The Military Archery at Neville's Cross, 1346

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On 26 August 1346, Edward III's army of English men-at-arms and archers and Welsh archers and spearmen crushed the vastly superior forces of Philip of France, on the low ridge and valley that runs between Crécy-en-Ponthieu and Wadicourt. The victory was a great shock to the French. The thousands of longbowmen of Edward's army, preserving perfect discipline and shooting arrows 'so thickly and evenly that they fell like snow',[1] outranged the mercenary crossbowmen sent forward by the French to open their attack, and then shot down fifteen or sixteen separate cavalry charges, or so disorganised them that, though hard-pressed, the English men-at-arms, fighting on foot, were able to hold their positions. France reeled; King Philip, wounded in the face by an arrow, narrowly escaped and set about persuading his young Scottish ally, King David, to invade England and provide a diversion.

The details of the Scottish attack, the sacking of Lanercost and so forth, and the advance towards Durham, are dealt with earlier in this volume. Edward of England, with rare strategic foresight, had provided for just such a contingency, and was able to field a capable army to oppose the invasion. It seems as if this army, under the command of Henry Percy, Ralph Neville, the archbishop of York, Lord Mowbray and Thomas of Rokeby, was comparable to the small force with which Henry V, sixty-nine years later, faced the massive French army at Agincourt. It is likely the total English force at Neville's Cross was about 6,000 strong, though the proportion of men-at-arms to archers was probably higher than the Agincourt force which numbered 1,000 men-at-arms and 5,000 archers.

The contemporary *Anonimalle Chronicle* of St Mary's Abbey at York speaks of an army of over 10,000 archers and men-at-arms,[2] and equally contemporary lists suggest a number of just over 3,000 mounted archers.[3] The speed with which the English responded to the Scottish threat rather suggests that at least the greater part of the archer force had been swift-moving, so I am inclined to think that between 3,000 and 4,000 archers out of a total force of 10,000 represents the proportion fielded at

1 *Froissart Chronicles*, ed. G. Brereton (Harmondsworth 1968), p. 88.
2 Document d.
3 PRO E101/25/10; document i.

Neville's Cross. Thus, if the total was more like 6,000, 2,000 archers would seem a likely proportion, most of them mounted. The question is: how effective were they, and what could they achieve with their weapons in 1346?

David of Scotland thought the main strength of the English was across the Channel. Edward III, foreseeing the threat, had provided against it, and though he probably took the cream of both English and Welsh bowmen with him, he certainly left behind a force of archers to be reckoned with.

According to a report of the battle written in a letter by one Thomas Sampson, and of which copies can be seen in the Bodleian Library, Oxford, 'twice', once battle was joined, 'the archers were driven back' (*deux fois se retrairerent les archers e communes de nostre partie, mais nos gents d'armes se combatierent e se continuerent durment bien tantq les arches e communes reassemblerent*). We are offered a picture of an archer force which perhaps lacked both the numbers and the solid cohesion of the Crécy bowmen, but which nevertheless was sufficiently well-ordered and disciplined to get themselves back into action after a reverse.[4]

Before offering a little research into the effectiveness of these archers' weapons, a short footnote: why, at a Durham battle was the warlike Thomas Hatfield, bishop of Durham, not in the command structure? He was, in fact, with Edward's army in France, and when during the Battle of Crécy the sixteen-year old Prince Edward of Wales in the vanguard, or English right wing, was hard pressed by the French, those about the prince sent for help to his father, who held a large reserve behind the immediate battle-lines. The king sent the famous answer back 'let the boy win his spurs',[5] but did allow the Bishop of Durham, with twenty knights, to go to his son's assistance.

In my book *Longbow: A Social and Military History*, first published in 1976, I wrote: 'I believe we cannot be far wrong if we say that by the reign of Edward III his archers would have used longbows of 80 *lb* up to 160 *lb* draw-weight, achieving ranges up to 300 yards.'[6] When the archery world in general laughed at my claim, I argued that my guesswork was based on the sort of bow-strength that would best have suited the one surviving medieval arrow we then knew of, found in Westminster Abbey in 1878, which I and my team had measured for 'spine', or stiffness, and weight, allowing for shrinkage and desiccation. The results of those measurements suggested very heavy bows – heavy, that is, to modern longbow archers who seldom use bows stronger than 60–65 *lbs* draw-weight.

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4 Document b.

5 *Froissart Chronicles*, p. 92.

6 3rd edn (Sparkford, 1992), p. 54.

Indeed, one was working in the dark until in 1979 unexpected, almost unbelievable, light began to flood the obscurity. It will be remembered that the wreck of the *Mary Rose*, located in the 1830s, then lost because of inaccurate charting, had been re-discovered in the 1960s.[7] The ship, Henry VIII's vice-admiral, and the pride of his fleet had sunk with all hands in full view both of the king and his troops at Southsea, and of a large French invasion fleet in the Solent in the summer of 1545. In 1979 I was telephoned by Dr Margaret Rule, Archaeological Director of the *Mary Rose* Trust. On her desk, among the many books on shipbuilding, ship rigging, ship armament and so on, was a copy of *Longbow*. Dr Rule had said, 'Try and get hold of this Robert Hardy.' I raced down to Portsmouth with Professor Peter Pratt and Professor John Levy; the first, Professor of Crystal Physics at the Imperial College of Science and Technology with whom I had been working on longbow research for some time; the second, Professor of Wood Science, also at Imperial College, who was already consultant to the Trust on the ship's timbers. The chief diver had surfaced the day before our arrival with a long, rather knobbly stave from the wreck site and Dr Rule, identifying it as a longbow, one of the 250 listed in the ship's armaments roll, which is to be seen in Magdalene College, Cambridge, wanted longbow people to examine it. Was it a bow, or, as some thought, a pikestaff? It was a bow, a great big Tudor war-bow, blackened from long immersion and covered in oyster spat and other underwater accretions. Our excitement was intense. It was the first truly authenticatable military bow of such an early date, and it was obviously of a hefty weight. The roughness of its timber hardly surprised us, because it is hard to find long clean staves of yew-wood without pins and knots, and this weapon was all but seven feet long. Then came another, and another, and in no long time a whole bow-box full of bows was brought up to the deck of *Sleipnir*, the support vessel moored permanently over the wreck-site. Another full box followed, and box by box, thousands of arrows.

The world knows that the *Mary Rose*, finally emptied of all her treasures, was raised to the surface in 1982, and eventually put on public view in a new museum in Portsmouth harbour, beside HMS *Victory*, and not many yards from where, as the first purpose-built Tudor warship, her keel was laid in 1509.

The wealth of artefacts raised from the wreck, and now to be seen in the museum, is beyond compare. For our purposes we must turn aside from the stern beauty of the guns, the intimacy of the thumb-print in the ointment box found in the barber-surgeon's cabin, the golden glow of the 'angel' coins, and concentrate on the 138 complete longbows, the many broken pieces of other bows, and the thousands of arrows that had been

[7] Margaret Rule, *The Mary Rose* (London, 1982), *passim*.

issued to the archers aboard *Mary Rose* in 1545 and which now provide us with irrefutable proof of the skill of Tudor bowyers and fletchers, the potential power of the weapons and the strength and constant practice that were needed from the archers to make them formidable weapons of war.

As the slow processes of conservation began and the bow timbers began drying out, it became apparent that we were dealing with big weapons, well beyond the capabilities of most archers nowadays, and with fully completed bows of the finest quality imaginable, none as knobbly as that very first bow raised.

It was evident that all the bows were made of fine-grained yew timber, cut radially from logs across the sapwood and heartwood boundary, which allows the highly tensile sapwood to remain on the back, or convex side, of the drawn bow, lying against its own heartwood towards the centre of the log, which forms the belly or concave side of the bow, and which is probably the timber with the best resistance to compression known to man. Yew timber, if so cut and used, offers a natural spring, and no other timber has been found to surpass its combination of tensility and strength.

When the bows from the chests were still wet, they had almost the appearance of new wood, though it was only after drying that the pale sapwood took on the true colour that one sees today in a yew bow made fifty or a hundred years ago. The deep reddish brown of the belly lightened as the timber dried through the months, and later gentle oiling and waxing restored to them something of their youthful look. It was possible from the detailed examination of broken fragments to establish that there was a degree of cell degradation in the timber surfaces, but whether there was vital degradation in the many complete bows could only be revealed by testing their elasticity and strength. It was also clear from the narrowness of the growth rings, in some cases reaching over 100 to the inch that the timber was extremely slowly grown. This suggested two things: strength and a foreign provenance; and the average radius of the growth rings suggested that the bowmakers had chosen grown timber of more than eight inches diameter.

During the long months of cleaning and drying, each bow was examined, and preliminary measurements were taken. A complicated system of description and identification was begun to record the idiosyncrasies of each weapon. In many instances, among the best preserved, the extraordinary skill and confidence of the bowyers with their draw-knives, or 'floats', were plain to see, even to feel, like delicate fluting on a glass stem. So sure were the bowmakers of their skills and of their timber that they clearly felt no need to work out those last straight marks of manufacture, as we would now.

The bows were found variously about the ship, on the weather deck, in which number must be included those that fell into the ship from the bow and stern castles, either on impact with the sea bottom or during later disintegration of the castles; in the gun deck, and in the orlop. In one chest were forty-eight bows, in the other thirty-six, almost all in miraculously fine condition after 437 years' immersion. The rapid inflow of silt accounts for the good state of preservation, which is far better than would have been the case if the bows had been preserved in air, since much of the natural make-up of the timber was sealed in anaerobic conditions.

It was noticed at once that every bow, no matter what condition it was in otherwise, as long as one or both tips remained, showed at the tips a plain differentiation of colour for some 5 cms. This was clear evidence that the tips had originally been covered by an applied nock of some kind. Since horn is and was the most usual material for such applied nocks, and since horn has been proved to perish fairly rapidly in the conditions of the Solent silt, it can safely be assumed that the nocks were of horn. This is borne out by the fact that of the thousands of arrows recovered, having a slot at the nock end which runs down towards the fletching and which would originally have taken a horn sliver for the purpose of strengthening the force-absorbing end of the arrow, only one or two still have the horn in place. Those few only remain as a result of being protected, for instance by a coil of tarred rope, from the effects of micro-biological and seawater decay. It is also notable that among all the *Mary Rose* finds, no horn buttons have survived, no horn panels for lanthorns, no horn handles, though it is obvious that there had been many such articles in 1545.

Since writing that paragraph, which remains true, the exception proving the rule has arisen. In July 1997, Maggie Richards, Research Assistant at the *Mary Rose* Trust, wrote me a letter, from which I quote:

> I thought that you would be interested in a recent *Mary Rose* find (MR97A0003). It is a horn nock for a longbow! Last Thursday, I was excavating a concretion containing human bones, when I came across the nock. Immediately I knew it was a longbow tip; but due to its size and the depth of the notch for the bow string, I was also convinced that it was covered with a horn nock. I am glad to say that my initial instincts have proved correct, Dr Mark Jones has today confirmed that it is horn, and is investigating the best method for conservation. I have enclosed a 1:1 drawing for your records.
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> The concretion was recovered from the Upper Deck sector 5. The unfortunate individual whose bones were caught in the concretion may have been an archer. Besides the longbow nock, a small fragment of arrow was also found. The concretion also contained what could possibly be very degraded body armour. I have searched the database for a longbow from U5 with its tip missing, but have had no success.

> I hope this information is of interest; it is satisfying to have positive evidence for the attachment of horn longbow rocks, in addition to the discolouration of the bow tips. This new piece of evidence surely will convince any remaining 'doubters' that the *Mary Rose* bows are not bowstaves, but are indeed bows ready for use as you state in your book *Longbow*.

In the opinion of the Consultants these *Mary Rose* longbows, whether found at action stations or in boxes in the orlop, were finished weapons ready for use. It might seem unnecessary to make such an obvious claim, but it is necessary because within the archery world a good deal has been said and written expressing the view that the *Mary Rose* longbows are not bows, but bowstaves, unfinished and not ready for use. Apart from the very oddity of the idea that a ship of war, in time of war and actually in action against the enemy, should put to sea for action with no longbows but a large number of unfinished staves, there is the massive evidence of the bows themselves. What started the hare of this nonsense was our first published suggestion of the draw-weights of these bows. It was hard to believe them ourselves. Few believed us when we came up with the first massive weights, arguing that the *Mary Rose* bows ran from about 100 *lb* drawweight at 30 inches to 180 *lb*. These estimates were obtained from a computer model invented by Dr Bob Kooi of Gröningen University to whom we supplied detailed measurements and he in turn came up with the bows' optimum and original strengths. Many said these weights were impossible, and that therefore the bows must be unfinished, carrying more timber and hence more weight than they would when completed. That they are completed is now self-evident.

By this time we ourselves had completed three or four copies of *Mary Rose* bows, or rather 'approximations' (since in following the dictates of individual staves, a true copy can never be achieved) of which we knew all the relevant details. When the vital statistics of these weapons were fed into the Kooi computer their draw-weights came out with absolute accuracy, so we had to believe them.

All the bows were made from yew timber, each from a single, unjointed, unpieced stave. The quality of the timber, its density, the extreme fineness of the grain in most cases, suggested that we were dealing with imported staves of a straighter and finer quality than can readily be found in the soft climates of the British Isles. That most of it was imported from the Continent there is small doubt, and several documents from Henry VIII's reign record such imports either through Venice by the Doge's special permission or from elsewhere by special mandate of the Emperor Maximilian.[8] Such timber would be gathered from those parts of

[8] *Letters and Papers Foreign and Domestic of the reign of Henry VIII, 1509-13*, p. 529.

Europe – Spain, when she was not our enemy, Italy, Austria, Poland – where the yew grew high and fine-grained, and where for centuries timber had been felled and split into staves to supply our military needs.[9] Henry VIII was a great encourager of the military use of the longbow, just as he keenly pursued the development of gunpowder artillery. He sent his agents into Europe to choose the finest yew timber, selecting at a time thousands of the best staves which were then stamped with the Rose and Crown for export to England. The orders were almost always large – one part-order was for 40,000 staves to be sent to England through Venice[10] – and the names exist of five bowyers who made up 600 of this particular batch of staves into finished bows, for which they were paid altogether £200 13*s.* 4*d.* at a time when a master carpenter was paid 4*d.* a day and beef was about 2*d.* a pound.

After long and frequent examination we came to the conclusion that the bows showed exactly what today's longbows show in the way of age and use. Those in regular use exhibit a slight or a marked 'string-follow', that is they remain curved towards the belly, or 'de-flexed'; one of the deck bows was certainly in use when the ship foundered and the string somehow survived long enough to set the bow in the braced position for good. Others lie almost straight; but a majority of the boxed bows show a 'reflex', a bend towards the back, away from the natural bow shape. The probable reasons for this curvature are either natural, the bowyers selecting timber with a natural bend towards the back, or the fact that when bowstaves are split from recently cut logs they will tend to reflex themselves. The result in either case is just what the bowyers were after, timber that would maintain optimum straightness after much use, which means a longer and faster return of the limbs from full-draw to the braced position at which the arrow quits the string. The faster that return, the greater the bow's ability to cast an arrow. Since most of the boxed bows appear to be new bows, they were probably intended for land service not naval use.

The *Mary Rose* bows are handle-less. There are no indications of any binding being put on them, and it must be assumed they had none. The approximate position of the 'arrow-pass' is just above the handle position (for even without a marked handle section, there is of course still a handle position), and it is in very many cases indicated on the *Mary Rose* bows by incised, pricked, and in some cases stamped, marks.

The marks consist mainly of groups of incised dots, as if made with a chisel corner (perhaps a float-blade corner) arranged in pairs, threes,

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Also *ibid.*, p. 566 (4 September 1510), and *Calendar of State Papers, Venetian*, II, 78 (Licence passed 5 May 1510 for 40,000 longbows).

9 Roger Ascham, *Toxophilus, 1545*, ed. Edward Arber (London, 1902).

10 *Letters and Papers Foreign and Domestic, Henry VIII*, p. 757 (see above, n. 8).

crosses, or little tree-like groups. There is a variety of circular marks: plain circles, circles with a cross, segmented circles, some apparently made with dividers, one or two possibly with a tubular stamp. There are variations on the cross: plain, and with dots in various arrangements. There are other linear marks, often in association with dots, sometimes whole clusters of pinpricks up to thirty or more in number. In general there seems a difference between the heavy marks which suggest a maker's advice or identification, and rather more random markings which could be personal additions. But those bows which are not marked at all, some fifth of the total, do not seem to be generally inferior, or different from the marked bows.

Though it is hard to detect a standard in these marks, it is certain there was hardly a standard bow; yew does not yield to a standard; there are not two dozen bows at exactly 100 *lb* and two dozen at exactly 110 *lb* and so forth. There are more standard arrows at predictable lengths; the bow by its nature is personal and unique, first in the timber, then in the bowyer's hands, then in the hands of the archer.

There is a painting in the manuscript collection of Christ Church, Oxford, an illumination of 1326, showing a castle defended by two women, one using a massive crossbow, the other an equally massive longbow. The moral of that is: training can make nearly all things possible. Does anything lead us to suppose that bows of the weights represented by the *Mary Rose* collection would be unusable? The answer must be no. If they were unusable they would not be there. So, if we admit them usable, what is there to suggest that the men who used them were specially selected, specially trained? The answer is: a very great deal. Those skeletons found in the *Mary Rose* which can undoubtedly be linked with archery tackle, and can be presumed to have been those of archers, belonged to large men, six-footers or so, and described by the Senior Consultant Anthropologist to the Trust who examined them as 'huge ... not necessarily tall, but massively boned'. The shipboard location of skeletons representing the highest percentage of bone-changes attributable to the use of heavy bows occurs in the areas most associated with archery equipment. Even with the lighter bows we use for sport today it is in the shoulders, the upper arm and the elbows that things tend to go wrong. The lengths of the bows, from just over 6 feet to just under 7 feet suggest men of some 5 feet 7 inches to over 6 feet, and the arrow measurements, with average draw-lengths of 30 inches confirm these as likely proportions.[11]

Increasingly today there are to be found those who are teaching themselves to master bows of such great weights. I know of, and benefit

[11] The arrow-lengths range from 28 inches to 34 inches. See the *Mary Rose* full report of finds, yet to be published.

from the skills of, young archers who can handle weights well over 100 *lbs*, as well as those who have trained themselves to shoot, with reliable accuracy, twenty and more arrows in a minute. Turn those few into thousands and one begins to get a genuine idea of the formidable power of our archer corps throughout the long years of its military ascendancy. What sort of men could use the *Mary Rose* bows? Young, fit men in constant practice chosen for well-paid military service from a nation to which the shooting of longbows had been second nature for 250 years at least; men who by and large came from intensive rural labour, whose bodies, and stamina were certainly formidable in comparison with average male bodily strengths today.

By Henry VIII's reign, military archery was in decline. Can we infer that in these heavy bows rescued from the Solent we have the sort of weapons that were used at Bosworth, at Towton, at Agincourt, Poitiers, and at Crécy and Neville's Cross 200 years before the *Mary Rose* archers sailed out of Portsmouth? I see no reason why we cannot be confident of that. If decline in the use of the weapon is going to change anything in the weapon itself, it will tend surely to diminish the strength of it, not increase it. We cannot but believe we now have available to see and to study nearly 140 bows that represent the great period of military archery. The *Mary Rose* bows were part of the equipment of the army of Henry VIII, himself a fine longbowman, who went to great lengths to procure the finest timber for his archers; he was also an innovator in the use and development of artillery. Within those terms of reference it seems to me unlikely either that he was demanding from his bowyers the making or from his archers the use of either heavier, or lighter bows than were previously in general use. Because of the growth of artillery we might expect a downturn in the strength of bows, just as there is a lowering of the proportion of archers to other arms in his army recruitment. It cannot be that there is a drop in bow strengths, because if there is, from what weights, drawable by man, can bows of 180 *lb* draw-weight have diminished? Can we suppose that he demanded greater weights, greater feats than he inherited from the past of military archery? When it was becoming increasingly difficult to recruit and train archers, it is scarcely credible that the use of the weapon itself should have been put beyond average trained practitioners. I see no reason to suppose these bows we have from 1545 differ in general from the military weapons of the Hundred Years' War. Therefore I believe we can argue usage and tactics during these wars from the evidence of the weapons that we have recovered from the Solent.

We are now beginning to know from practical experiments (which are by no means complete) that effective bow range can exceed 300 yards, though not I think by much. It depends on the purpose of long-range