HIST E-1146/W: Medieval Warfare and the Crusades

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“The Crossbow and Longbow”

Perhaps the two most important technologies to bring about the demise of the medieval knight were the emergence of the crossbow and the long bow. The knight had reached a pinnacle from around 1000AD until the battle of Crécy in 1346. During this era, the military establishment expressed itself with the knightly gentlemen on horseback using lance and sword, and these aspects of mounted shock were considered supreme. For Europe, this was a period when the art of war was at a low point tactically and the nobility protected their social class using an elaborate system of ransoms. They set themselves up as the mediators and designers of proper social military conduct,[1] enjoying an almost artificial form of combat that was beginning to resemble a tournament rather than a battlefield. The protection gained by this series of complicated ransoms and duties influenced both causes and tactics. Men of class were all but immune from the usual hazards of life and limb and friend and foe alike mourned their death.[2] Conversely their lowly peasant subjects died by the thousands. One contemporary historian, Victor Hurley, in his book *Arrows Against Steel* describes them as "Godlike men in fear of the Church, with ungodlike manners, they accepted pillage and murder as the natural rights of a gentleman. Recognizing a king but refusing any real impressment of authority, they were proud, arrogant men on horseback."[3]

Enter the crossbow and longbow. The importance of these missile weapons were that they permitted the powerful knight to be dispatched from a distance by a projectile capable of penetrating his amour, or at least his horse. What's more is that the missile could be fired from the arms of the lowly levy infantry, who's casualty had previously barely been counted as relevant. The cost of a

[1] Victor Hurley, *Arrows Against Steel*, (New York: Maso/carter, 1975).

[2] Lynn Montross, *War through the ages*, (New York: Harper & Brothers, 1946).

[3] Victor Hurley.

longbow or crossbow was much cheaper than all the paraphernalia of the knight, and his expensive armor and war horse. European nobles and papacy were daunted by the crossbow and the horrendous wounds it rendered. It directly challenged the mounted elite's dominance of armed violence. Emperor Conrad III of Germany (reign 1138-52) forbade its use in his realms and in 1139 the Second Lateran Council, Innocent II, banned the crossbow under penalty of condemnation, as a weapon that was "hateful to God and unfit for Christians." The weapon was banned except for its use against infidels. Prohibition was unenforceable as during the heat of warfare every opponent seemed at least crypto-infidel.[4] Proving especially effective during the Crusades, the crossbow could not be removed once introduced and thereafter produced a grudging acceptance among the European mounted elites. In due course the nobility used the technological advances of metallurgical skills to enhance their own defensive amour, trying to prolong their function, and by the fifteenth century armor had became a "complete carapace of splendid steel carefully tailored to fit the purchaser."[5] On many surviving suits of expensive armor dated at the end of the middle ages there exists over the heart, on the left side of the breastplate, a small dent made from a crossbow bolt at a standard distance. This dent was proof to the buyer that he was getting a reliable product, and the dent was often decorated with etched ornament.[6] Likewise the crossbow underwent a continuous process of technical development toward greater power that ended only in the 16th century. Armors could not keep up with the terrible force of the crossbow bolt, or similarly the musket ball, and the knight and his suit of armor became obsolete. Nobility

[4] Lynn White, "Technology Assessment," *American Historical Review*, 79-1, (Feb-June 1974).

[5] Robert S. Gottfried, *Dictionary of the Middle Ages*, book 11, eds. Joseph Reese, (New York 1987).

[6] Robert S. Gottfried.

reluctantly entered an era of infantry dominated warfare, which was also provoked by the halberd and pike, but these weapons perhaps played a lesser role.

What exactly is a crossbow? The idea had actually been around for quite some time. Crossbows were buried in Chinese graves in the fifth century BC. In the classical era large artillery versions of the crossbow existed. The Greeks used the crossbow principle in the gastrophetes, and the Roman's knew the crossbow proper as the manuballista, though they did not use it extensively. The European or "Frankish" crossbow of the Middle Ages differed from all of these in its combination of power and portability, also known as the arbalest, it was the first mechanized hand weapon. When the crusaders passed through Constantinople, the observant princess Anna Komnena saw the weapon and in the *Alexiad* describes it thus:

> The cross-bow is a weapon of the barbarians, absolutely unknown to the Greeks. In order to stretch it one does not pull the string with the right hand while pushing the bow with the left away from the body; this instrument of war, which fires weapons to an enormous distance, has to be stretched by lying almost on ones back; each foot is pressed forcibly against the half circles of the bow and two hands tug at the bow, pulling it with all ones strength towards the body. At the mid-point of the string is a groove, shaped like a cylinder cut in half and fitted to the string itself; it is about the length of a fair sized arrow, extending from the string to the center of the bow. Along this groove arrows of all kinds are fired. They are very short but extremely thick with a heavy iron tip. In the firing the string exerts tremendous violence and force, so that the missiles wherever they strike do not rebound; in fact they transfix a shield, cut through a heavy iron breastplate and resume their flight on the far side... Such is the crossbow, a truly diabolical machine.[7]

Essentially, the greater the force used to bend a bow, the greater the force to which the arrow flies and the greater the range and penetrating power of the shot. The stiffer the bow, the sooner the point where a human arm is no longer capable of drawing back the bowstring, so machinery is brought into play and a series of triggers and pulleys introduced allowing the operator to spread the

[7] Philippe Contamine, *War in the Middle Ages*, (Oxford: Blackwell Publishers, 1998): 71.

force over a series of exertions.[8] The pulleys allow the strength of the operator to concentrate in bending the bow, but the power of the crossbow is also limited by the triggers capacity to maintain tension in the bowstring. As early as the eighth century, craftsmen in the West began to develop a better trigger, a notched circular nut pivoting in the bow's stock.[9] The earliest crossbows had a simple bow of wood, these were not powerful enough for serious military usage and by the 11th century they gave way to composite bows of wood, horn, and sinew. By the 13th century, bows were being made of mild steel, the temper of the steel used for crossbows needed to be precisely controlled. The expression "crossbow steel" became an associated with steel of the highest quality.

One of the first cocking aids developed was a hook suspended from the belt. The crossbow man could step down into a stirrup set in the front of a bow stock, loop the bowstring over the hook, and by straightening up use the strong muscles of his legs and back to cock the weapon. Belt hooks where inadequate for cocking steel crossbows of the sort used to penetrate plate amour. By the 14th century removable windlasses were being fitted to crossbows and winding mechanisms called cranequins. These effectively freed the crossbow from strength limitations.[10] There where eight progressive cocking methods developed over time: the chord and pulley, belt and claw, screw and handle, goatshead and lever, windlass and ropes, crane, lever fixed on a block, light wooden lever.[11] As a result, the crossbow man, unlike the archer, need not be particularly strong and volume of fire was not limited by fatigue.

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[8] Isaac Azimov, *Asimov's Chronology of Science & Discovery*, (New York, 1994).

[9] Robert S. Gottfried.

[10] "Crossbow", *Encyclopædia Britannica Online*, <http://www.eb.com/>.

[11] Victor Hurley.

Each progressive cocking method required longer load times. The windlasses system required at least a minute for the operator to ready for another shot, so the crossbow suffered from a slow rate of fire. Once the operator had discharged his weapon, he was somewhat defenseless until he could ready another shot, and hence the expression "to have shot their bolt," being to have taken action and to be then helpless.[12] In this way, unprotected crossbow men in the open field were at risk as the enemy might easily swoop down before the weapon could be cocked a second time. Still the crossbow made for extremely good use in Guerilla style warfare. It was also a good siege weapon and could be readied well before battle or fired from a reclining position, unlike the bow. Bolts were cheaper and less bulky than arrows. As long as crossbowmen were kept in a position of relative safety, their volleys, when fired where deadly. The crossbow first found a niche in areas that were outside the economic, cultural, and political core of feudal Europe, particularly were the topography was unfavorable for mounted shock action and land too poor to support armored aristocracy. Within this sphere, the crossbow proved itself a missile weapon par excellence, greatly hindering the supremacy of the mounted knight.[13]

Although the crossbow and the longbow undermined the knight, there were many conflicts between the two weapons and their uses. Early crossbows suffered in many respects against the bow, and not only in rate of fire. Initially infantry crossbows were outraged by the bow. This was because crossbow bolts were short and heavy, using a flat base to absorb initial impact of the string. The flat base and relatively crude leather fins, being produced in volume, were not as finished as arrows and had more drag with the velocity falling off quicker than that of an arrow. These factors,

[12] Isaac Azimov.

[13] Robert Hardy.

combined with basic lack of precision in the trigger mechanism, made the ordinary crossbow shorter-ranged and less accurate than a bow in the hands of a skilled archer.[14] The crossbow was susceptible to wet weather, which at the battle of Crécy, as we shall see later in this essay, proved decisive.

The crossbow is mentioned at the battle of Hastings, but remained a novelty until the Crusades, after which it became more integrated into the medieval arsenal. Some of its success can be attributed to Richard Coeur de Lion, who was a great enthusiast of the crossbow in an era when it was frowned upon by aristocrats and nobility. He himself was killed by a crossbow shaft when besieging the castle of Châlus in Limousin.[15] Richard used the crossbow to great effect during the crusades in two particular engagements. The first being the combat at Jaffa. Surprised by a dawn attack, he could muster only 55 knights and 2,000 infantry against several times his own number. Ordering his infantry spears to kneel in the first line, behind them he placed expert crossbow men to fire weapons that where loaded and handed up by the shoulders of the third line. His small body of horse was held in reserve for a counterattack. The hedge spears kept the enemy at a distance, while the crossbows delivered a concentrated hail of missiles. The Turks were thrown into complete disorder, their armor unable to deflect the crossbow bolts and their ruin being completed by the charge of the 55 knights. Within a few minutes they had left 700 men dead and 1,500 horses on the field, at a cost to Richard of only two men slain. Had Richard persisted with this method of shock/missile combat he might well have changed the history of the crusades.[16] Indeed,

[14] "Crossbow", *Encyclopædia Britannica Online*, <http://www.eb.com/>.

[15] Victor Hurley.

[16] Lynn Montross.

the Crusaders when suffering though a lack of horses, seem to have been more successful than when fully equipped with mounts such, as during the first Crusade.[17] Though even in the age a chain mail, the sheer weight and discomfort of armor resulted in mailed horseman to be reluctant to fight on foot under any circumstance.[18]

Asuof, another battle lead by Richard, was a conflict where the crossbow made what was probably its most impressive battle appearance. The light Turkish arrows could not penetrate the heavy felt and chain armor that Richard had provided for his men, the crossbows slow rate of fire was not a major factor in the engagement for the speed of the enemy composite bow was negated by the heavy protection afforded the Christian crossbow men.[19] This is described in Bo-ha-Din's account of Richards march:

> Each foot soldier had a thick hassock of felt and under it a mailed shirt so strong that our arrows made no impression upon them. They meanwhile shot at us with crossbow, which struck down horses and men among the Moslems. I noted among them [the Christians] men who had from one to ten arrows striking out from their backs, yet trudged on at ordinary pace and did not fall from their ranks... and so they marched until they finally pitched their tents on the farther side of the river Caesarea[20]

One of the most important advantages of the crossbow was that it took comparatively little training to use properly. The skill required to wield a crossbow was far easier to master than the skills of horsemanship and knightly combat.[21] Troops could be levied quickly and placed on the field armed with crossbows and still be marginally effective. It was likewise far easier to learn to fire a crossbow than a long bow of equivalent power.

[17] Lynn Montross.

[18] Lynn Montross.

[19] Victor Hurley.

[20] Victor Hurley.

[21] "The infantry revolution," *Encyclopædia Britannica Online*, <http://www.eb.com/>.

During the 12th century the longbow evolved in response to siege and guerrilla style operations occurring in the Welsh Marches. This area was regionally close and economically similar to the locations in which the crossbow had evolved three centuries earlier. The long bow had more massive arms than the short bow and imparted force onto the string at a lower velocity but with more force. While the short bow had greater velocity and further distance, the longbow had the required killing power at medium ranges, driving a relatively heavy arrow.[22] The longbow became the most effective individual missile weapon of western Europe, lasting well into the age of gunpowder.[23] Edward I is considered the father of the English Longbow. He learned to respect the longbow in the hands of the Southern Welsh, who where both his foes and his allies. Using the weapon in both Wales and Scotland a new strategy evolved using a blend of forces that made the English army nearly invincible until the end of the Hundred Years War.[24]

In capable hands the longbow was far superior to the ordinary crossbow in range, rate of fire and accuracy. A good longbow archer could reasonably fire between eight to twelve arrows per minute, soundly beating the rate of fire of the crossbow. Shaped from a carefully cut stave of yew or elm, it varied in length depending upon the height of the user, usually being between five to seven feet. It could drive a heavy arrow through armor with efficiency at medium ranges of 150-300 yards. Archers would carry a few light arrows for shooting at distances and may have been able to reach 500 yards using these.[25] When drawn to its full extent the longbows great penetrating power

[22] "the bow," *Encyclopædia Britannica Online*, <http://www.eb.com/>.

[23] "Longbow," *Encyclopædia Britannica Online*, <http://www.eb.com/>.

[24] Lynn White.

[25] "Longbow," *Encyclopædia Britannica Online*, <http://www.eb.com/>.

was capable of pinning knights to their horses.

The longbow's great weakness was the immense amounts of energy and time required to master it, being heavily dependent on the strength and competence of its user. Evidence of the extreme demands placed on the archer can be found in the skeletal of a bowman who went down with the English ship Mary Rose, sunk in Portsmouth Harbor in 1545. The archer (identified by a quiver and leather strap circling his spine) exhibited skeletal deformities caused by the stresses of archery. The bones in his is left forearm showed evidence compression thickening, his upper backbone was twisted radially, and the tips of the first three fingers of his right hand were markedly thickened, unquestionably the results of a lifetime of drawing a bow of great strength.[26] Effective longbowman where brought up to shooting the weapon from birth where it took at least two years to gain some competency. This handicap was recognized by Edward I who actively fostered English yeomanry. Archery prospered in small hamlets that lacked a tavern or enough in habitants for group games. The shrinkage of population in the second half of the fourteenth century, due in part to the Black Death (plague), led to abandonment of country pastures of marginal productivity and small settlements. The now scarcer peasant labor was concentrated on the more profitable soils, and thus in larger villages.[27] Interest in the longbow waned and so to did the effectiveness of the English archery. In 1365 Edward III tried to enforce interest in archery by outlawing all other games. Sheriffs where told to suppress bowling, handball, football, club ball, hockey, cockfighting, "and other vain games of no value." They attempted to see to it that Sundays and holidays where days in which the Englishmen of the lower orders practiced their bows and arrows. In 1388 tennis

[26] "Longbow," *Encyclopædia Britannica Online*, <http://www.eb.com/>.

[27] Lynn White.

and dice were added to the list on banned sports. Nevertheless, the long decline of English archery continued. In 1549 the Bishop Hugh Latimer thundered "we have taken up whoring in towns instead of shooting in the fields.[28] It even became a requirement for English commoners to own a longbow, yet the skill and strength of those who responded to muster was well below the standard set two centuries previously. Good longbowmen became so scarce that in 1595 the longbow was officially discarded by Elizabeth's army in favor of the musket. This was done regardless of the fact that the longbow was still technically a superior weapon. Muskets in the hands of less well-trained soldiers are reasonably effective, and that fact was decisive.[29]

Edward I indoctrination of the English with the longbow and his methodology of doing so brought about a social change in the composition of armies, he was moving towards an army that should be paid, from earl to spearman. The feudal system had previously been supplying troops through a hierarchy of lords, troops where expected to fight for a given period of time unpaid. Edwards changes were, in some cases, against the wishes of those lords who determined to keep their feudal duties to preserve independence, which they felt would be forfeited by becoming a mercenary of the crown. There were enough lords and barons willing to accept the kings money, making the gradual abandonment of the feudal idea inevitable. Edward system allowed much larger reliable regular armies to be fielded, even being prepared to borrow money for Italian merchant bankers to ensure that the troops received pay. This new method of employing regular troops substantially changed the composition of battle.

The battle of Crécy, Aug. 26, 1346, was a landmark victory for the longbow. The signal

[28] Lynn White.

[29] Lynn White.

victory of an outnumbered English army of longbowmen and dismounted men-at-arms over mounted French chivalry, supported by mercenary Genoese crossbowmen, marked the end of massed cavalry charges by European knights for at least century and a half.[30] The main contemporary sources for the battle of Crécy are: Froissart Le Bel, Le Barker, and Villani. Robert Hardy's *Longbow, A social and military history* alludes to them all and much of the following description of the Crécy battle is based around Hardy's work.

The battle itself was conducted between Edward of England, the invader and Philip of France. The numbers of men concerned in medieval warfare are always hard to estimate, but it seems most likely that the English assembly had 12,000 and 13,000 men defending the Crécy-Wadicourt ridge. The center of these comprised of men-at-arms. The French army numbered between 36,000 and 40,000 men, three times the English force, the cavalry alone probably matching them. Edward had two secret weapons at his disposal. One was a curious gun powder tube to fire iron balls - an early medieval cannon, whose presence has been disputed, but the evidence in favor of their being in use is strong, and now generally accepted. His other secret was the longbowmen. Nobody on the continent had yet experienced what a massed formation of highly organized and trained longbowmen could achieve. Interesting too is that during the very campaign that saw the longbow reach its full and devastating development the seeds of gunpowder were sown, which would eventually oust the longbow altogether from military use.

The battlefield at Crécy was probably slightly less than 2,000 yards wide, although it was indented. The English archers deployed in ranks so that they could achieve a thicker barrage of arrows. Where enough slope gave them the chance, their ranks could stretch back many deep.

[30] Robert Hardy.

When on flatter ground they had to open their formation at the front to allow the staggered two, three, four ranks behind to see and shoot. When the English archers had shot off all their arrows, they could run back through the ranks for more, and his place would be filled by another. Each archer going into battle line with two sheaves of arrows. Forty eight arrows in total. The archers stuck some in their belts and some in the ground in front of them, which was quite likely in pitched battle. The French cavalry used big trappered horses bearing armed men. It is estimated that it would have taken only 90 seconds to cover the 300-odd yards of uphill slop that faced them during their charge, in which they would be in bow shot. 500 archers shooting at 12 arrows per minute would have discharged at least 7,500 arrows. The basic allowance per man is of about 100 arrows, so there would have been close to a million arrows at hand. The total number of arrows shot off during the hours of the battle at Crécy is thought to have been somewhere in the region of half a million.[31]

Edwards preparations at Crécy were pushed forward with good discipline. Where the archers were not protected by sharp falls in the ground, they dug potholes a foot square in front of them. The French spread about the countryside on either side, their huge force of men and horses consisted also of some thousands of Genoese crosssbowmen. At four o'clock in the afternoon the French vanguard with banners and pennons flying and Oriflamme blowing slowly out, the sign of no quarter to the enemies of France, the French gradually flooded forward into the valley. The Genoese commanders were first to attack, and had to quickly organize their thousands. In their haste they lacked the protection of their pavises, which were still in the baggage wagons. To make matters worse, there was a sudden downpour of torrential rain, possibly damaging their crossbow

[31] Robert Hardy.

strings and putting them at further disadvantage. In the valley bottom the Genoese marched forward to within range, stood, raised their bows, and shot. As the bolts flew towards the English lines they stooped to reload their cumbersome machines. Even as they bent to reload orders were shouted all along the lines above them on the slip, thousands of longbows were drawn back and the first flights of English arrows hissed, curving down at them "so thick that it seemed snow." The Genoese had never met such archery, nor at such range, thinking until they were struck that they could shoot further than any bow the English had. Pierced in their hundreds, heads, arms, legs, coats of mail, they began to recoil. At this time it is also thought that the first booms of cannon echoed over Crécy, French sources indicating there were three cannon, "which much disturbed the Genoese." Seeing the fracas below and in front of them, the hot blooded among the French nobility surged forward, thundering into the backs of the Genoese, yelling and deriding and lancing as they galloped. The Italians, under attack from their own ally, shot at the French who plunged among them. Up the slope came the first enraged charge.[32]

Subsequent lines of French cavalry wheeled one after the other to face the English and spread out onto the English left. In groups and masses they spurred up the slope against the firing English archers. Very soon the ridge was strewn with fallen men and animals. The yelling French rode over them, horses skidding and plunging as arrows pierced them. In the pressing forwards of so many men and horses, numbers got through, their sheer masses protecting those in the center against the arrow storm. The English men-at-arms fought the men on horses, the archers on the flanks poured their driving shafts into the clusters. There were 14 or 15, or, some say, 16 charges against one part or other of the English line, sometimes great waves of men against the whole

[32] Robert Hardy.

reachable front. Those in the English reserve must have run behind the lines handing out new sheaves of arrows, and runners must all the time have been going to and from the wagons and stacks of arrows to the men in the front who worked ceaselessly shooting. In the lulls, while the French masses in the valley moved and milled before the next charge, archers ran forward among the carnage on the slope and retrieved arrows where they could. Captain after captain among the French commands went down, their banners falling. The King of Bohemia, nearly blind, begged some of his knights to lead him forward so that he could strike a blow. They tied their reins together and galloped towards the arrows, next morning they were found all together, men and horses dead, their reins knotted together as they had ridden.[33]

Still the French came on. They could not believe, and could not bear, that the mighty chivalry of France should fall before base born men. They broke through the archers, but always the gaps were filled. Those that charged through were dragged down and hacked to death. The sun went down, and the stars came out. The moon rose, and by its pale light the French charges continued, but more and more desultory, until about midnight the fighting ceased. King Philip had left the field already, wounded in the face by an arrow. So many of the leaders lay dead or dying on the field. "The flower of the chivalry of France lay dead upon the field" while the English losses were light. After Crécy, the great shock to the French was that their chivalry could be shot off their horses.[34]

Crécy was the first major contest on European soil between the armored knight and the yeoman archer. It sounded the death knell of chivalry. Never again would the mailed knight be

[33] Robert Hardy.

[34] Robert Hardy.

supreme on the battle field.[35] For England the cult of the horse had remained ingrained, the noble class being left with an acute distaste for missile war. It was not considered wholly correct for a peasant yeoman to bring down a French knight with a shaft, even though that French knight was an active field enemy at the time. The pageantry, and ritual of war, were important in the eyes of the English gentlemen and the destruction of a gentleman opponent by a ragged peasant was quite upsetting to the status quo. Quite rightly, there were dangerous social implications involved.[36] The slaughter of gentlemen knights on the field of battle was not an approved practice, financially or socially. The European nobles were dragged unwillingly into a new era that would become more and more governed by projectile weapons such as the crossbow, longbow and musket. The cavalry era had ended and infantry would take to the battlefield as the dominant force.

[35] Victor Hurley.

[36] Victor Hurley.

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