

2. The use of archaeological and zooarchaeological data in the interpretation of Dún Ailinne, an Iron Age royal site in Co. Kildare, Ireland.

Pam Crabtree, Susan A. Johnston and Douglas V. Campana

Abstract

Dún Ailinne, also known as Knockaulin Hill, in County Kildare is one of the Irish royal sites, identified in historical sources as the seat of the kings of Leinster. Excavations were conducted at the site from 1968 to 1975 under the direction of Professor Bernard Wailes of the University of Pennsylvania. The analysis of the archaeological remains and faunal materials from Dún Ailinne has recently been completed. This paper will show how archaeological data and faunal remains were critical in reconstructing the ways this ritual site was used during the Iron Age. The nature of the artefacts and structural remains at Dún Ailinne suggests that it was a ritual site, but the zooarchaeological data provide important additional evidence—that there was craft production at the site alongside ritual activity, and that there is a significant shift during the site's final phase when ritual feasting became a major focus.

Introduction

Dún Ailinne or Knockaulin Hill is located in County Kildare, Ireland, near the modern town of Kilcullen (Figure 2.1). Medieval Irish scholars identified Dún Ailinne with the pre-Christian kings of Leinster (Grabowski 1990). Other Irish royal sites include Tara, which has been associated with the kings of Meath (Newman 1997); Rathcroghan or Cruachain (Barton and Fenwick 2005), which has been associated with the kings of Connaught; and Navan or Emain Macha, which is traditionally associated with the kings of Ulster (Waterman 1997). On Knockaulin Hill, a bank and ditch encloses an area of 13 ha. This does not appear to have been a defensive fortification, since the bank is located outside the ditch, a pattern that is seen at the much earlier henge monuments in the British Isles (Wailes 1990). Radiocarbon dates for the Iron Age features at Dún Ailinne range from the third century BCE to the 4th century CE. Stylistic parallels for the metal objects found at the site are mostly first century BCE to first century CE (Wailes 2004: 239). All the royal sites are located on prominent hilltop locations with commanding views of the surrounding countryside, and they all include some type of timber structure at their centre (Johnston 2006).

Excavations at Dún Ailinne

A major programme of excavation was carried out at Dún Ailinne between 1968 and 1975, under the direction of Prof. Bernard Wailes of the University of Pennsylvania (Wailes 1990; Johnston and Wailes 2007). Geophysical surveys indicated anomalies in the centre of the site, so the excavations were focused in that region. The excavations revealed a complex pattern of structural features and stratigraphic levels (Figure 2.2).

Three Iron Age timber structures were constructed at the site. The earliest structure, from the White Phase, would have held upright wooden posts. The White Phase structure was demolished and replaced by more complex



Figure 2.1 Map of Ireland showing the location of Dún Ailinne and the other Irish royal sites.

Rose Phase structures that included a triple-walled, figure-of-eight timber structure with a funnel-shaped entrance. The Rose Phase structures in turn were demolished to make way for the Mauve phase constructions, which included a double-walled circular structure that surrounded an inner wooden building that is arguably a tower. When the Mauve Phase structures were demolished, a low mound of burnt material and animal bones accumulated (Flame Phase), suggesting that the site served as a location for feasting on a periodic basis long after the structural remains at the site were demolished. No features were recovered that could be associated with this phase. While Wailes' excavations revealed the complex architectural history of the Dún

Ailinne site, the question of the function or functions that this site may have served has been a matter of debate. Wailes (1990; 2004) has argued that the Dún Ailinne was a ritual site since the White, Rose, and Mauve Phase structures show no evidence for either residential or funerary use. But what kinds of activities were carried out at this ritual site?

Since the Irish medieval documents were written after Dún Ailinne was abandoned (see Grabowski 1990 for a complete review of the medieval historical record

concerning Dún Ailinne), we have no direct historical evidence for the types of activities that may have been carried out at the site. In this paper, we will show how the analysis of the faunal remains and worked bone objects, when combined with the analysis of other artefact classes, have provided new evidence for some of the activities that may have been carried out at Dún Ailinne during the Iron Age.

Faunal Remains

The 1968-1975 excavations at Dún Ailinne yielded 18,755 mammal bones and unidentified fragments, making this faunal assemblage one of the very largest that has ever been recovered from a pre-Christian Iron Age site in Ireland. Preliminary analyses of the fauna were carried out by a number of different students between 1968 and 1983. In the early 1980s, one of us (Pam Crabtree) re-analyzed the entire Dún Ailinne faunal collection. The work was carried out using the comparative collections housed at the Museum Applied Science Center for Archaeology (MASCA) of the University Museum, University of Pennsylvania. Since the initial goal of the research was to determine whether ritual feasting took place at Dún Ailinne, the analysis focused on identification and quantification of the faunal remains. Dental eruption and wear, following Grant (1982) was used to determine the ages at death for cattle, sheep, and pigs.

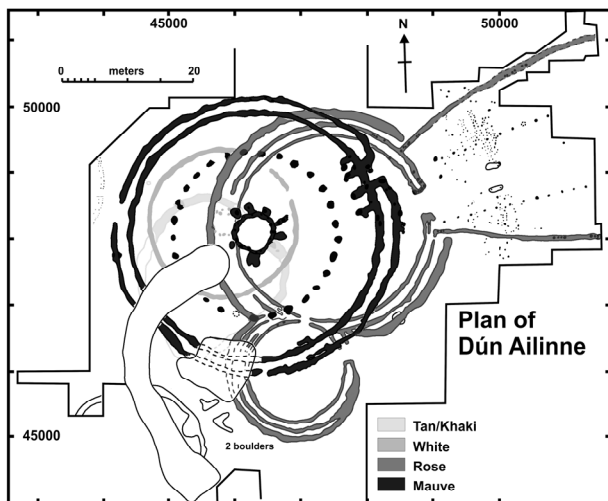


Figure 2.2 Plan of the 1968-75 excavations at Dún Ailinne showing the locations of the Iron Age structures.

Table 2.1 A phase-by-phase summary of the animal bones recovered from the 1968-75 excavations at Dún Ailinne.

	Cattle	Sheep	S/G	Pig	Horse	Dog	Red Deer	L. Ung.	S. Ar.	Unident.	Total
Flame	1075	11	162	711	46		2	773	446	2378	5604
Dun	91		9	72	3			35	65	119	394
U. Emerald	205	1	27	123	5			122	161	328	972
Crimson	54	1	5	29	2			17	40	179	327
L. Emerald	84		12	62	9	1		90	140	296	694
Later Iron Age	228	2	17	166	15			117	149	1232	1926
Harry	101		18	77	4		1	41	56	1309	1607
Jade	6		1	7	1			1	4	81	101
Niamh	3			18				2	5	55	83
Mauve	283	1	25	132	21			102	69	538	1171
Rose	491	3	44	355	17	2		165	190	2394	3504
White	27		8	23	1			12	53	135	259
Iron Age Gen.	32	1	7	45	1			16	47	73	222
Total Iron Age	2680	20	335	1820	125	3	3	1493	1425	9117	16864
Pre Iron Age	10			21	1				3	101	136
Unphased	127		19	92	4			73	92	1348	1755

Notes: S. Ar. includes fragments identified as small artiodactyl or “sheep-sized.” L. Ung. includes fragments identified as large ungulate or “cattle-sized.” S/G is used to designate indeterminate caprine (sheep/goat) fragments.

The mammal bones identified from the 1968-75 excavations are shown in Table 2.1. The material from the individual stratigraphic and structural phases was analyzed separately. The faunal remains from the Iron Age stratigraphic phases are listed in chronological order from youngest (Flame) to oldest (Lower Emerald). The later Iron Age category includes material that can be assigned to the Flame through Lower Emerald phases, but cannot be dated more closely. These data are followed by the fauna from the structural phases, listed from youngest (Harry) to oldest (White). The Iron Age General category includes a small number of bones which could not be assigned to a specific structural or stratigraphic phase. The largest faunal assemblage was recovered from the Flame Phase deposits in the low mound. This material accumulated after all the Iron Age structures had been dismantled. The Flame Phase material appears to represent the remains of periodic feasting at the site, and our discussion of the fauna will focus primarily on the Flame Phase remains.

The Flame Phase fauna is dominated by the remains of cattle (*Bos taurus*), pig (*Sus scrofa*), sheep (*Ovis aries*), and horse (*Equus caballus*). The only remains of wild animals are two bones of red deer (*Cervus elaphus*). Dog bones (*Canis familiaris*) are rare at Dún Ailinne, and there is no evidence for butchery marks on the three dog bones that were recovered from the site. In contrast, dog

bones make up over 9% of the faunal remains from the Iron Age royal site at Tara (McCormick 2002), and a number of those bones revealed butchery traces. At Dún Ailinne, clear butchery traces were seen on cattle, sheep, pig, and horse bones only. Species ratios based on NISP counts (Table 2.2) show that cattle and pig bones made up the vast majority of the Flame Phase faunal assemblage; sheep and horses were relatively rare. Body part distributions (Crabtree 2007) show that all parts of the animal skeletons are represented, indicating that the animals were probably driven to the site on the hoof and then slaughtered on the spot.

Since the Dún Ailinne site is located on the top of a substantial hill, it would have been far easier to drive the animals to the top of the hill than to transport substantial quantities of dead meat up the steep slope. The ageing data for the Flame Phase cattle indicate that most of the cattle consumed at Dún Ailinne were either young calves or older adult cattle. The faunal remains from Dún Ailinne were highly fragmented, and only a small number of complete or near complete cattle mandibles were recovered from the site. Since so many of the cattle mandibles were fragmented, we chose to base our analyses of dental wear on individual teeth. We focused on the deciduous lower fourth premolar (dlp4) and the lower third molar (LM3). These teeth are

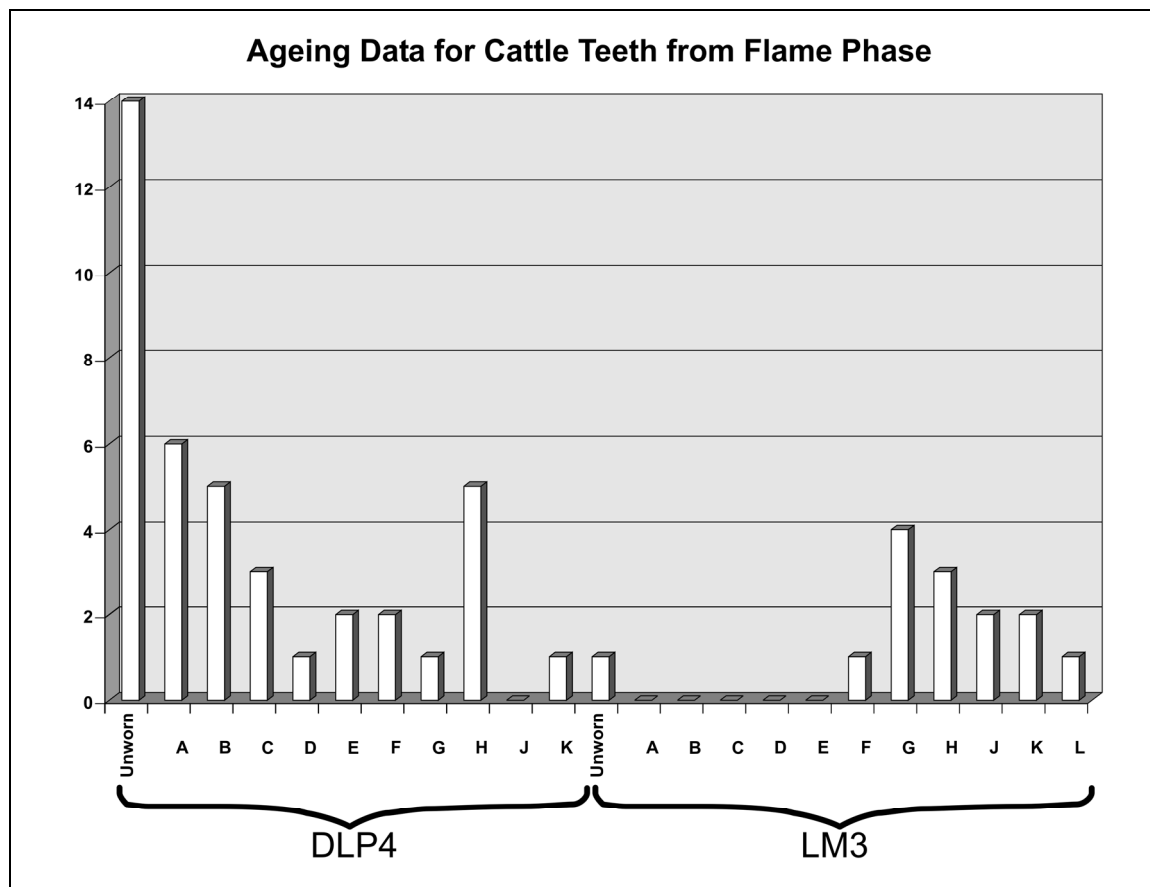


Figure 2.3 Kill-patterns for the cattle recovered from the Flame Phase deposits at Dún Ailinne. The stages illustrated follow Grant (1982).

Table 2.2 Species ratios based on NISP for the Flame Phase deposits.

Species	NISP	%NISP
Cattle	1075	53.6
Sheep/goat	173	8.6
Pig	711	35.5
Horse	46	2.3

morphologically distinctive, and the dlp4 is shed around the time that the LM3 begins to come into wear. The wear states for the cattle teeth were recorded following Grant (1982). The ageing data for the Flame Phase cattle from Dún Ailinne are shown in Figure 2.3. Most of the cattle that were consumed at Dún Ailinne were young calves, six months of age or younger. The rest of the animals were older adults, probably more than five years old when they were slaughtered. Few prime-age adults were used in feasting.

The unusual age distribution of the Dún Ailinne cattle raises some interesting questions about the relation of these ritual feasts to the broader Irish economy. Since dairying residues have recently been recovered from Neolithic and Iron Age ceramics in the British Isles (Copley *et al* 2003; Copley *et al* 2005), it is reasonable to assume that Iron Age cattle were raised, at least in part, for dairy production. If the slaughter of these young cattle caused their mothers to cease lactating, as McCormick (1991) has suggested, then these feasts would have been quite costly. They would have entailed the sacrifice of the calf and the loss of potential dairy products as well. The animals used in these feasts may well have been drawn from a wide area surrounding Dún Ailinne, and their cost may be a reflection of the power and wealth of the kings of Leinster.

Worked Bone Artifacts

While the faunal remains recovered from the Flame Phase deposits at Dún Ailinne reveal the components of ritual feasting, the worked bone objects highlight some of the other activities that may have been carried out at the site. Twenty-nine worked bone objects were recovered from the 1968-75 excavations at Dún Ailinne. An initial study of these objects (Crabtree 1982) focused primarily on the body parts from which they were made. In preparation for the final publication of the Dún Ailinne excavations (Johnston and Wailes 2007), we had the opportunity to re-examine the worked bone objects (Crabtree and Campana 2007). This new study has provided evidence for craft production activities that were carried out at Dún Ailinne.

Three fragments of worked bone were sectioned using a straight-toothed, short-bladed metal (presumably iron)



Figure 2.4 Fragment of cattle metatarsal that has been sawn at both ends. This object appears to be a blank for bone working.

saw. Since saws were not used for butchery in Ireland until the post-medieval period, these objects are clearly pieces of worked bone. They include the sawn-off distal end of a horse cannon bone, a 2 cm-long section of the shaft of a horse metapodial that is sawn on both ends, and a 9 cm-long section of a cattle metatarsal shaft that is sawn at both ends (Figure 2.4). Other than the obvious saw-marks, none of these fragments shows any evidence of further use. The sawn sections of metapodia appear to be unused blanks intended for further working into finished objects. The sawn distal end of the horse cannon bone is clearly a “waster,” a left-over from bone working. The presence of this waste fragment suggests, along with the unmodified blanks, that bone-working was carried out on-site.

Two additional bone tools provide some evidence for textile manufacture (Figure 2.5). An unfused proximal epiphysis of a bovine femur was drilled from both sides, through the *fovea capitis*. There is no wear of any kind visible on this object; it may have served as a spindle whorl, although other interpretations are possible. A needle, possibly made from a pig fibula, provides even clearer evidence for textile working. The eye was carefully made from two intersecting drill holes. There is a small amount of rounding in the eye, indicating the object received some use. With an eye about 5 mm in length, this needle was probably too large to have been used in sewing, but may have served as a lacing or weaving needle.

Two wide, flat, spatulate implements (Figure 2.6) provide evidence for another craft activity at Dún Ailinne. The first was made from the exterior surface of a cattle-sized



Figure 2.5 A bone needle and a possible spindle whorl from Dún Ailinne.

rib. The rib was split between thin inner and outer surfaces. The cancellous bone was then carefully removed, and the entire surface was worked to form a roughly elliptical outline with a very thin cross-section. The tip and the edges were intentionally rounded and smooth rather than sharp. The object had a light overall polish. The second implement was made from a large piece of mammal bone (possibly a rib as well). One face of this object has been flattened, resulting in a fairly sharp edge. There is no polish or evidence of use-wear on this specimen.

These objects generally resemble the tools made by a number of Native American groups for the sewing together of cattail mats (Ritzenthaler and Ritzenthaler 1983). These implements were made from split ribs in a roughly similar fashion, but they were perforated to carry the binding cord. The pattern of wear seen on the Native American tools is limited to a bit of polish on the surface, much like the wear seen on the first of the Dún Ailinne implements. Unfortunately, both the Dún Ailinne objects were broken, so it is uncertain whether they originally were perforated at one end. Even so, the formal resemblances suggest that they were utilised in broadly similar tasks, most probably for the making of mats, baskets, or perhaps as weaving tools.

The faunal evidence for craft production at Dún Ailinne does not stand in isolation. Recent analysis of the metal remains from the site indicates that small-scale bronze-working was also carried out there. This is in the form of slag (Hamilton 2007) and the presence of casting jets and a possible ingot among the bronze artifacts (Fisher 2007). In addition, a number of small glass fragments may indicate the presence of glass-working as well (Johnston and Wailes 2007). Iron needles, a bronze tracer, and stone spindle whorls or loom weights may also reflect this kind of activity.



Figure 2.6 A bone object, made from a split rib, that may have been used for basketry or matting.

Conclusions

Early medieval historical sources suggest that the Irish royal sites were “associated in particular with the inauguration and developing status of kingship” in Iron Age Ireland (Cooney and Grogan 1999: 188). These historical sources, however, provide little evidence for the range of activities that were carried out at Dún Ailinne and the other Irish royal sites and were in fact written well after the site was no longer being used. Stratigraphic study of the structures and features at Dún Ailinne, combined with detailed study of the unmodified faunal remains, indicates that the functions of the site changed through time. After the three elaborate timber structures were sequentially constructed and dismantled at the site, Dún Ailinne continued to serve as a locus for periodic ritual feasting. Beef and pork played a major role in these feasts, and smaller quantities of mutton and horseflesh were also consumed.

The worked bone objects indicate that feasting was only one of a number of activities that took place on Knockaulin Hill during the Iron Age. The bone tools and other worked bone items suggest that bone-working, matting or basketry, and possibly textile production were also carried out at the site. Archaeological evidence indicates that other crafts, including metal-working and possibly glass-working, were also carried out at Dún Ailinne. It is possible that, in addition to activities

directly related to the emergence of kingly power, these Irish royal sites may have also served as locations of periodic markets or craft fairs, similar to the Type A emporia described by Hodges (1981).

Prospect

The inverted bank and ditch surrounding the hilltop at Dún Ailinne enclosed an area of about 13 ha. The 1968-75 excavations at the site covered less than 10% of the enclosed area. In 2006, a new programme of resistivity and magnetometer survey began at the site under the leadership of one of us (Susan Johnston). During the summer of 2006, the joint American-Irish team surveyed 3 ha at the top of Knockaulin Hill and identified additional anomalies and features that may date to the Iron Age. Additional survey work is planned for the summer of 2007. This programme of remote sensing will serve as a guide to future excavations at Dún Ailinne, which may provide more evidence for the range of activities carried out at this Irish royal site.

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Authors' affiliations

Pam Crabtree
Center for the Study of Human Origins
Anthropology Department
New York University
Rufus D. Smith Hall
25 Waverly Place
New York
10003
USA

Susan A. Johnston
Anthropology Department

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George Washington University
2110 G Street Northwest
Washington DC
20052
USA

Douglas V. Campana
Anthropology Department
New York University
Rufus D. Smith Hall
25 Waverly Place
New York
10003
USA