

Aspects of Ritual Deposition in the Late Neolithic and Beaker Periods at Newgrange, Co. Meath

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The passage tomb at Newgrange served as a focus of ceremonial activity in the Late Neolithic and Beaker periods. A complex of monuments was constructed around the mound, consisting of a timber circle or woodhenge to the south-east and a smaller, possibly roofed, timber circle to the west; an enclosing bank constructed along the southern and western sides, and a free-standing circle of great stones encircling the monument. In this paper the view that the faunal and material remains from the Newgrange excavations are domestic refuse is questioned. The deposition and spatial patterning of the faunal material is interpreted as having a ritual significance and the use of this material as representative of the Late Neolithic/Beaker period economy is rejected

INTRODUCTION

The animal remains recovered from the Late Neolithic and Beaker phases of the Newgrange excavations are the only major faunal assemblage known from the Irish Neolithic or Early Bronze Age. This assemblage is of importance for assessing not only the nature of the economy at Newgrange but, by extension, the economy of the Neolithic and Bronze Age periods in Ireland. In recent decades patterns of structured deposition have been recognized at a number of Neolithic monuments (Richards & Thomas 1984, Pollard 1992, 219, Eogan & Roche 1993) in Britain and Ireland. Viewed in this light the Newgrange material provides important information on the ceremonial activities involving a pair of timber circles (*see below*), and raises important questions about the overall nature of the activities, at the site.

The prevailing assumptions regarding the faunal remains were strengthened by van Wijngaarden-Bakker (1974; 1986) who analysed the animal bone from M. J. O'Kelly's excavations. She accepted the excavator's interpretation of the material as the refuse from Beaker squatting and assumed that it was the discard from a domestic settlement. She suggested that the stripping of sods to construct the passage tomb mound had decreased the productivity of arable farming and led to

an emphasis on pastoralism and especially the exploitation of cattle and pig, though not wild species, for their meat (van Wijngaarden-Bakker 1986, 101). She argued that the unusual age profile of the cattle remains (*see below*) reflected a transhumant or seasonal economy, with cattle moved eastward to the coast for summer grazing. Van Wijngaarden-Bakker thought the absence of saddle querns and grain rubbers at Newgrange important, indicating that cereals were not processed on the site. The presence of naked barley was explained by accepting that part of the catchment area must have supported cereals, but van Wijngaarden-Bakker (*ibid.* 101) suggested that the bulk of the cereals might have been obtained through exchange.

Woodman (1985) developed this view of the faunal material and associated economy and suggested that the Boyne Valley was used seasonally by mobile communities through the Middle and Later Neolithic. Cooney (1987; 1991) has disagreed with these positions, as well as previous views of the shifting nature of Neolithic agriculture in temperate climates, and argued instead that the Boyne Valley could have supported a large sedentary and stable population throughout the Neolithic. He pointed out that only limited areas of poor quality pasture were de-turfed for mound construction. He went on to argue (Cooney 1987, 114-115; 1991, 135) that the large numbers of pigs at Newgrange may indicate their ceremonial importance in relation to the

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timber circles rather than their economic importance. This paper will argue that a 'domestic' interpretation of the faunal remains does not account for the deposition of the animal remains within the pits and post-holes of the timber circles, the overall large number of pigs at the site or the exceptional aspects of the associated material assemblage and its deposition. Nor does it appear to account for variations in the relative percentage of animal parts found within the faunal material in other areas of the site. This paper is not a definitive statement, a comprehensive re-examination of the excavation record is required for that, but is a review of the published evidence intended to reopen discussion about the nature of the Late Neolithic and Beaker activity at Newgrange.

THE EXCAVATIONS

The area near the entrance of the main passage tomb at Newgrange was excavated by M. J. O'Kelly between 1962 and 1975 and later by David Sweetman in 1982-84 (Fig. 1; see O'Kelly 1982, O'Kelly *et al.* 1983; Sweetman 1985; 1987). O'Kelly excavated an area measuring 144 m east to west by a maximum of 48 m north to south and uncovered 17 well spaced hearths, most of which appear to have been open air, a large number of pits, some of considerable size, post-holes, and a number of structures, some defined by bedding trenches and others by post-holes (Fig. 2). These were ranged around the front of the monument, near the entrance and to the east and west of it. An oval stone setting was situated just a few metres to the east of the entrance and an oval hut about 8 m south of it. South of this was the great oval pit and to the west was the C-shaped trench enclosing hearth No. 13. A structure at the very west of the excavated area was defined by two parallel lines of post-holes running north-east to south-west and two parallel ditches running north-west to south-east and was apparently roofed. This structure was partially burnt and covered by a bank of yellow clay and subsequently partially enclosed by the circle of great stones. O'Kelly also uncovered the north-western portion of the eastern timber circle.

For the purposes of recording O'Kelly divided the Newgrange excavations into three areas, a western unit, situated between kerbstones K6 and K21, an eastern unit, between kerbstones K92 and K80, and the central unit, between kerbstones K6 and K92. These are gross divisions imposed on the site by the excavator and bear no relationship to the way in which the contemporaneous people viewed or used the site. But the post-

excavation analysis adopted this division and there are no published finds list with coordinates. Until the primary excavation record is re-examined in detail the faunal and material remains must be examined within the parameters of this system.

Sweetman (1985) excavated portions of the western and south-western part of the eastern timber circle in 1982-83. He found that the outer row of holes had been dug to accept timber posts. A second row of pits had a clay lining and evidence for prolonged burning and appeared to have been used for the cremation of animal remains. The inner three rows of pits had no evidence of post-holes and Sweetman suggested that they had been dug to accept deliberate deposits of cremated animal bone. He compared the timber circle to examples at Woodhenge (Wainwright 1979), Durrington Walls (Wainwright & Longworth 1971), Marden (Wainwright 1971), Arminghall (Clark 1936), the Sanctuary, Overton Hill (Cunnington 1931; Pollard 1992) and Mount Pleasant (Wainwright 1979). The internal arrangement of pits was also paralleled at Stonehenge (Burl 1969, 7), Maumbury Rings (Bradley 1976), Llandegai (Houlder 1968), and Dorchester on Thames (Atkinson *et al.* 1951) where there was also evidence of pits, some in circular arrangements. Although the pits at these sites were used solely for deposition rather than burning the function of the Newgrange pit circle was clearly similar. At Balfarg, Fife, however, similar pits were used for burning (Mercer 1981). An area was noted within the eastern Newgrange circle consisting of post- and stake-holes associated with charcoal spreads, Beaker pottery, and dense concentrations of mostly unretouched flint flakes. Similar knapping debris have been noted at the Sanctuary, and Avebury (Pollard 1992, 211).

Sweetman (1985, 214-215) reinterpreted the Late Neolithic/Beaker sequence at Newgrange. O'Kelly had argued that the circle of great stones was contemporary with or earlier than the passage tomb. He had illustrated cairn slip covering large areas of the Late Neolithic/Beaker activity (O'Kelly 1982, 82, pl. 33) and hearths 2 and 5 were also stratified above Beaker pits (O'Kelly *et al.* 1983, 184, pl. 6) indicating the pit circle pre-dated some of the Late Neolithic/Beaker activity. Sweetman (1985, 215) found no pottery in the pits of the timber circle which he excavated and argued that O'Kelly's assertion that he had found pottery in the timber circle was incorrect. He proposed a two period Late Neolithic/Beaker activity with the initial phase consisting of the construction of the timber circle fol-

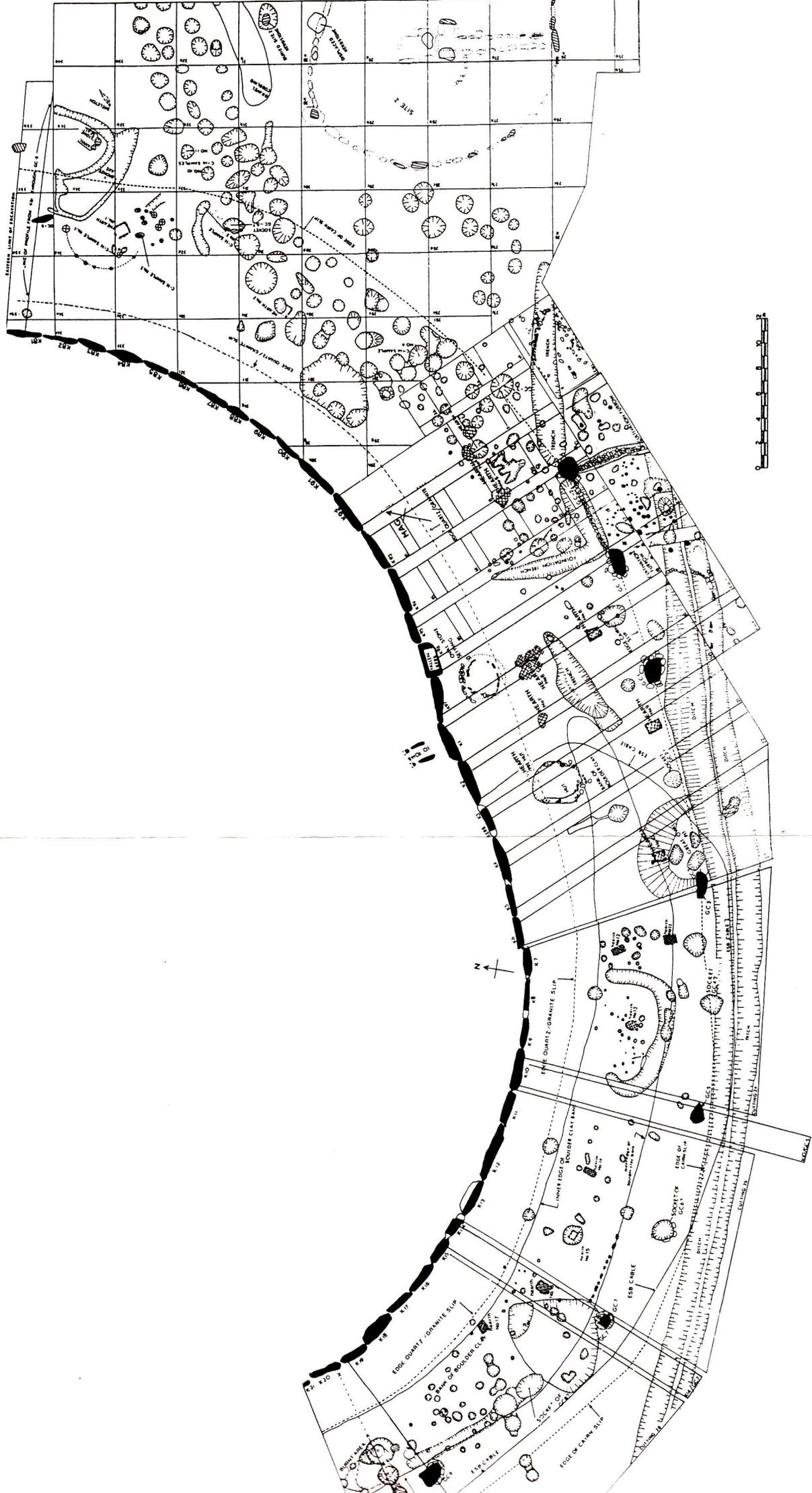


Fig. 2
 Plan of O'Kelly's excavations at Newgrange (after O'Kelly 1983)

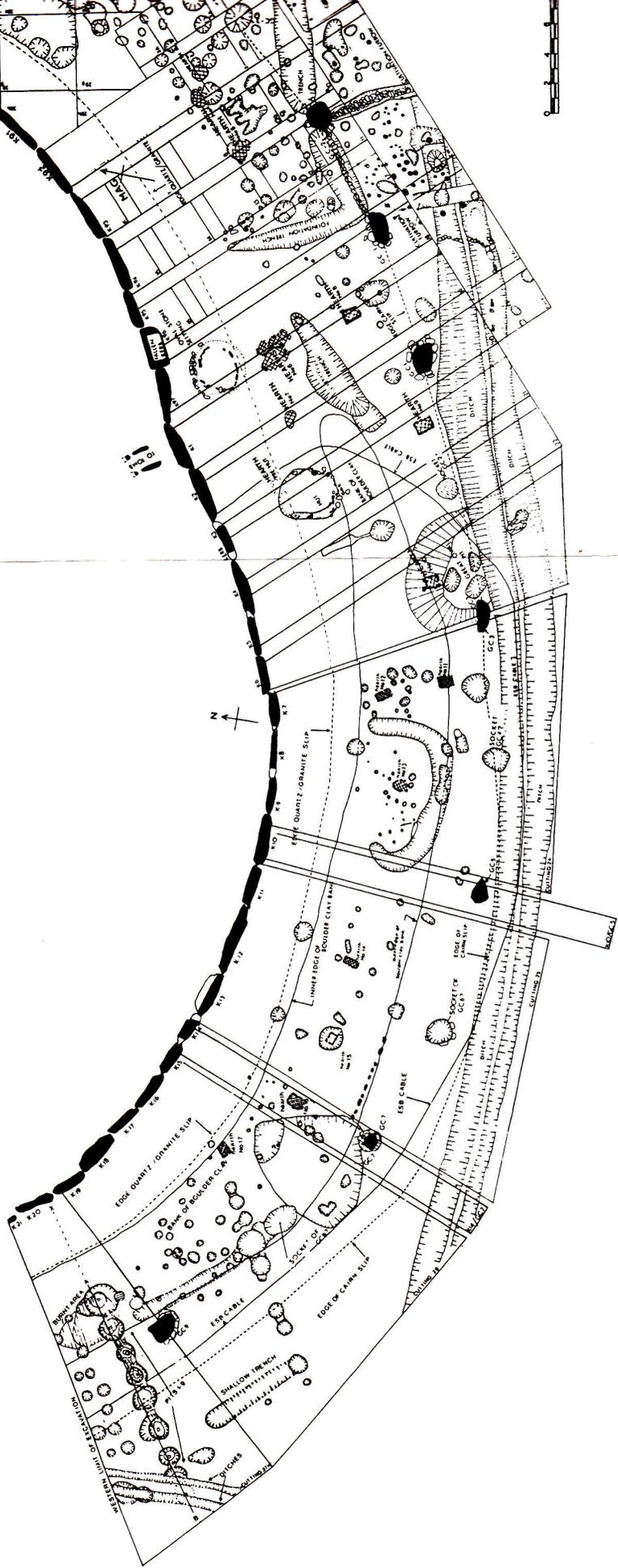


Fig. 2
Plan of O'Kelly's excavations at Newgrange (after O'Kelly 1983)

lowed by the use of the Late Neolithic/Beaker hearths and associated activity and subsequently the construction of the great stone circle.

In 1984 Sweetman (1987) excavated an area 50 m to the west of the passage tomb and uncovered two parallel concentric rows of post-holes and pits forming another timber circle about 20 m in maximum diameter. The excavator interpreted this as a two phase monument contemporary with the timber circle to the east. Some of the pits had evidence of burning and were subsequently refilled and used as post-holes, a second group of pits had deliberate deposits and some were refilled and used as post-holes, and a third group were deliberate post-holes. Sweetman interpreted the western timber circle as a roofed structure with an inner circular area defined by a corridor (1987, 296). In scale it is roughly the size of the Sanctuary on Overton Hill (Pollard 1992, 213), a generally contemporaneous structure, which may also have been roofed, and the timber circle at Sarn-y-bryn-caled in Powys (Gibson 1992, 84-92 (*see also* Gibson this volume-Ed.) which was probably not roofed. At closer hand it is comparable to the smaller Grooved Ware timber circle at Knowth (Eogan & Roche 1993).

These structures are situated amongst a number of hengiform enclosures known from the Boyne valley. These include two sites at Newgrange, sites A and O, a third site at Dowth and a fourth at Monknewtown (Stout 1991). Monknewtown has been excavated by Sweetman (1976) and was also found to date to the Beaker period. These henges are characterized by having a flat-topped earthen bank 10-14 m in thickness and 1.2-2.5 m in height with no evidence for a construction ditch. The yellow clay bank at Newgrange (*see below*) is similar in construction to these, although it is smaller in scale. The timber circles at Newgrange and the great stone circle appear to form part of this henge complex. The replacement of a timber by a stone circle has parallels, especially at Stonehenge, and the enclosure of a passage tomb by a stone circle is common amongst the Scottish Clava passage tombs (Megaw & Simpson 1979, 140). The enclosure of the great Maes Howe passage tomb by a deep ditch (*ibid.*, 137), the enclosure of the megalithic tomb at Ballynahatty, Co. Down by a great bank (Hartwell 1991, 13-14) and the henge at Newgrange site A, which encloses a mound which may cover a passage tomb, may all be comparable examples of the continued ritual use of tombs by their incorporation into hengiform enclosures.

Grogan (1991, 126-132) has analysed the corpus of radiocarbon dates from the excavations at Newgrange and Knowth. He noted 31 dates which indicated Late Neolithic/Beaker period activity which extend from 2855-2140 cal. BC (at one sigma), including 16 from the eastern timber circle. He argued on archaeological and radiocarbon grounds that a Late Neolithic phase involving the introduction of Irish Grooved Ware pottery to the site could have been as early as 2850 cal. BC, although this date may be too old due to erratic wiggles in the calibration curve. He concluded that the subsequent Beaker phase commenced after 2580 cal. BC and did not continue very long after 2300 cal. BC. Therefore the Beaker chronological horizon at Newgrange may have lasted 300-400 years.

THE MATERIAL ASSEMBLAGE

The pottery assemblage at Newgrange was composed of about 11,000 sherds of some 210 vessels representing four principal varieties: fine Beaker and coarse domestic Beaker, Grooved Ware, Late Neolithic decorated ware, and Food Vessel (Cleary 1983, 58-117). Although representative of chronologically separate pottery traditions, sherds of these vessels were found mixed in five main concentrations, or middens. Four of these were situated in a restricted area about 30 m in diameter in the central excavation unit near the tomb entrance.

Concentration 1 was associated with flint, animal bone, ash, and charcoal mixed through and beneath the earth and stone layer, which sealed the layer of granite and quartz in a hollow above the oval hut foundation (O'Kelly 1983, 26). Concentration 2 was opposite the tomb entrance in and around open air hearth 7. Concentration 3 was east of the tomb entrance associated with the foundation trench which enclosed hearth 5. Concentration 4, which contained pottery, charcoal, and ash, was to the east of this and associated with hearth 5. In the northern part of the eastern excavation area was the largest midden, Concentration 5, unassociated with any features.

Similar pottery concentrations have been noted at other sites. O'Riordáin (1951, 73-74) believed that the variety of broken pottery sherds and their proximity to the stone uprights within the Grange stone circle at Lough Gur, Co. Limerick indicated a ritual breaking. Similar activities have been noted in the stone circle at Dromberg, Co. Cork (Fahy 1959, 12-18), as well as at Durrington Walls (Wainwright & Longworth 1971) and the Sanctuary (Pollard 1992). The presence of

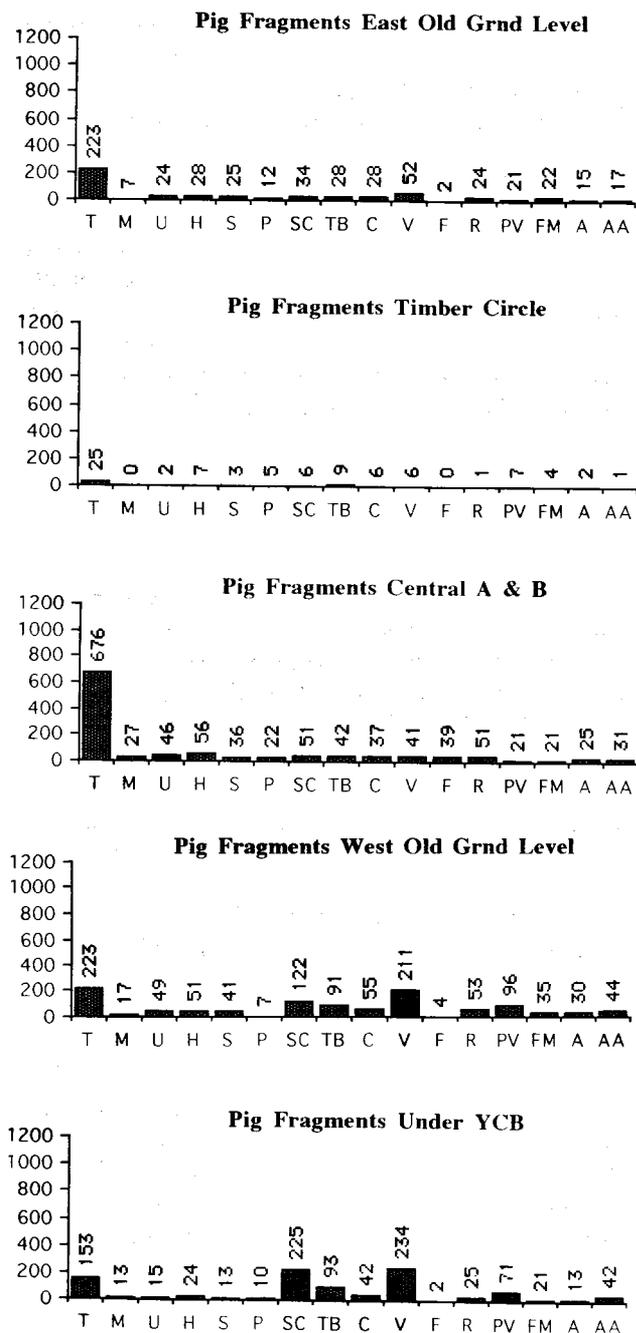


Fig. 3

Numbers of identified pig bone fragments from each excavation area: T = teeth; M = mandible; U = ulna; H = humerus; S = skull; P = phalanges; SC = scapula; TB = tibia; MC = metacarpal; C = calcaneus; MT = metatarsal; V = vertebrae; F = fibula; R = radius; PV = pelvis; FM = femur; A = astralagus; AA = atlas and axis vertebrae.

Grooved Ware at Newgrange and the Grange stone circle and its association with henge monuments in Britain indicates a common horizon of activity at Newgrange and the other great ceremonial centres such as Durrington Walls where Grooved Ware formed an important part of the material assemblage. The recent discovery of Grooved Ware deposited, ritually, in the post-holes of a circular timber structure at Knowth (Eogan & Roche 1993, 16) has emphasized the Grooved Ware horizon in the Boyne Valley and Eogan has suggested that the east timber circle at Newgrange may also be part of the Grooved Ware complex (*ibid.*, 18).

Eogan (1992, 126–127) has also emphasized the wider elements of this complex, noting that the stone maceheads, the settlement at Skara Brae, the henges, the post-passage tomb complex in the Lochs of Harray and Stennes regions, the ring cairns and stone circles of Clava, the stone alignment at Callanish, and the stone rows and associated monuments of Carnac, Brittany all form a part of it. Richards and Thomas (1984, 192–195) have argued in their re-examination of Durrington Walls that Grooved Ware pottery and its ornamentation, which in Scotland was closely related to Irish passage tomb art, played an important symbolic role in ceremonial activities which also involved the structured deposition of animal remains.

FAUNAL REMAINS

Van Wijngaarden-Bakker (1986, 21, 102–106) identified 12,191 bone fragments from O'Kelly's excavations. The total number of unidentifiable bones was not quantified but consisted of diaphysis, skull, and rib fragments and was estimated at 50–60% of the total remains (*ibid.*, 23–24). Therefore the total quantity of recovered bone would have been in the region of 24,000–30,500 fragments. Sweetman's excavations have produced a further 877 fragments of which 88 were identifiable. To assess the nature of the Newgrange bone assemblage we must first come to some understanding of what a domestic assemblage might be like.

Haughey's Fort, Co. Armagh was a defended settlement dating to 1170–90 cal. BC–1030–770 cal. BC (Mallory 1991, 10). Although a Late Bronze Age settlement it is nevertheless one of the few extensive Irish prehistoric domestic sites for which faunal analysis is available and is therefore useful, at least, for comparative purposes. The faunal assemblage at Haughey's Fort

consisted of cattle and pig with small amounts of dog, horse, and sheep/goat. Analysis of the site is still in progress and there is no information on the spatial distribution of the animal bone published, but bone has been found both in the waterlogged deposits of the inner ditch and in a series of large internal pits. McCormick (1991) has analysed the assemblage from the inner ditch and made a number of interesting comparisons with the Newgrange material. Cattle represent 63% of the total minimum number of individuals at Haughey's Fort and pig 30.4%. This is the reverse of the situation at Newgrange where cattle were 31.5% of the remains and pig 61.3%. McCormick could not attribute this contrast to environmental factors as both Haughey's Fort and Newgrange were situated within open landscape, ie, cattle rather than pig country. He concluded '... that some socio-economic factors rather than simple physical determinism is probably responsible ...'. He also noted the high percentage of pig found at Navan Fort, Co. Armagh in the Late Bronze Age–Early Iron Age levels at 63.3%, in comparison with 29.6% cattle. That Navan Fort was an important ceremonial and religious centre is not in dispute (see Lynn 1986; 1991; 1992) and the contrast between the faunal assemblages there and at Haughey's Fort probably indicate the contrasts between a ceremonial site where pig was an important feasting animal and a domestic site where cattle were numerically as well as nutritionally dominant. Although much earlier in date the similarity between the Newgrange percentages and those at Navan suggest that both may be regarded as ceremonial assemblages.

The Remains in the Timber Circles

In the eastern timber circle three rows of large pits, resembling post-holes, within the arc of great pits and concentric with it, contained quantities of animal bone. These pits were steep-sided, c. 80 cm in depth and 30–40 cm in diameter at the top (Sweetman 1985, 201). The fills consisted of black soil with charcoal and some burnt clay. Animal bones were often found in these pits on or under small rounded stones. The faunal remains consisted of burnt and unburnt fragments, smaller than 70 mm. They ranged from unburnt, to smoked, burnt, partly calcined, and totally calcined. Some were unflashed when burnt while others were still flesh covered and some fragments had remains of flesh and hair. There were a total of 552 fragments noted representing cattle, pig, deer, dog, sheep, and goat. Burial 4 had 84 fragments representing 1 pig, 2 cattle, and 2

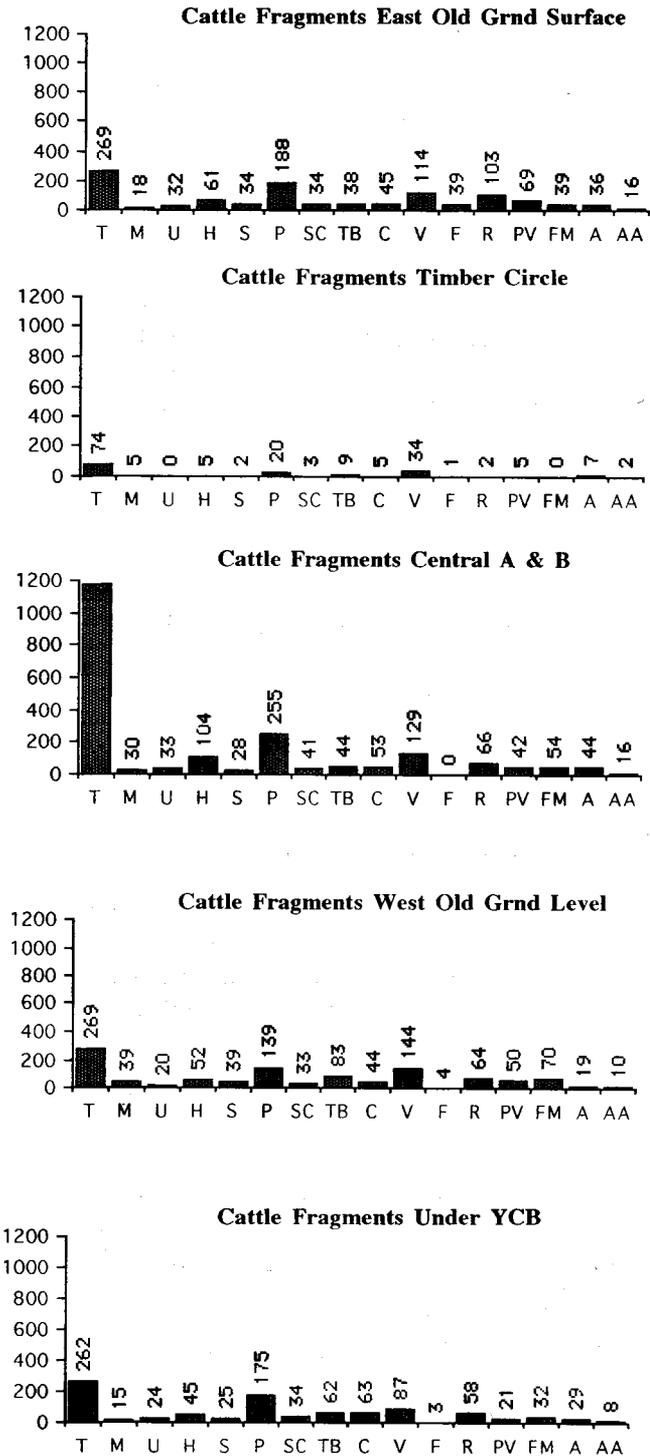


Fig. 4

Numbers of identified cattle bone fragments from each excavation area: see Figure 3 for legend.

different breeds of dog. Burial 8 had 118 calcined, smoked, and burnt fragments representing a deer, dog, and an ox or second deer. Pit 15 had 24 fragments of which only one was burnt and represented a red deer and ox. These remains represent a deliberate treatment and deposition of animal remains, primarily from the relatively inedible parts of the animals (O'Sullivan *et al.* 1985, 219).

In the western timber circle, Pits 1, 2, 4, and 19 contained Beaker pottery and a number of the pits had deliberate deposits of burnt flint. Pit 6 had the rim of a stone bowl. The faunal remains from the features (McCormick 1987) consisted almost exclusively of pig astralagus and calcaneum with cattle fragments occurring in only one pit. These were also deliberate deposits with the emphasis apparently on pig remains. The deposition of pig bone was also a feature at Woodhenge (Pollard 1992, 223, fig. 7b) where pig bone was placed into the post-holes.

Richards and Thomas (1984, 206) have suggested that animal remains represented an element of the natural world incorporated into the Wessex henges. Their treatment emphasized the ritual reordering of the natural world and their potential symbolic power was exploited to stress particular human qualities (strength, purity, dirtiness, etc.) or to stress ritual or social divisions amongst the participants in ceremonies. It has been suggested that the deposition of human remains within megalithic tombs is patterned (*see* Shanks & Tilley 1982; Clarke *et al.* 1985, 22–24) so that it should come as no surprise that the deposits of animal remains and artefacts outside tombs may mirror this activity and display a structured depositional pattern of their own.

The evidence from the timber circles strongly indicates the ceremonial and perhaps ultimately symbolic use of animal remains at the site and their deposition in defined spatial areas. It will be tentatively suggested that the ceremonial use and deposition of animal remains may have occurred on other parts of the site as part of contemporary and successive episodes of activity at the site.

Van Wijngaarden-Bakker's Analysis

Van Wijngaarden-Bakker analysed the 2665 identifiable bone fragments from the old ground level and the 344 identifiable fragments from the pits of the timber circle in the eastern excavation unit together. The fragments consisted of 1862 cattle bones, 585 pig bones, 81 sheep/goat bones, and 51 horse bones from the eastern old ground level (Figs 3–5; note that animal bone

fragments are presented by species within each excavation unit). She estimated that the minimum number of individuals (MNI) consisted of a minimum of 58 animals, including 25 cattle (43%) and 18 pig (31%). Sheep/goat, dog, and horse made up the remainder. Some of this material, as noted above, had been deliberately placed into pits in the timber circle and back-filled. These remains consisted principally of 214 cattle bones, 88 pig bones, and 30 dog bones, but only 2 sheep/goat (the smallest occurrence of sheep/goat on the site). Unfortunately the material from the old ground level is not satisfactorily provenanced in any publication so that it is not possible to state how much of it came from the interior of the timber circle or how much was associated with the three hearths in this area. Van Wijngaarden-Bakker (1986, 100) noted that horse bone was absent from the pits of the timber circle and suggested that these were the oldest features of the complex and pre-dated the appearance of horses at the site.

The bone from the central excavation unit was divided into two groups: remains from the old ground surface and the granite/quartz layer above it which was contiguous with the kerb of the monument and the layer of earth and stone above this (A), and the material from the subsurface features (B). It is unfortunate that the faunal remains from so many contexts have been mixed in this analysis, especially as some 4231 identified bone fragments are noted and the total number of bones collected was probably twice this figure or more. The A level includes at least four different contexts, including an area covered by the yellow clay bank, which is stratigraphically later than the oval hut near the tomb entrance. The subsurface features are particularly complex with material from the 'L-shaped foundation trench' treated in the same way as material from the pits to the north and south which are clearly part of the timber circle. Cooney (1987, 114–115) has already commented on this. Indeed the stratigraphic relationship between the 'L-shaped trench' and hearths 3, 4, and 5 (which are later than the timber circle) is not clear from the published report, however it appears that there are a number of phases or episodes of activity, with the digging of the possibly pre-Beaker great oval pit followed by the construction of the east timber circle and the possibly contemporaneous western timber circle; the covering of part of the east timber circle by hearths 2 and 5; the digging of the 'L-shaped trench'; the construction of the yellow clay bank over the southern end of the oval hut, and the covering of these features by

more Beaker occupation, a layer of granite and quartz, which had Beaker material over it and a layer of earth and stone; and finally the erection of the great stone circle.

Level A contained 2186 cattle bones, 1196 pig, 203 sheep/goat, and 65 horse (Figs 3-5). In terms of MNI these were identified as 32 cattle (32%), 26 pigs (31%) with sheep/goat (12%), dog (12%), and horse (6%) respectively. The bone from the subsurface features contrasted with this. It included 234 cattle (63.5%), 84 pig, 25 sheep/goat, only 1 dog, and 24 horse bones (6.5%). As MNI these were identified as 3 cattle (23%), 2 pig (15%), 4 sheep/goat (15%), and 1 dog. Significantly the highest percentage of horse from the site (23%), representing three individuals, occurred in these features near the tomb entrance. Horse is not particularly abundant in the west of the site and if the chronological arguments regarding the east timber circle were set aside it could be suggested that horse remains were deliberately deposited in this area.

Cooney (1987, 115) has argued that the bones from a number of pits in this area were deliberate deposits, notably those from a pit beside hearth 3, probably part of the timber circle, which contained 21 cattle fragments, 4 pig, a single sheep/goat, and a deer tooth. The three pits dug into the base of the great oval pit contained cattle jaws and unbroken metatarsals, the axial skeleton of a pig with atlas, axis, 5 cervical vertebrae, and 4 thoracic vertebrae. Another pit contained a single large antler. The faunal remains from these features and levels need to be re-analysed and compared with the deposition of the pottery and lithic material before definite conclusions can be drawn, but this material appears to indicate a number of episodes of feasting.

In contrast to the eastern and central excavation units the central area of the western unit, beneath the yellow clay bank, was dominated by pig bone. There were 1057 fragments of pig of which 225 (21%) were scapula, 234 (22%) vertebrae, 93 (87.7%) tibia, and 153 (14.4%) teeth. The vast majority of the total animals represented, about 104 individuals (79%), were pig, in comparison with 25 cattle (19%). This area also had low percentages of sheep/goat and a complete lack of horse as well as low values for dog. The special nature of this part of the site is emphasized by the construction of a bank of stoneless yellow boulder clay which sealed it. This method of construction contrasts with the turf construction of the passage tomb mound.

In comparison 1198 pig fragments were noted from the western old ground level and granite and quartz

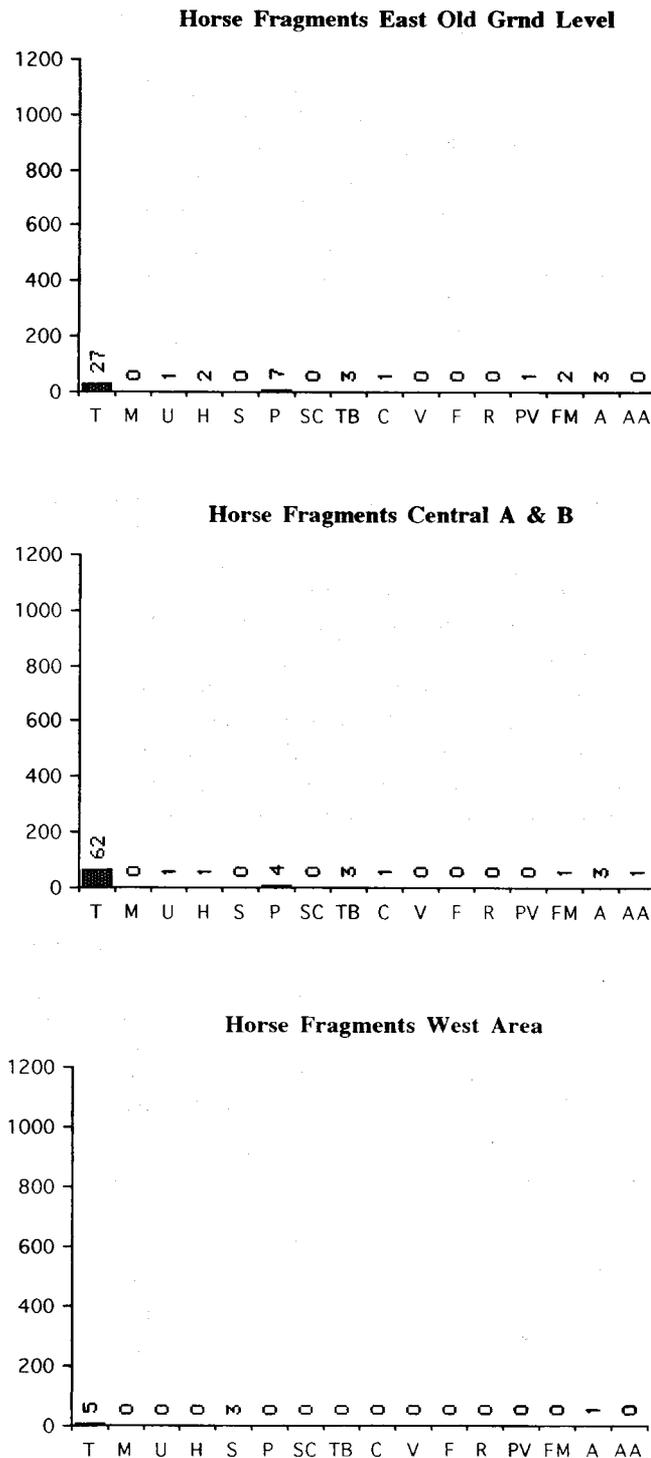


Fig. 5

Numbers of identified horse bone fragments from each excavation area: see Figure 3 for legend.

layer. These consisted of 10% scapula, 17.6% vertebrae, 7.5% tibia, and 18.6% teeth. In the central A levels scapula were only 4% of the pig remains, vertebrae 2%, tibia 3%, and teeth 54%. In the central B layers pigs teeth were 40%, vertebrae 20%, scapula 3.5%. Clearly this patterning of body parts was not just a result of casual discard and taphonomy. Van Wijngaarden-Bakker recognized that specialized activities must have been carried out on the western part of the site. She suggested that the area of cutting 26 under the yellow clay bank was a butchering area in which pig vertebrae were discarded, some in an articulated state (without removing the marrow), and the meat joints smoked and subsequently 'used to tide the inhabitants over the annual period of scarcity of food resources in early spring'. However, the large numbers of pigs teeth in the central area are presumably the remains of mandibles and skulls and it is not clear why, as part of the smoking process large numbers of skulls should have been discarded near the tomb entrance. There appears to be more than taphonomy and casual discard involved in the contrasting portions of pig occurring on different parts of the site, with scapula and vertebrae in large numbers in the west area, teeth and presumably skulls in the central area and teeth, tibia, humerus, scapula, and calcaneum occurring in the pits of the east timber circle. The numbers of cattle teeth in the central excavation unit are also especially high.

It appears that a pattern of emphasis on different animals and different animal parts in different areas of

the site linked to the deposition of pottery may have been aspects of ceremonial activities. Wainwright & Longworth (1971, 190) and more recently Bradley (1984, 51), and Richards & Thomas (1984, 206) have suggested that the large amount of pork represented at Durrington Walls may represent the deliberately deposited refuse from ceremonial feasting. This kind of feasting may also account for the large quantities of meat and especially pork noted at Newgrange. Animals could have been prepared in the area of the yellow clay bank for feasting and a significant portion of these remains deposited in other areas of the site. If we total the amount of usable meat at Durrington Walls (Tables 1 and 2) it amounts to over 34,00 kg. In comparison the total weight of usable meat represented at Newgrange amounts to more than 46,000 kg, a significantly higher quantity. It should also be borne in mind that the area excavated at Newgrange is somewhat smaller than that at Durrington Walls, therefore this figure may well represent only a fraction of the total quantity of meat consumed at the site.

Very little butchering evidence of the Newgrange cattle survived (Van Wijngaarden-Bakker 1986, 40). The foot bones of cattle were not split for marrow extraction and some femur fragments were also intact (*ibid.*, 36). In 10-15% of cases pig tibias were not broken for marrow extraction. In many instances vertebrae, proximal radius and ulna; distal humerus, proximal radius and ulna; central metacarpals, distal tibia and astralagus; calcaneum, astralagus, etc. were found

TABLE 1: FREQUENCY OF ANIMALS AND ESTIMATED AMOUNT OF MEAT AT NEWGRANGE
(DATA FROM VAN WIJNGAARDEN-BAKKER 1986)

	Kg of usable meat	No. of animals	% of total animals	Total est. kg	% of total est. weight	Kg of usable meat from total est. kg
Cattle (400)	235	106	27%	42,400	58%	24,910
Pig (100)	80	206	53%	20,600	28%	16,480
Sheep/goat (25)*	12.5	24	6%	600	0.82%	300
Dog (10)*	5	23	6%	230	0.31%	115
Horse (600)*	300	12	3%	7,200	10%	3,600
Red Deer (190)*	95	10	3%	1,900	2.6%	950
Wild Boar (107)*	53	1	0.25%	107	0.14%	53
Other wild fauna	—	9	1.5%	—	—	—
Total		391		73,037		46,408

an estimated adult weight in kilogrammes
* average weights from Milisauskas 1978

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TABLE 2: FREQUENCY OF ANIMALS AND ESTIMATED AMOUNT OF USABLE MEAT AT DURRINGTON WALLS
(DATA FROM WAINWRIGHT & LONGWORTH 1971)

	Kg of usable meat	No. of animals	% of total animals	Total est. kg	% of total est. weight	Kg of usable meat from total est. kg
Cattle (400)	235	85	27%	34,000	60%	19,975
Pig (100)	80	198	63%	19,800	35%	15,840
Sheep/goat (25)*	12.5	6	—	150	0.26%	75
Dog (10)*	5	5	4.5%	50	0.08%	25
Horse (600)*	300	—	—	—	—	—
Red Deer (190)*	95	14	4%	2,660	4.7%	1,330
Other wild fauna	—	5	1.6%	—	—	—
Total		313		56,702		37,245

Numbers in brackets refer to estimated weight in Kilogrammes

* average weights from Milisauskas 1978

in association, suggesting they were deposited while still in an articulated state. The bones of the hind legs of the pigs sometimes had complete diaphysis indicating that marrow fracturing did not take place. Richards & Thomas (1984, 206) interpreted similar evidence from Durrington Walls as indicating that the entire potential calorific content of the animals was not being consumed and equated this minimal utilization with ceremonial feasting. The presence of articulated bones at Durrington Walls and Newgrange also indicates that these portions were buried soon after consumption rather than simply discarded.

Animal Age at Slaughter and Seasonality

If one accepts that there was domestic habitation at Newgrange, and this was responsible for the accumulation of faunal remains at the site, then we should concur with van Wijngaarden-Bakker that the animal husbandry system primarily exploited animals for their meat rather than their secondary products. That author (*ibid.*, 48) concluded from her examination of the phalanges and metapodials that there was no direct evidence for the castration of the Newgrange cattle, but that the equal numbers of males and females and the advanced age at slaughter (3–4 years old) pleaded for it. Oxen would of course have had the secondary use of providing traction. The low numbers of elderly cattle (5 years and older) would also suggest that they were not specifically kept for milking. However, when one considers the ceremonial activities associated with the timber and stone circles, then it is conceivable that the

animals introduced to the site, and the cattle in particular, were selected from a larger population which is not represented at the site. In this scenario the cattle at Newgrange would represent the prime beef animals available from a number of herds in the Boyne Valley, rather than a single representative population. This explanation would tend to account for the lack of animals between 2.5 and 3 years of age. Van Wijngaarden-Bakker suggested that a system of transhumance was in operation in the Boyne Valley and animals in this age group were kept on seasonal pasture away from the site. Cooney (1991, 134–135) has noted that the likely division of the Boyne Valley by land boundaries and the high quality of the pasture (today cattle are moved to the Boyne valley for fattening rather than out of it) would have precluded the need to move cattle seasonally.

Legge (1993) has examined the domestic cattle remains from the Early Bronze Age deposits at Grimes Graves and his conclusions, based on tooth eruption and wear data from mandibles, indicates a much different pattern at that site. He found a high rate of slaughter in the first few months of life with 50% of cattle killed before 6 months, and considered the possibility of seasonality but rejected this hypothesis in favour of a husbandry system based on milking.

At Newgrange the numbers of bones from neonatal and juvenile cattle may have been depressed due to a number of factors. Taphonomic processes may have played a role as juvenile bones are often small and fragile and do not survive well. The methods of

archaeological retrieval may also have decreased the numbers of juvenile bones if larger bones were collected more readily and if, appears likely, no sieving of deposits took place during the excavation. As only half the recovered fragments or less were identified this may also have introduced a bias into the age estimates. It is of interest in this light that van Wijngaarden-Bakker (1986, 74) noted that the bones of most of the juvenile pigs had also disappeared from the archaeological record. However this would still not account for the lack of cattle between 2.5 and 3 years of age and the remeasurement of the bones on which this estimate is based may be required. It may be that only the fat beef cattle were selected and brought to the site, and the juveniles and older milking cows, bulls, and oxen left in their pastures.

At Irthlingborough, Northamptonshire (Pearson 1993, 78–81) a Beaker burial in a wooden mortuary structure within a barrow had the remains of 184 cattle skulls, 38 mandibles, 33 shoulder blades, and 15 pelvises deposited on it. Analysis showed that most of the cattle were about 2 years old and male. The lack of younger animals is reminiscent of Newgrange and the possibility that specialized ritual deposits are represented at both sites has important consequences for our interpretation of the economy of the Late Neolithic and Beaker periods. If the animal remains at Newgrange are the remains of feasting then they cannot be used to support the idea of a population operating a system of pastoral transhumance.

The seasonal use of the site is not necessarily implied by the other animal remains either. Van Wijngaarden-Bakker (1986, 88) noted that the presence of shed antlers at Newgrange suggested deliberate collection in April and May of each year. She (*ibid.*, 75) also noted that while 70% of the pigs were slaughtered between October and April, 30% were slaughtered between April and September, clearly indicating that activity continued on the site during the spring and summer months. The occurrence of more young adult sheep/goat and few mature/old individuals (*ibid.*, 77) at the site is also of interest. If we accept that lambs were born in the spring then the death of young sheep, under 12 months, may indicate that they were kept at or brought to the site year round (Legge 1993, 28).

CONCLUSION

The definitive statement on the faunal and material remains from Newgrange has yet to be written. The

large amount of pig represented on the site which compares with high pig numbers at large ceremonial centres like Durrington Walls and later at Navan Fort is important and contrasts with domestic sites like Haughey's Fort where cattle were numerically dominant. The occurrence of a number of hengiform ritual circles of timber, stone, and earth at Newgrange and throughout the Boyne Valley and the deposition of a portion of the Newgrange animal remains into pits in these circles is significant and links the use of animal remains at Newgrange to the British henges and especially Durrington Walls. The apparently structured deposition of animal remains, especially pig and possibly horse, in other areas of the site, combined with the unusual age structure of the cattle all contradict a simple domestic interpretation of the site. It seems likely that a proportion, if not most, of the animal bones represent a series of deliberate deposits connected with episodes of ceremonial activity at the complex over a period of time. This being the case it is by no means certain that this faunal assemblage is representative of the economy of the Late Neolithic/Beaker peoples of the Boyne Valley. In this light we may consider the possibility that rather than a system of mobile pastoralism a relatively mixed agriculture could have been practiced in the Boyne Valley by a relatively settled and stable population.

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