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until the hooks holding the cord brought it into position in the notch of the nut. The vires or viroux or bolts depicted in our plates are of a more arrow-like description than the quarrels for warfare. The latter were usually only about ten or twelve inches long, the head being a plainly-forged point, and not barbed as these are. If the "feathers," which were often of thin wood or leather, were placed spirally on the stem, so as to give the bolts a twist in their flight, these were called viratons.

That the propelling force of the steel fifteenth-century cross-bow must have been much greater than that of the long-bow is shown by the interesting experiment made by Sir Ralph Payne-Gallwey with a strong mediæval cross-bow he had obtained from Nürnberg. To bend this arm, weights of 1200 lb. had to be employed in order to pull the cord into position, while 60 lb., as all modern archers know, represents the pull of an ordinary long-bow.[1] No wonder that with such a cross-bow Emperor Maximilian could kill at 200 yards a chamois or even a stag, and that men could be shot at more than twice that distance. Of the latter a somewhat curious instance comes under my personal cognisance, if any belief can be attached to a legend of which the ancient Schloss in which the present lines are written was once the scene. It occurred in the middle of the fifteenth century, when two brothers, the knights Hans and Ulrich of Frundsberg, owned two neighbouring castles in Tyrol, both occupying slight elevations of the ground, the old Roman high road to Italy passing between the two, the distance from tower to tower being between 450 and 500 yards. One day, as a result of a fraternal feud, Knight Ulrich took a pot shot with his cross-bow from his Schloss Lichtwehr at brother Hans, standing at the window of a tower of Schloss Matzen, his aim being as good as his cross-bow was strong, for, notwithstanding the great distance, a fatal bull's-eye was scored.

The longest though not the most effective shooting in mediæval times was done with the oriental short-bow, shooting a very light arrow made of reeds or bamboo. According to Sir Ralph Payne-Gallwey, monuments were placed to mark particularly long shots at the Ok Mydan (place of the arrow) near Constantinople, and there Sultan Selim shot an arrow which drove into the ground at a distance of 838 yards!

One great advantage of the oriental short-bow was the ease with which it could be used from horseback, a facility that was, of course, denied to the long-bow, which had to be as long as the archer was tall. "Gaston Phœbus," in the chapter on the long-bow, gives its proper length as 20 to 22 fists, irrespective, apparently, of the man's height. At the conclusion of the chapter, Gaston declares that "of the arc I do not know too much. He who wants to know all about it must go into England, for that is their right craft (*droit mesurer*)," a confession which we must interpret to mean that he cared more for the taking of big game by force of hounds and finally slaying it with spear or sword, be it bear, wild boar, or stag, when the hounds had brought it to bay, than for shooting game with the long-bow or cross-bow. To these sentiments, as I have already pointed out, most old French sportsmen subscribed.

The bows of cross-bows in the earlier days were frequently made of a composition, and though called horn bows, they consisted of layers of yew with a core of whale-bone bound together by sinews and coated with a glue-like varnish of wonderful strength. Not long ago Baron de Cosson sacrificed an ancient Spanish cross-bow to investigations concerning the materials composing the bow, the result being published by him.[2] The way the strips of whalebone that formed the core were mortised together, and the fine workmanship of the whole, showed that the artificer possessed a surprising degree of skill and practice. Sinews and tendons of animals seemed to play an important part in the composition of bow and cord. This we know also from the Pipe Rolls and Wardrobe Accounts; thus, in 1302, William Conrad, bowyer to the Tower of London, received four pounds of "sinues of seadogs," and in 1358, Robert l'Artilleur at Rouen requisitioned certain nuts, stirrups, keys (triggers), hempen string, wax, pitch, tallow, charcoal, glue, ox-sinews shredded out like lint, varnish, and 12 rams' horns, for the construction of cross-bows. Great prices were consequently paid for good cross-bows; thus, when our Henry IV., then Earl of Derby, undertook the first of his expeditions to Prussia in 1390, we know that as much as three ducats was paid for "one arblast for our prince." Another curious entry relating to both cross-bows and long-bows is quoted in relation to the preparations made by Henry V. for his invasion of France in 1415. Among the "vitaille et autre stuff besoignable," or, in other words, the military stores, forwarded by him from Southampton, there were 1000 arcs (long-bows), 2000 trusses of arrows, 100 gross of bowstrings for the bows, and 100 arbalastes. As there is no trace of cross-bows having been used by the English at Agincourt, it is probable that some if not all of these 100 cross-bows were used for the siege of Harfleur, and possibly some of them may have been "arbaletes ribaudequins," or siege cross-bows—huge machines twelve or fifteen feet in length, propelling darts five and six feet long. Another curious entry in the duchy of Lancaster records of the year 1403, takes us back to the days when cannon were in their infancy. The entry relates to the material sent by the king from London by cart to Bristol for the defence of Kidwelly. After the usual array of breastplates,

[1] This passage was written before the appearance of Sir R. Payne-Gallwey's interesting volume on the Cross-Bow. In it his researches concerning all mechanical details have been done so exceedingly well that one regrets not to be able to say the same of some of his historical researches. He omits some important details and his ascriptions are occasionally erroneous.

[2] *Archæologia*, liii. 445–464.

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basnets, vanbraces, gauntlets, lances, and pole-axes for six men-at-arms, we hear of six arblasts, a windlass with a belt, two small cannon costing each 12 shillings, 40 lb. of gunpowder in a cask, 40 bows, 80 sheaf of arrows (a sheaf consisted of 24 arrows), 2000 quarrels, and 12 dozen bowstrings. When the Duke of Burgundy, in 1406, was making vast preparations for the siege of Calais, he collected at St. Omer a great army, amongst which were 3000 archers (long-bow men), and 1500 cross-bow men, chiefly Genoese. Besides cannons, one of which weighed 2000 lb., bombards, rams, and stone-bows were accumulated, and the stores contained 125,000 quarrels, 100,000 viretons, 10,000 dondains (large siege arrows), 200 "arbalastres de Romaine a tendre a tour," and 300 dozen arrows. The ammunition for the great 2000 lb. cannon that had been brought from Bruges consisted of 2568 lb. of saltpetre, 1114 lb. of sulphur, 520 lb. of charcoal (to be mixed when wanted), and 7200 lb. of gunpowder, of which 1200 lb. was bought on the spot, and a stock of 150 round stones, each weighing 120 lb., that were shot from this formidable piece. For the cross-bow strings 277 lb. of thread of Amiens were provided. Wylie mentions, iii. p. 57, that the arblasts (cross-bows) were fitted with triple strings, but this is, I am inclined to think, a misapprehension, for in the first place, the entry in the "Tresor des Chartres," from which he quotes his list, runs: "100 arcs à main garnis chacun de 3 cordes," which distinctly means long-bows and not cross-bows, and, secondly, cross-bows with more than one cord were a later invention, and one of which I have not come across any traces in the first half of the fifteenth century. Possibly the true meaning of this "garnis chacun de 3 cordes" is that each long-bow had three spare strings. In the sixteenth century double-stringed stone-bows furnished with a sort of pouch, in which the pebble or leaden bullet was placed, became very favourite arms for killing birds and small game. The French called them *L'arbalètes à jalet*, and their English name was "latch" or "prodd," and they came under Henry VIII.'s ban when he forbade the use of cross-bows and hand-guns, in order that the use of the old national weapon, the long-bow, might not go out of fashion.

Stradanus's well-known series, called by him "Venationes, Ferarum, Auium, Piscium," which was really only a sort of sporting picture-book, consisting of 104 pictures of possible and impossible sporting incidents, will be known to many readers taking an interest in antiquarian research. This series, which was drawn about the middle of the sixteenth century, and engraved by Galle, de Mallery, Collaert, and others, and published in 1578, throws valuable light upon various forms of sporting arms.[1]

In France, notwithstanding the great English victories achieved by the long-bow, the favourite weapon for warfare remained the cross-bow, and records show that after every important English victory guilds of crossbowmen were formed in various French towns, in order to make the population skilled in its use. The Paris company of crossbowmen was established in 1359, soon after the disastrous defeat at Poitiers. Two societies of crossbowmen were founded soon afterwards in Reims, and of these some early records have come down to us. The distance they shot was 110 "reasonable paces," and the members appear to have been recruited from various social circles. Thus we find Jehan Moet, apothecary; the noble Jehan de Bohau; Remy Legoix, parish priest; Thiebault Levoirier, cloth merchant; then canons and chaplains, butchers, tanners, stonemasons, saddlers, &c. In 1415 "the knights of the crossbow" of Sezanne sent a challenge to their brother archers at Reims to shoot a match on the Saturday before John the Baptist's day, the first prize being a silver stag with gilt antlers, of the value of eight to nine livres tournois, the second a silver hind. Four months later a more serious match was shot on the fields of Agincourt, when the English long-bow again pulled off a brilliant victory against most formidable odds. The two cross-bow gilds of Reims were amalgamated under Louis XI., and as late as 1603 Henry IV. granted them fresh letters patent.

Cross-bows for the chase were very favourite presents from kings and princes. When Louis de Bruges, or the lord of Gruthuyse as his chronicler calls him, visited Edward IV. on a special mission from Charles of Burgundy, the English king, besides making him earl of Winchester, presented him with a gold cup garnished with pearls, in the middle of which there was "a greate pece of an Unicornes horne," with "a right feyr hoby," and "a Royall Crosbowe, the strynge of silke, the case covered with velvette of the Kinges collour and his armes and bagges (badges) there apon. Also the heddes of the quarrelles were gilte." This gorgeous cross-bow was probably put to a practical test a few hours after the presentation, though apparently not with any conspicuous success, for "before dynner they kylled no game, saving a doe."

The points of cross-bow bolts were of manifold shape; those used for shooting birds and hares and rabbits had, as we have seen, a blunt knob, that prevented the bolt from penetrating, and the game was killed by the mere shock. Another shape was the *Boson*, which had a turnip-shaped bulb of wood at the end, from which a sharp nail-like point protruded. It was probably used for small game, for the purpose of preserving as much as possible the quarry from external wounds, for the larder played an important *rôle* in those days. Others again had double or forked points, connected by a sickle-shaped sharp edge. Of these, Shakespeare, more than a hundred years after their introduction, complained in "As You Like It," so that they appear to have remained in use for a long time, in fact till the cross-bow went out of business altogether, at least for practical purposes. The most usual shape,

[1] Among the fifty odd original drawings by this master's hand which I possess there are many of the originals of the engravings reproduced in this series. A number of these tinted drawings were reproduced by the *Burlington Magazine*, Nov. 1903, Feb. and March 1904.