie* evidence of witchcraft. Lombard law forbade women from carrying weapons or taking part in quarrels. Nonetheless, there exist numerous positive or at least neutral depictions of women using arms in both literary and historical works. These could be allegorical, such as conflicts of virtues and vices in the *Psychomachia* of Prudentius; historical, such as Amazons; or sometimes cryptic, as the figure of Walpurgis in MS I.33. A truly noteworthy literary example of women engaged in a tournament is the thirteenth-century anonymous German verse narrative “Frauenturnier” (Classen 2008).

Valerie Eads has written about several circumstances in which women could legitimately make recourse to arms. The first was *in extremis*, such as in a besieged fortress or an attacked camp. This especially comes to the fore when Christian forces are outmatched, such as in the Crusades or the Baltic Crusades, and women defended the camp or acted as archers and siege machinery crews. Another circumstance is in personal self-defense.

Obviously, the fact of women using weapons to defend self, home, and family in such circumstances is understandable, and was even valorized—but of women taking the offensive? In Icelandic literature, we do find examples of fighting women (Eads and Garber 2014). In the twelfth-century *Grágás*, the earliest Icelandic law code, it is theoretically possible for an unmarried daughter with no male relatives to prosecute a feud. Similarly, in Germanic law codes, women had recourse to the judicial duel in certain cases, particularly in unwitnessed cases of rape. The possibility that such combats actually did take place is indicated by at least two mentions in chronicles (Eads and Garber 2014). The fifteenth-century fencing master Hans Talhoffer shows techniques for such a combat, with the man armed with a club and forced to stand in a pit, while the woman assaults him with a rock wrapped in her veil. A later master in the same tradition, Paulus Kal, restores gender norms by having the man win. Amazons are more prominent in manuscripts produced under the patronage of women from prominent Crusading families (Derbes and Sandona 2004). Eads also cites the cases of those “Italian Amazons” of the late eleventh century (Adelheid of Turin, Beatrice of Lorraine, Matilda of Tuscany, and Sichelgaita of Salerno) who led armies through their family position and long habit of command. However, in these cases, it is not clear if they themselves wore armor or took part in the fighting (Eads 2006).

For women to wield weapons was clearly unusual. Occasionally, and especially in extreme circumstances, it did happen. Yet, in this complicated relationship, we see much of the meaning imbued to weapons in the medieval world.

IV The Social Meaning of Weapons and Armor

As noted above, to perform the part of a *gen d'armes* was to claim enfranchisement. The Paston letters, for instance, are filled with references to arms, armor, and fighting; the family may have descended from Norfolk peasantry and lawyers, but as soon as they rose to landed estate, battle was part of the family business. In the same vein, Steven Muhlberger cites a 1382 incident when the burghers of Paris sought to pressure the young Charles VI (1368–1422) by appearing at the king's entry to the city armed from head to toe like professional soldiers. "The king overawed the Parisians and the other burghers of northern France, brutally punishing various leaders and demonstrating forcefully that the burghers would not be able to assume the position accorded to 'true men at arms,' even if they had, for a moment, been able to dress the part.... The dissatisfied of the world, the ambitious, the disillusioned, and the social radicals all pressed their claims to greater wealth, respect, or authority on their successful use of arms" (Muhlberger 2005, 14–15).

It was most likely in Germany that the genre of the "fencing" or "fighting-book," or *Fechtbuch* (plural: *Fechtbücher*), originated. The *Fechtbücher* give us the best documentation of medieval martial practices and the place of teaching of arms, showing us sophisticated martial arts that used Aristotelian physics both to analyze and describe action that took place in space and time. They could take the form of elaborately planned illustrated manuscripts, such as the aforesaid Walpurgis *Fechtbuch* or the several contemporary and posthumous manuscripts of the *Flower of Battle* of Fiore dei Liberi (fl. 1380s–ca. 1409), who served the Visconti and d'Este families. *Fechtbücher* could also take the form of commonplace books, such as Nuremberg codex 3227a, which dates from 1389 and is the first record of the master Johannes Liechtenaur whose Aristotelian-tinged teachings formed the basis for a tradition that lasted at least until the seventeenth century, or the anonymous fifteenth-century British Library MS Harley 3542. We can gain an appreciation of the sociopolitical context of training in arms from the manuscript context of early *Fechtbücher*: Nuremberg codex 3227a, Historisches Archiv der Stadt Köln, W* 150, and MS Harley 3542 all contain alchemical treatises on metallurgy, and Fiore dei Liberi notes that his education included learning the "temper of iron." (For a study and facsimile of Köln W* 150, see Bauer 2009.) From the jealously guarded smiths of the early Middle Ages to the fifteenth century, metallurgy was a technology of enfranchisement no less than swordsmanship.

To be sure, to teach fencing professionally, certain prerequisites must exist: one must have a monetized economy and a clientele willing and able to pay for the services. However, to write down the necessities requires more: It assumes

patronage, not just a literate clientele, but also a literate master who has the education to record his pedagogical method in a static, two-dimensional form. Works such as I.33 and Fiore dei Liberi's *Flower of Battle*, combining images and text, give us insight into this pedagogy: The master's actions were copied by the student, just as an apprentice painter copied the master's drawings.

This literature, in short, participated fully in the intellectual paradigms of its day and recorded the knowledge for upward mobility. Such cannot help but call to mind Froissart's description of Sir Robert Salle, governor of Norwich, who was born the son of a mason but rose to knighthood by his own ability. He was killed by the Peasants' Rebellion in 1381 when he refused to join the rebels, but before he died, laid about him with his sword using techniques not unlike those described in the Harley MS and so killed a dozen men.

Perhaps the ultimate performance of armigerousness was when two social equals confronted one another on a level playing field. This explains the many "deeds of arms" during lulls in the Hundred Years' War: The realities of medieval Vegetian warfare allowed few opportunities for *gens d'armes* to distinguish themselves in the manner approved by their society. Indeed, no clear division existed between duel, tournament, and war: Jean II le Maingre and Galeazzo da Mantova (a student of Fiore dei Liberi) fought a 1495 duel over a point of honor that was halted before serious wounds occurred to either and was, in fact, more of a tournament-fight, while the 1351 Combat of the Thirty, an arranged deed of arms between English and French *gens d'armes* was lethal to at least twelve of the combatants.

Of course, most such activities were not very dangerous at all; in the fifteenth and sixteenth century tournaments became pageants-cum-sporting events sponsored by the high nobility both to tie the grandees of emerging states together as well as being a strategy of social differentiation. These sorts of allegorical, political, but very real, tournaments continued through the Elizabethan era, such as the Accession Day tilts. Indeed, the tournament never really went away: Jousting and carousels continued through the eighteenth century, and, as late as 1839, Archibald William Montgomerie's Eglinton tournament reenactment had clear (Tory) political meaning.

On the other end of the ideological spectrum, the participation of common people in warfare also had political implications. "That there is a relationship between military power and political power is self-evident; thus, it should come as no surprise that the growing importance of common infantry on the battlefield was reflected in the growing political influence of the commons, especially in those nations such as England and Switzerland, where the Infantry Revolution was the most completely embraced," as Clifford Rogers has paraphrased Stanislaw Andreski (Rogers, ed., 1995, 61). The fact that common people were not only

subject to tax assizes to fund the new, larger armies, but also kept and bore arms in the service of their nascent countries, may have led ultimately not only to a feeling of enfranchisement on the part of the yeoman, but enfranchisement in fact—and, ultimately, modern parliamentary democracy.

H Conclusion

The study of weapons, armor, and warfare in the Middle Ages, far from an antiquarian or peripheral pursuit, can help illuminate many aspects of medieval society. Technological progress, developing ideas of government, gender norms, and other fields all affected, and were affected by, the realities of warfare. Medieval society was one in which the use of weapons was a central concern. Likewise, we can say that the study of weapons and warfare, and attitudes pertaining thereto, should be a central question to modern students of the medieval era.

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