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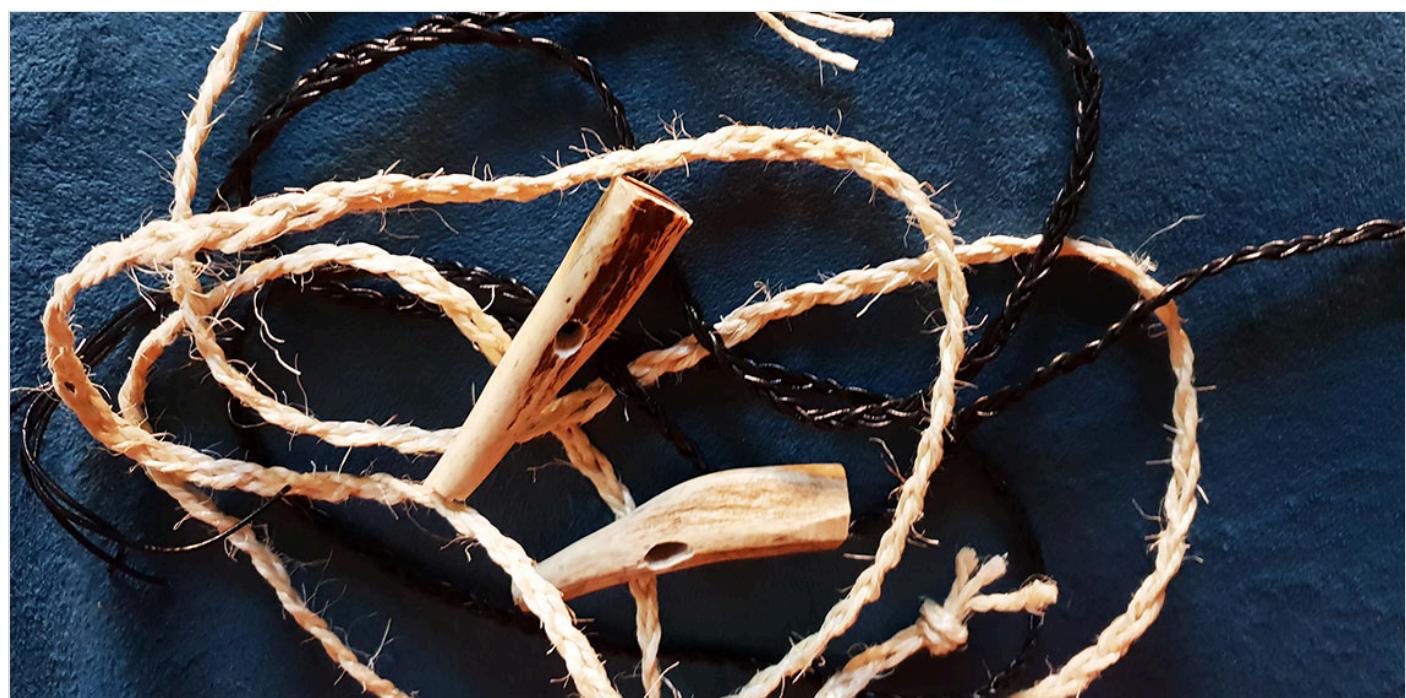
Let's Do the Tine Warp Again: Reconstructing a Late Bronze Age Bridle from Moynagh Lough, County Meath, Ireland

Persistent Identifier: <https://exarc.net/ark:/88735/10439>

EXARC Journal Issue 2019/3 | Publication Date: 2019-08-15

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Both before and after the Irish Late Iron Age (AD 50 - 400) there is an exceptional paucity of knowledge regarding equitation in Ireland. We know that equids are present during prehistory, but basically nothing about their use. This paper documents the reconstruction and use of an organic bridle, based on a possible Late Bronze Age cheek-piece found at Moynagh Lough, Co. Meath.

Under Starters Orders: An introduction to the experiment

“ The only way to try and understand how the people of Ireland were employing horses at the junction of the Late Bronze Age and Early Iron Age was to scrutinise the artefact and try to replicate it, and figure out how it would actually work.

Horses and equitation are often associated with Ireland; coins of the pre-Euro modern period displayed Irish hunters, and florid Victorian art imagined the heroes of the *Táin* (the early medieval Irish saga of gods, bulls and heroes) in chariots drawn by fiery steeds. That image has persisted despite archaeological evidence, or lack thereof. There is a considerable lack of understanding of the prehistoric use of the horse, and even the types of animals present. There is incontrovertible evidence that horses were present in Ireland of the Late Bronze Age and Early Iron Age. Bone assemblages from the Hill of Ward/Tlachtga cult site in County Meath provided calibrated dates of equine remains, dating between

401 BC and 195 BC (Maguire, 2018, p.35). Horse bones found in Killuragh Cave, County Limerick (Woodman, et al., 2017, p.28, Table 1) produced an even earlier chronology, with calibrated dates between 1402 BC and 1127 BC, placing them firmly in the Middle Bronze Age. Yet there is no indication if the status of the prehistoric horse was friend, food – or both.

Recent research into the exquisite La Tène-derivative snaffles and bosals of the Late Iron Age (Maguire, 2018) has encouraged discussion among some Irish archaeologists, culminating in the acknowledgement that work needs to address the paucity of knowledge regarding horses and equitation from earlier periods. Horse bones found at Shandon Caves, Waterford date between 30,977–29,275 (calibrated) BC, well before the last Glacial Maximum (Woodman, McCarthy and Monaghan, 1997), although those indigenous equids became extinct during the glaciation of Ireland. The species was re-introduced at some phase of human habitation but there remains uncertainty as to whether this occurred during the Neolithic or Early or Middle Bronze Ages.

Ireland has no Late Bronze Age tack assemblages or explicit evidence of vehicles like the Welsh Pairc-Y-Meirc or Llyn Fawr hoards (Boughton and Maguire, 2015), and no Developed Iron Age equestrian evidence like the chariot burials of Arras and Wetwang Slack in Britain (Stead, 1979), or the Marne chariot burials in France (Stead, 1991; Verger, 2010). Innovative research approaches, culminating in a forthcoming paper by Brian G. Scott (2019), offer a series of hypotheses on riding equipment of Later Bronze Age Ireland. The project documented in this paper was born from questions surrounding the functional viability of Scott’s proposed Bronze Age bridle components. My personal scholarly background is in European Iron Age equitation and lorinery. My own not-so-scholarly enthusiasm for all things equitation and horse-related is fairly well known in archaeology circles, so this challenge to test the waters of experimental archaeology within my own field proved irresistible!

Therefore, this research sets out to reconstruct a set of cheek-pieces, similar to the single piece found at a multi-period crannog site in County Meath (Bradley, 1991).

Through his artefact analyses, Scott (2019) has proposed that the antler cheek-piece from Moynagh Lough crannog (Bradley, 1991) may well be that rarest of artefacts – a component of Irish Late Bronze Age tack. It is 9.9 cm in length, with a single worn rectangular aperture of 2.2 cm (Bradley, 1991, p.11, Fig. 4). It is almost identical, apart from a lack of carved decorative patterns, to single aperture examples found at Flag Fen, Norfolk (Brittain and Overton, 2013, p.141, Fig. 4), although it also resembles the morphology of pieces found at Heather Burn Cave in Durham, (Britnell, 1976, p.25, Fig.1.4) which date to c. 700 BC, although the intact specimen from that site has extra perforations. The Flag Fen antler cheek-pieces (Brittain, 2010) are likely of a comparable date to the Heather Burn examples which would back up the dates presented for the Moynagh specimen. There is a persistence of occupation at Moynagh Lough, and during later prehistory and certainly into the early medieval period, the site would have accommodated artisans of all kinds, even if on a seasonal basis, from metal to fabrics, and obviously antler as well (Bradley, 1993; O'Sullivan and Nicholl, 2011, pp.82-84). Heather Burn Cave near Durham, Britain, may well have been a production site for antler work, if indeed five other specimens were found, and then lost (Britnell, 1976, p.27).

Similar cheek-pieces have been found across European Urnfield regions from Hungary to western Europe, with notable sites including Ushkalka I, in the Ukraine (Pankowsky, 2016) and Nitriansky Hradok in Slovakia (Hüttel, 1981, plate 1.11; Maran and van der Moortel, 2014). There are a bewildering selection of bored holes in various positions on antler cheek-pieces, and apart from research by the ubiquitous team of Brown and Anthony (1998) there has been little attempt in understanding how and why they fitted. While Mediterranean and Levantine equestrian art of the Late Bronze Age indicate the fitting of the triple bored pieces fairly well (Benecke, 2006; Chechushkov, Epimakhov and Bersenev, 2018), some of these bits and cheek-pieces were also made in metal, but no similar statuary or artistic representations of equitation exist in the Atlantic archipelago of basic single perforation antler cheek-pieces such as the Moynagh specimen. The only way to try and understand how the people of Ireland were employing horses at the junction of the Late Bronze Age and Early Iron Age was to scrutinise the artefact and try to replicate it, and figure out how it would actually work.

The tines they are a-changin': Materials and methodology

The only species of deer known to exist in pre-Norman Ireland was *Cervus elaphus*, the Red Deer (Carden, et al., 2012) so it was imperative to source tines from this species, to create authentic bridle components. The choice was made to select two brow tines, closest in curvature to the Moynagh cheek-piece.

Each tine was cut with a small hand-held saw to precisely match the same length dimensions of the Moynagh piece, with the size and shape of the cleft marked with pencil on each (See

Figure 1), although one tine was thicker than the other. The equipment chosen for this experiment were kept as simple and basic as possible, consisting of a bow drill, fitted with a copper alloy bit, half of a copper alloy knife, and a roughened limestone pebble to sand down rough surfaces and act as a hammer. These were the closest and most basic tools, similar in function to those available from the Late Bronze Age onwards (Choyke, 2005, p.129; Luik, 2011, p.42). As an aside for health and safety matters, it must be noted that a dust mask was worn through this process, as antler dust is an irritant and can also carry bacteria when as fresh as those used.

Attempts were made to cut through the dry antler with the knife, tapping with the stone as a hammer, although this proved exceptionally difficult using the equipment I had chosen to limit myself to. As noted earlier, the Moynagh specimen has a slightly squared rectangular aperture. While some of this shape is likely to be due to constant use-wear from friction of the organic mouthpiece, it became clear that the perforation had to have been started from a basic hole, and then enlarged afterwards. The antler was soaked for 24 hours to allow for ease of drilling. The effect of the bow drill and small copper alloy bit attached was surprisingly rapid on the softened antler, taking just over 25 minutes to puncture the other side. It took another 20 minutes drilling into that puncture to create a hole with an even inner diameter on both sides. The downside of this stage of the experiment was the extremely pungent odour of the soaked antler, which seemed to pervade everything.

The bored hole was then enlarged by using the knife in a scrape and drag motion, to replicate the worn rectangular cut in the antler, just like the Moynagh piece. This was best achieved by a twisting motion, first one side of the drilled hole, then the other, with a similar vertical cut and side-scrape action applied down the sides of the aperture. As the blade of my knife was slightly curved, it produced a slightly more rounded shape than the Moynagh specimen, suggesting that the actual tool used would have been more like a rasp with sharp, cutting edges. It was interesting to note that my method created an aperture almost identical in shape to that of the largest Flag Fen antler cheek-piece (Brittain and Overton, 2013), in itself indicating different tools being used, rather than one single type being used exclusively.

At any rate, this method produced a suitable sized hole of comparable size. This process took remarkably little time, with the pair of tines being cut, drilled and perforated within 4 hours, reinforcing that this kind of bridle would have been very much a piece of vernacular equipment, and unlikely to reflect any kind of status in itself, despite the use of the horse.

It was very obvious that this small cleft in the tine (2.2 cm length by 0.8 cm width) would never be suitable for the insertion of a metal mouthpiece with cheek rings. Considering the ease with which the knife scoured through the internal antler structure, a metal bit would likely cut through the tine very quickly from the pulling of rein pressure from the rider's hands. Horses are rather slobbery animals, and if 24 hours soaking in water could soften antler that it could

be worked with relative ease, then regular application at the sides of a horse's mouth would leave the antler permanently softened. Metal mouthpieces would not be practical as their grinding action against antler would break the aperture quite rapidly. We can therefore suggest that organic mouthpieces, like the preserved rope specimen found at Baekkedal, Denmark, which has been dated between 900 BC and 700 BC (Sarauw, 2015) were likely a commonplace means of controlling equids during the Late Bronze Age and possibly beyond.

Such a proposed bridle would exert minimal pressure on the mouth of the horse, and as such, any animal would be trained to respond more to the other riding aids such as legs, seat, and voice more than hands. This is a different training scenario than that implied by the use of the bronze and iron single-jointed snaffles of La Tène-period Europe and Britain, and even the earlier single bar 'mullen mouth' snaffles of the Bronze Age (Medvedskaya, 2017). The efficacy of this proposed bridle could only be tested by actual use on a horse, so after fitting the bridle to a horse skull for measurements, the practical use was addressed.

Making it rein: Construction and use of the bridle

As no connective tack material has yet been found in archaeological context in Ireland, I chose to use plaited leather thonging. The arm bands of the Iron Age bog bodies known as Old Croghan Man (Giles, 2015) and Lindow Man (Stead, Bourke and Brothwell, 1986) both show simple plaiting techniques, while the Dartmoor Whitehorse Hill leather and copper alloy bracelet, dating from the Bronze Age (Sheridan, et al., 2016), is a more intricate and delicate form of plaited hide, obviously made for adornment rather than durability – the point being that plaited leather or hide thong was regularly used from the Bronze Age onwards as a ready and easily obtainable resource.

The plaited thonging was placed around the poll of the horse as a headpiece, with each side passed down the sides of the face and through the mouth of the animal (See Figure 3), creating a doubled mouthpiece, before being inserted into the cheek-pieces and looped again though them to secure them in place (See Figure 4). Both loose strands were then tied to make a rein (See Figure 5). It must be noted that a browband and throat lash are not actually necessary components of a bridle – the principle of any bridle is to create a connection between the rider or drivers' hands and the horse's head for guidance and directions. Observing the squared shape of the use-wear on the Moynagh specimen's perforation, an added rope was prepared, with the reckoning of using at as chifney¹ -style addition, making a form of halter bridle.

With the kind assistance of Ms Carol Dunlop, archaeology librarian in Queen's University Belfast's McClay Library, and her cob mare Roxy, and the proprietor of Loughowen Equestrian, near Hillsborough, County Down, and her grey gelding Bertie, the bridle was fitted and tested. Some of the results were unexpected.

The immediate observation was made by the group of practising equestrians who gathered round the very patient horses was that rein tension was required for any form of reliance on the bridle. The single-perforation cheek-pieces appear to primarily function as a means to keep the organic mouthpiece actually in the mouth of the horse, as well as a gentle aid to direction when rein pressure is applied.

It was clear from the moment of fitting that the plaited leather mouthpiece was insufficient to control a modern horse, used to a metal bit. Both Roxy and Bertie expressed more of an interest in trying to crunch the antler cheek pieces on fitting, perhaps thinking them some exotic form of carrot! Using the plaited sisal rope which had been on stand-by as a chifney proved more successful as a mouthpiece, perhaps because its texture was more obvious to them as something new to be investigated and engaged with. These points were noted while leading the horses wearing the bridle around the sand-school, and I intend to replace the entire headstall with a plaited sisal and forego the leather for Mark II.

Straight from the horse's mouth: Discussion and results

The Danish Baekkedal bridle (Sarauw, 2015) with its well-preserved organic rope mouthpiece offered a vital 'smoking gun' regarding the nature of equitation during the Bronze Age, and how these halter bridles would have been used. Regardless of the status of the humans who were creating a grand display with horses and/or vehicles, these animals would have been as well trained as the delivery horse which knows exactly when to stop at each house, and who holds the best carrot or apple treats! Rope mouthpieces offer a gentle control system, indicating an intuitive form of riding or driving.

To ride or drive a horse in an organic mouthpiece with a single perforation cheek-piece would have meant that the equid had been trained specifically to this type of bridle, and it would be suspected the rider would have relied on seat, voice, and especially legs to direct and control the creature. To attempt riding with this bridle, and no saddle, on fairly headstrong Irish horses of 14.2 hh and 16 hh, who displayed an amusing if blatant scorn for the organic mouthpiece, was a step further than we wished to take at this moment of research, but I do not rule out riding or driving in this form of bridle in future experiments, but perhaps on smaller animals.

It would seem likely that the triple-hole cheek-pieces would allow for additional facial strapping of both leather and rope, for more immediate contact with the horse, and therefore extra control. It is likely that this is also the phase of equitation that decorative metal phalerae and connective mounts (Kossack, 1954, p.116, abb. 1) have been added to the structure of the bridle, to keep all straps in place and minimise fraying. The Baekkedal hoard (Sarauw, 2015) shows a hybrid harness comprising leather and rope, with decorative phalerae connected to strapping; it seems likely that this would have been the case in most triple-holed cheek-pieces.

The use of metal mouthpieces, then, during the European Late Bronze Age, makes a statement about animal control, as much as power or wealth. They are of course a formal statement of display, as metal production involved lengthy processes such as mould-making, smelting and casting. This is very different from the manufacture of the antler cheek- pieces, which can be made comparatively quickly from resources which would be classified as potential waste.

This experiment raised questions about changes in training methods and reasons for these changes. Were the organic pieces for practical vernacular use, and metal for war or display? When did these changes occur? If there is a definite period of transference between organic and metals, how does it compare to other aspects of the archaeological record?

It takes a great deal more patience to train an equid to respond to soft riding aids than the immediacy of a metal snaffle or curb bit, which will inflict instant pain if excessive pressure is applied to the rein. The impression given to the modern equestrian was that the Moynagh Lough bridle would have been used for hacking peacefully along an esker or trackway, rather than galloping into a raid. If these bridles were used in hostilities, where control and manoeuvrability would be premium, I am in awe and admiration for the riders, their horses, and the training methods used.

As a footnote to this experiment, Baekkedal's rope mouthpiece is echoed in the continued construction of the traditional brangas, or rope and wood harness bridle used in Tiree Island, off the western coast of Scotland. The wooden cheek-pieces, made from reworked fragments of whiskey barrels, were used to emphasise the command of the rider or driver, while the rope was made from marram grass or straw (Holliday, 2017). The islanders have a strong awareness that these objects originate in prehistory, and their creation today is a maintenance of tradition. The existence of these bridles, reliant on easily sourced organic materials, perhaps offers a good explanation as to the lack of tack within Ireland's archaeological record, an issue which persists into the early medieval period in Ireland. Preservation of such organic pieces would require unbelievable luck, and if found by those wishing only the shiny treasure-like qualities of metal, would be discarded as rubbish, which is a likely scenario of what may well have happened during the age of the Victorian and Edwardian antiquarians.

Something must also be said about the likely status of the antler makers. If they were manufactured in areas slightly removed from settlements, it may well be due to the anti-social odour of the steeped antler. One of my tines had traces of its velvet still on, and the smell after 24 hours was deeply unpleasant. One wonders if this job was confined to perhaps women with small babies in swaddling, or individuals with mobility issues – those who were more productive if not having to move a great deal from one location. My perception of the

task was that this was a sociable job, where I could well imagine chattering groups involved rather than solitary artisans.

My future research will involve micro-wear analysis of Irish horse teeth from the scant equine remains we have, alongside the Mark II Moynagh bridle, which will certainly include an added rope chifney for extra control, and reconstruction of a triple-holed antler cheek-piece bridle, not to mention sourcing a smaller pony to ride using the bridles, as it would not be as far from which to fall! For now, however, the practical testing of such a bridle has stimulated many questions which I am eager to work through, as it has equal relevance to Ireland's early medieval period, where evidence of equitation is equally scarce, and may well be due to the use of organic materials not preserving well. If we consider the tasks for which we tack up a horse or pony to do as reflecting the needs of a society, then this very new area of material studies allows us to flesh out the workscapes of past peoples and their animals, and understand them just a little better.

¹ A chifney is type of bit for horses that are difficult to lead, often used on stallions. The mouthpiece consists of a (usually) metal circle, part of which is placed over the horse's tongue, part behind the chin, and attached by loops to a single-strap headpiece

Keywords **horse**
(re)construction

Country Ireland

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FIG 1. ANTLER TINE PREPARED FOR SAWING AND DRILLING.



FIG 2. ASSEMBLED TINE CHEEK-PIECES AND PLAITED LEATHER AND ROPE. JUST ADD HORSE....



FIG 3. ROXY BEING FITTED WITH THE HEADSTALL OF BRIDLE.



FIG 4. LOOPING THE THONGING INTO THE CHEEK-PIECE, ON A PATIENT BERTIE.



FIG 5. ROXY MODELLING THE COMPOSITE OF LEATHER AND ROPE MOUTHPIECE WHICH SEEMED BETTER ENGAGED WITH THAN LEATHER ALONE.