

## Two antler crossbow nuts and some notes on the early development of the crossbow

by Arthur MacGregor

In his account of the 1880 excavations at Buston Crannog, Ayrshire, Robert Munro illustrated a 'curiously-shaped object of bone' for which he was unable to suggest a function (Munro 1882, 217, fig 216). Several parallels may now be cited for this interesting piece (fig 1A), whose true significance has been recognised in recent years by a number of scholars, and it may be identified with certainty as an unfinished nut from a crossbow.

The Buston nut (NMAS cat no. HV 106) is made from a sawn section of antler beam, the original periphery of which has been smoothed on one side and cut away to form the string and trigger notches on the other. There is an axial perforation, 4 mm in diameter; an earlier attempt at perforating the nut, by drilling from either side with a pointed implement, has been abandoned at an early stage, presumably when it was realised that the resulting hole would be considerably off-centre. An arrow slot, 6 mm wide, has been cut through the uppermost quadrant. It is clear from the irregular outlines of the piece that it has been shaped entirely by hand: many small facets, grooved in various directions by the action of a file or other abrading implement, can be

detected on the bearing surface and show no signs of being obscured or smoothed away by subsequent wear from prolonged use.

A second antler nut (NMAS cat no. HY 21) was recovered during excavations carried out by the Office of Works between 1912 and 1922 at Urquhart Castle, Inverness-shire (Simpson 1930, 59). The Museum accession register records that it was found in 'Chamber 31, 20 ft from the S end-wall and 2 ft down', but from the incomplete site records which survive it has proved impossible to pinpoint the precise location of this chamber, although it seems to have been in the area of the 'motte' and was probably the largest room in the long building there.<sup>1</sup> The Urquhart Castle nut (fig 1B) is basically cylindrical in shape and was probably turned on a lathe. It has

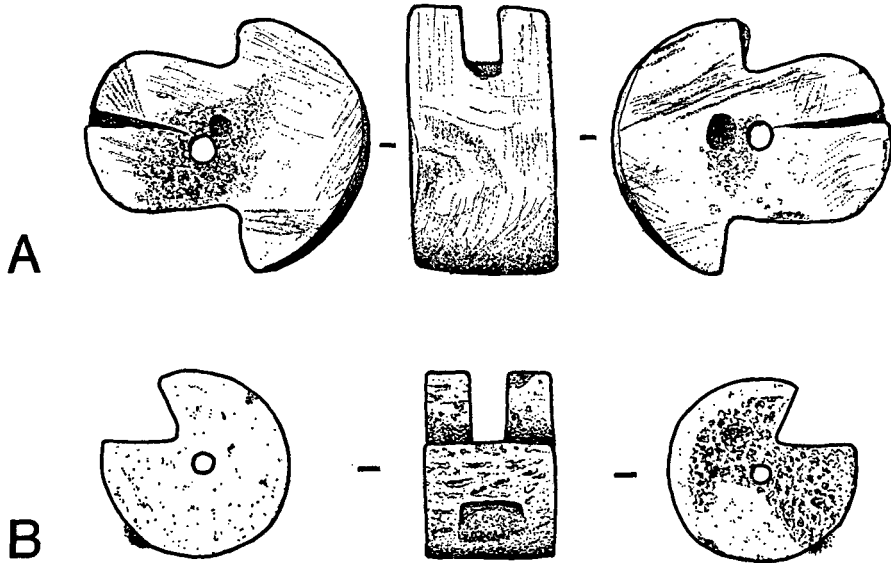


FIG 1 Antler crossbow nuts: A, Buston Crannog, Ayrshire; B, Urquhart Castle, Inverness-shire (scale 3 : 4)

well-defined string and arrow notches, a cleanly drilled axial perforation and a trigger notch which is now filled with iron corrosion products.

Payne-Gallwey (1903, 95ff, figs 48-55) describes in detail the function of the nut in the crossbow: cradled in a socket lying across the top of the stock, it was secured by an axial pin or by strands of catgut threaded through the perforation; the sear of the trigger engaged in a notch on the underside of the nut, which was usually protected from undue wear by the insertion of a steel wedge; the bow-string was held by the twin projections on the upper side, between which lay the arrow or bolt, fitted to the string. Pressure on the lower end of the trigger mechanism disengaged the sear from its notch, leaving the nut free to rotate in its cradle under the tension of the bow-string until the string was freed and the arrow released.

The Buston nut conforms to this general pattern but is unusual in that the trigger notch (which shows no sign of ever having been protected by a wedge) extends across the entire width instead of being contained within a central slot. Furthermore, the seating for the string has not been undercut to provide a more secure hold for the string in the usual manner. The rather obtuse angle of the string notch may be a further indication that the nut was never finished. The nut from Urquhart follows the more conventional pattern and evidently did incorporate a wedge, represented now by the iron oxide deposits filling the trigger notch.

While the Urquhart piece is fairly certainly of medieval or early post-medieval date – the history of the castle has been traced from its foundation as a Norman motte until it was garrisoned in the 17th century, and coins of Edward I to Charles II were found in the excavations (Simpson 1930, 51ff) – any attempt to date that from Buston is made extremely difficult by the limitations of present-day knowledge of early crossbows. The earliest evidence for any kind of crossbow is the description of the *gastrophetes* or belly-bow contained in the handbook of Heron of Alexandria who, although writing in the second half of the 1st century AD, relied to a great extent on the works of an earlier Alexandrian writer who was active in the middle of the 3rd century BC (see Marsden 1969 for an account of this early form of ‘non-torsion catapult’). In this primitive form, the limitations hitherto placed on the range of the composite bow by the strength of the bowman were overcome by mounting the bow on a stock fitted with a ratchet-mounted ‘slider’; the string was fitted into the slider in its forward position, the front of the slider placed on the ground or against some vertical surface and, with the bowman’s stomach applied to a transverse bar at the rear, the slider was forced back on the ratchet until fully tensioned. A trigger mechanism controlled the release of this assembly, and a groove was provided on top as a guide for the missile. Although the basic elements of later crossbows are represented in this early form, it seems to have suffered something of an eclipse towards the end of the 3rd century BC, when larger torsion catapults relying on springs rather than conventional bows came to the fore (Marsden 1969). Smaller hand weapons no doubt survived alongside these larger field pieces, perhaps covered by the rather ill-defined category of *manuballistae* (Webster 1969, 233, n 1). Whatever the precise form of these early hand guns, the record in the 4th century AD of a weapon called the *arcuballista* certainly implies by its name that it incorporated a bow, no doubt of composite form. Although no detailed descriptions of the *arcuballista* survive, it may be that this is the weapon illustrated on two Roman stone bas-reliefs from Aquitaine, both of which seem to incorporate simple nuts of the type considered here: the first of these (Espérandieu 1908, no. 1679), a *cippus* from Salignac-sur-Loire, illustrates a hunting assemblage, including a crossbow with reflexed (i.e. composite) bow, quiver and knife, as well as a hound on a leash; the second (ibid, no. 1683), a fragmentary slab found among the ruins of a Gallo-Roman villa at Espaly, has a more ambitious composition showing a hunting scene in which one of the huntsmen carries an unmistakable crossbow and has a quiver at his belt. The identification of these hunting weapons as *arcuballistae* rather than as *gastrophetae* (Heath 1971, 291) seems preferable both on chronological grounds and in view of the fact that neither of them has a stock which could be applied with comfort to the stomach. More importantly, however, the heavy sliding mechanism of the *gastrophetes* is absent from both these pieces and its place is taken by a small device with twin projections, which can hardly be other than a nut of the type considered here.

Two nuts of this form have so far been discovered in contexts suggesting a Roman date. From early excavations at Carnuntum in Upper Pannonia came one example indistinguishable in form from medieval and later nuts, but whose function was not recognised at the time by the excavator (von Groller 1909, 64, fig 22). Unfortunately, the conditions under which those excavations were carried out render the possibility of contamination of the Roman layers by later material highly likely, so that no certainty can be claimed for the date of this piece.<sup>2</sup> In England, a chalk-cut grave found towards the end of the last century at Burbage, Wiltshire, produced a nut of unusual form, quite unlike the normal lathe-turned cylindrical type described above, being rather flat in section and having a trigger notch extending across the entire width of the nut (Goddard 1896, 87ff, fig 5). The grave also contained a number of items of iron, some of which may have formed part of the crossbow, and also some bone objects including a long strip (or several strips) of a type normally thought to have ornamented caskets or boxes but which, it was

suggested, may in this instance have served as decoration on the stock. Although some doubt has been expressed about the date of this burial,<sup>3</sup> an origin in the Roman period (as suggested by Goddard) remains at least as likely as any later alternative.

Roman composite bows are represented by bone or antler splints from a number of sites, including Caerleon, Monmouthshire (Boon 1972, 54, fig 30), Silchester, Hampshire (Boon 1974, 68, fig 8, 7) and Bar Hill, Dumbartonshire (Robertson *et al* 1975, 56, fig 18, 8-10). All these fragments could have come from hand bows, however, and cannot be taken to demonstrate the presence of crossbows.

Beyond the close of the Roman period, the history of the crossbow enters a period of obscurity, with few references to demonstrate its continued (if, perhaps, isolated) survival in the western world. As is well known, crossbows are nowhere to be seen on the Bayeux tapestry, but it has been suggested that the presence of crossbowmen at Hastings may be inferred from the appearance of one of the figures on the tapestry, while Guy of Amiens, in his *Carmen de Hastingae Proelio*, written within two years of the Conquest, twice (vv 338 and 411) refers to crossbowmen within the Norman force (Morton and Muntz 1972, 112 ff). The fact that some tenants in chief recorded in *Domesday* as holding land in Yorkshire, Norfolk and Wiltshire are given the title *arbalistarius* (listed in Ellis 1833, 373f) confirms the existence of these weapons in England within a few years of Norman arrival. Corroborative archaeological evidence of an early Norman currency comes from Goltho Manor, Lincolnshire, where an antler nut was found in a late 11th-century context,<sup>4</sup> while another example, from Wareham Castle, Dorset, came from a layer dated to the first half of the 12th century (Renn 1960, 61, fig 19c).

Throughout the medieval period and until the general adoption of steel in the 17th century, antler was most commonly used in the manufacture of crossbow nuts; the Wallace Collection, for example, includes a number of Continental weapons with antler nuts,<sup>5</sup> ranging in date from the mid 15th to the late 17th century (Mann 1962, 477ff).

Returning to the Buston nut, it will be seen that the Early Christian date suggested by the bulk of the material from the site seems, on the evidence given above, to be difficult (although not impossible) to maintain for this piece. The presence of a fragment of samian ware and a gaming counter of white glass (Munro 1882, 233) testifies to the survival there of a certain amount of Roman material. Three socketed arrowheads (or crossbow bolt-heads?) are not unlike Roman examples (cf Boon 1972, fig 30, 6-7), but could equally be of later origin. A *terminus ante quem* is almost equally difficult to establish: since the crannog survived as a small island until the 19th century and was evidently the resort of numerous waterbirds (Munro 1882, 190), it would have made an ideal hide for wildfowlers. Perhaps it was one of these, only a few centuries ago, who carved and eventually discarded this clumsy copy of what should have been a precise piece of workmanship. At present there seems to be no way of attributing the nut with certainty to any one period between the Roman occupation and the 17th century, but further discoveries of typologically similar nuts may yet afford a more accurate identification.

#### ACKNOWLEDGMENTS

I am pleased to acknowledge the assistance and information given to me in the preparation of this paper by Mr D Caldwell and Dr D V Clarke of the National Museum of Antiquities, Mr F K Annable of the Devizes Museum and Mr I MacIvor of the Inspectorate of Ancient Monuments. I have also benefited from the advice of Dr D Baatz, Mr B R Hartley and Dr J N G Ritchie.

## NOTES

- 1 Mr Iain MacIvor has kindly searched on my behalf the records held by the Inspectorate of Ancient Monuments.
- 2 Dr D Baatz of the Saalburgmuseum has drawn my attention to the insecure stratigraphy in von Groller's excavations.
- 3 I am grateful to Mr F K Annable, Curator of the Devizes Museum, for acquainting me with the opinions of various scholars on the date of this assemblage: they vary in preference from the Roman to the early medieval period.
- 4 Mr Guy Beresford, excavator of the Goltho hut, has kindly allowed me to mention it here ahead of publication of a note which I have prepared for inclusion in the excavation report.
- 5 Ivory, the most common alternative, is represented by one example (Mann 1962, no. A1033).

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