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A BRONZE AGE CEMETERY MOUND AT GRANGE, CO. ROSCOMMON

BREANDÁN Ó RÍORDÁIN

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ABSTRACT

The rescue excavation of a tumulus at Grange, Co. Roscommon, in 1966-67, revealed that the cemetery mound contained eight cist graves and six secondary pit burials. Six of the cists contained Bowl-type funerary vessels and human remains. Cremations were the principal bone deposit in six cists and two of the cists contained unburnt skeletal material. Cremations were present in the six pit burials. In three instances they were accompanied by vessels of the Vase Urn class. Additional finds included a miniature cup in one grave and a small rimsherd, possibly of another cup, and a perforated bone pendant or amulet in another. Of particular interest was the discovery of a six-riveted bronze dagger, related to the Armorico-British type, with its bone pommel, a Vase Urn, a cremation and charcoal, in Grave 10 which was radiocarbon dated to the 18th century cal. BC.

THE CEMETERY MOUND

In mid October 1966 in the course of digging a trench into a mound in search of stones to build the foundations of a cartway, members of the Finnerty family discovered two stone cists containing pottery vessels. Work was halted and the find, on the lands of Mr Thomas Finnerty of Grange, was reported to the National Museum by Mr Patrick O'Donnell of nearby Four Mile House. The mound is situated in the townland of Grange (parish of Kilbride, barony of Ballintober South, Co. Roscommon (Fig.1). It is located slightly below the 300 ft contour. The natural rock is limestone. A considerable number of archaeological field monuments including the sites at Carnfree and Rathcroghan occur in this general area of Co. Roscommon (Waddell 1983; Herity 1983).

Following receipt of the report of the discovery, the site was inspected by Dr Joseph Raftery, Keeper of Irish Antiquities, in early November and it was decided that an investigation of the monument should be carried out immediately. Accordingly, a rescue excavation of the site was undertaken by the National Museum of Ireland in the period 15th November 1966 to 3rd February 1967, under the direction of the writer. Following on his inspection, Dr Raftery had reported that the mound measured some 21m in diameter and 1.80m to 2m high in the centre. A trench, 13m long and averaging 1.70m wide had been cut by the Finnertys into the mound from its northern perimeter revealing a core of closely packed large stones (averaging 50cm in size) covered by a layer of sticky grey clay (Plate 2). The cairn core had an edging which in places consisted of two courses of stones about 50cm wide but elsewhere was so slight as to hardly constitute even a non-functional kerb (Fig. 2).

Grave 1 (Fig. 2; Fig. 3:1)

In digging the trench into the mound two cists had been discovered. Grave 1 was located some 3m from the edge of the cairn and covered by a single capstone. When the capstone was removed by the finders a Bowl (E65:1) was found standing mouth upwards in the south-west corner. This vessel was empty when found, however burnt bones were scattered around it over the entire floor area of the cist. The cremated bone represented the remains of one individual (Ó Donnabháin, below). Four fragments of unburnt bone were also found in the cist: they are from the skeleton of an infant.

Archaeological excavation showed that this slab-built cist was of irregular sub-rectangular plan and measured about 56cm east-west and 50cm north-south in maximum dimensions internally. The floor was paved with one large slab. Most of the side slabs rested on this floor slab but one on the south-west was set in the ground as was an additional slab on the north, the space between the latter slab and the end stone being filled with small packing stones. Some of the cremated bone (E65: 6) was encrusted with carbonate of lime. The cist was set into the old ground surface beneath the cairn: the capstone of the cist was on a level with the original ground level and the cist floor was 40cm below ground level. Before disturbance, some ten layers of cairn stones measuring 130cm in overall thickness lay over the capstone. Above the cairn mass there was a sealing layer of grey leached soil some 16cm thick and above it a 30cm thick stratum of humus and sod.

Grave 2 (Fig. 2; Fig. 3:2)

South of Grave 1 the trench diggers had come upon a second cist (Grave 2) closer to the centre of the tumulus. The heavy capstone of this cist which appeared to be at a higher level than Grave 1 had not been disturbed by the finders. Some packing stones at the exposed northern side of the cist had been removed and two Bowls (E65: 2 and 3) taken out of the cist. According to the finders, one example (E65: 2) was superimposed on the other in a corner; both were mouth upwards; the lower vessel was 'propped up with little stones'. Unburnt bones (E65: 41) were found scattered on the floor and represent the remains of two individuals; those of an adult male may have been in a crouched position – the skull (and the two bowls) were found at the eastern end of the cist.

The cist, orientated east-west, was 84cm long, 60cm wide and 46cm high internally. The capstone was of greater dimensions than the cist structure and it ranged from 24cm to 12cm in thickness; there was a large floor slab 73cm long, 60cm wide and 11cm thick. The northern wall was composed of two slabs, the lower upright, the upper flat; the eastern wall was similar while the southern wall comprised a slab on edge with two long stones on top with a long flat stone above.

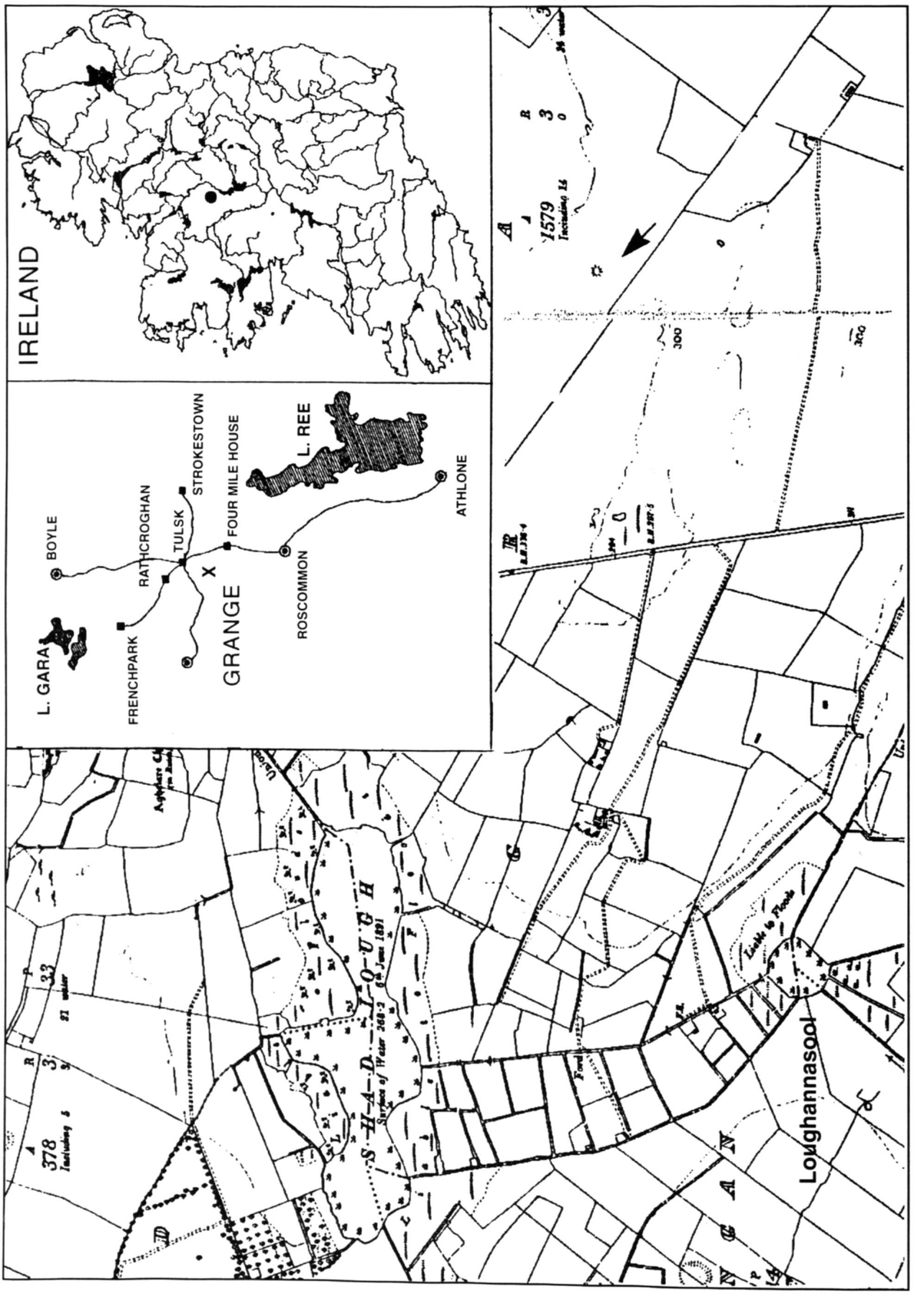


Fig 1. Grange, Co. Roscommon: location map. (six inch map inset reproduced by permission of the Ordnance Survey of Ireland, permit no. 5973).

Plate 1. Grange cemetery mound with view of pre-excavation disturbance

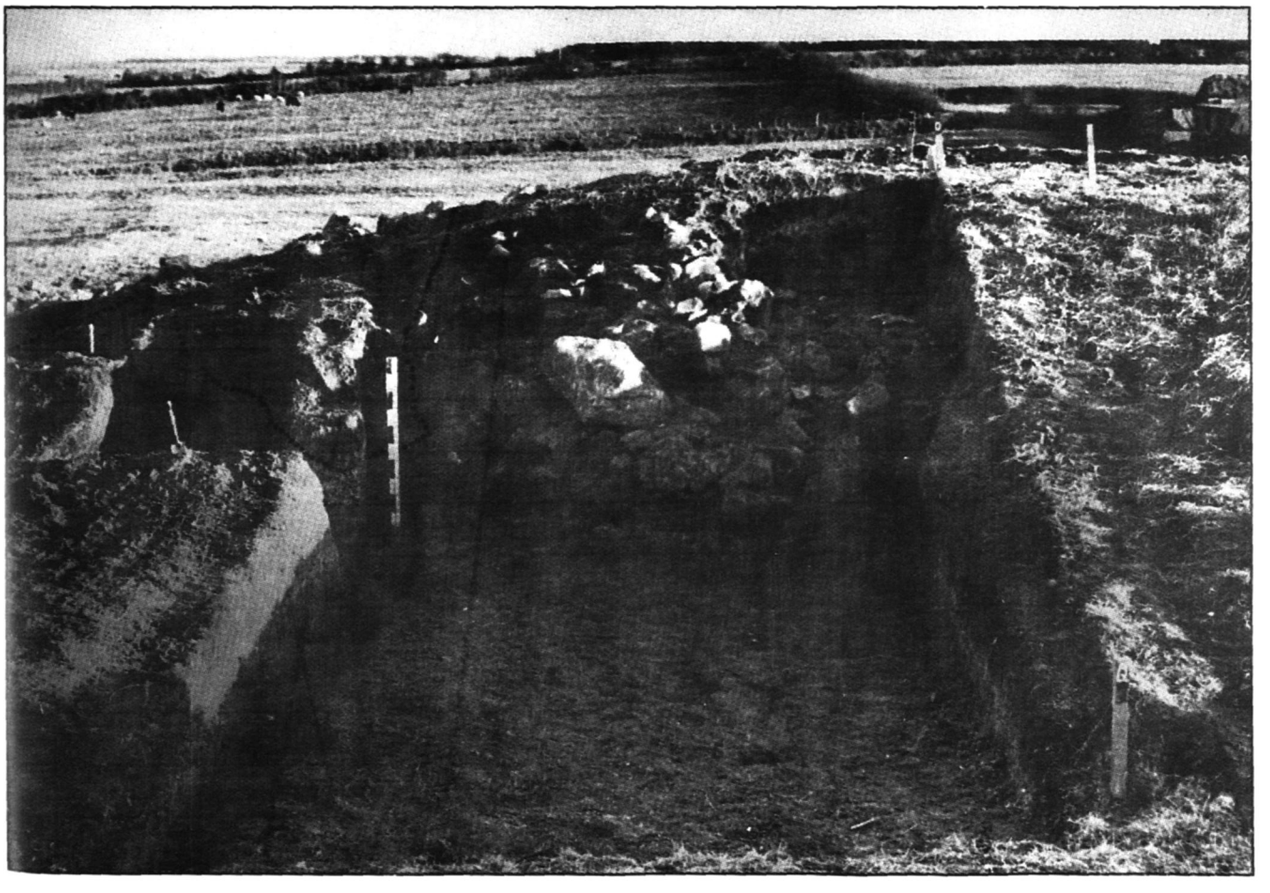


Plate 2. View of cairn stones and overlaying clay mantle

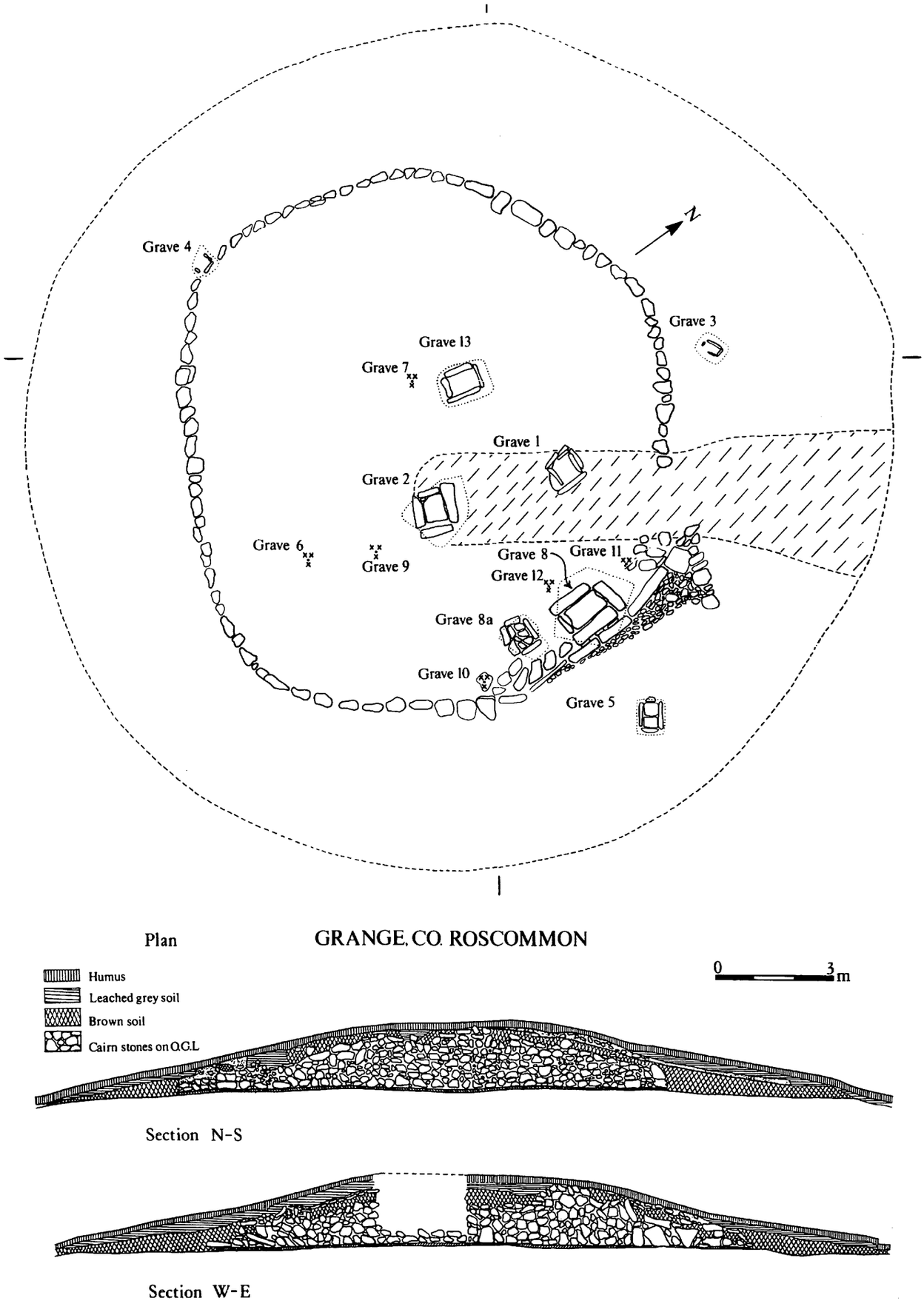


Fig 2. Plan and cross section of excavation at Grange.

Plate 3. Cist grave 5 after the removal of the capstone; it contained the cremated remains of an adult male and a small quantity of charcoal. Part of the rim sherd of a small vessel was found among the bones. Scale 30cm.

Before disturbance the stratified material over the cist consisted of a thick layer of grey leached soil and above it a stratum of humus, top soil and some field stones. This grave was not dismantled during archaeological excavation when access was gained via an end slab.

Grave 3 (Fig. 2; Fig. 3:3)

This poorly preserved cist grave, orientated east-west, was 35cm long, 38cm wide and 36cm high. The cist structure, little more than a few stones protecting a cremation, had collapsed in antiquity and the northern side stone fallen into the cist. This side stone measured 50cm long and had originally extended the full length of the cist and was 40cm high and 12cm thick. The southern side wall was a light slab 23cm long, 20cm high and 3cm thick. The only stone at the western end was a small slab measuring a mere 12cm long, 15cm high and 4cm thick. The grave was covered with a double capstone: the lower capstone, roughly square, was 80cm long, 87cm wide and 23cm thick and the upper measured 81cm by 64cm and was 12cm in thickness. Rain-water and soil had seeped into the cist. A Bowl (E65: 9) was found midway along the eastern side-slab and close to it the vessel had been partly crushed by the collapse of the northern side slab.

The cist had been constructed in the subsoil and the upper capstone lay 15cm below the old ground surface. The unpaved floor of the cist was 80cm below old ground level. The cist also contained a much decayed unburnt skeleton (E65: 10) of a seven year old child, orientated east-west with the skull at the eastern end of the grave beside the vessel. Despite the poor preservation it was apparent that this skeleton was in a flexed position. The bones of a hoof of a small animal were also found with this skeleton.

Grave 4 (Fig. 2; Fig. 3:4)

A cist was found on the perimeter of the cairn in the south-western sector. It was apparent that the grave was secondary. The capstone projected outwards beyond the regular curve of the cairn and was not covered by cairn material. It did not seal the cist which lay a short distance below the sloping grass-covered mantle of the mound. The cist measured 50cm north-south, 35cm east-west and 30cm deep. The capstone was 80cm long, 74cm wide and 12cm thick. A small amount of cremated bone (E65: 11) was found in the cist which was full of grey soil which had infiltrated the grave. The human remains are those of one individual.

Grave 5 (Fig. 2; Fig. 3:5; *Pl.* 3)

This cist was located in the south-eastern sector of the tumulus; it lay outside the actual cairn but was covered by the mantling mound. However, the disturbed soil over the structure suggested that this was a later intrusion into the burial mound. The cist was orientated roughly north-west to south-east and measured 72cm long, 49cm in maximum width and 30cm high internally. The capstone was 83cm long, 72cm wide and 22cm thick and lay 32cm below the surface. A deposit of cremated bone of an adult male (E65: 12) and a small amount of charcoal lay on the broken floor

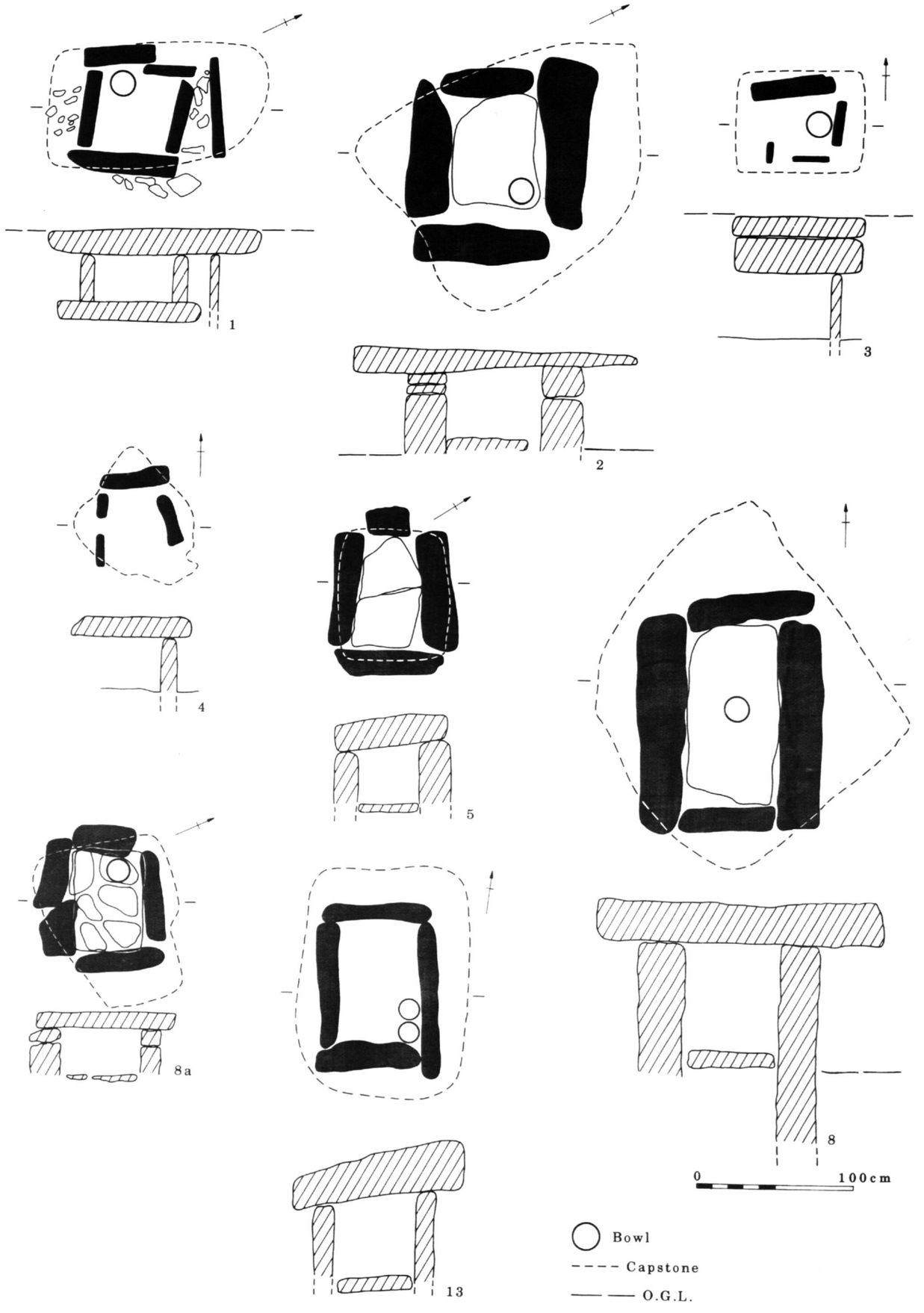


Fig 3. Plans and sections of cist graves.

slab. A small potsherd (E65: 12), part of the rim of a small vessel, was found among the cremated bone; a perforated bone disc (E65:13), possibly a pendant, toggle or amulet was also found.

Grave 6 (Fig. 2)
This was an unlined burial pit inserted into the mound in the southern sector. The pit had been dug into the mantling grey layer overlying the cairn stones and it contained sherds of a poorly preserved inverted Vase Urn (E65: 17) and an inverted cup (E65:16), which lay on the north-eastern side of the urn. The Vase Urn contained a quantity of cremated bone (E65: 15) representing one individual.

Grave 7 (Fig. 2)
This burial consisted of a deposit of cremated bone (E65: 19) representing the remains of one individual found in an unprotected pit in the mantling mound. Six very small fragments of unburnt human bone were also found as were three fragments of possible animal bone.

this cist was not covered by grey leached clay (as was the stone alignment – below) and even though one end stone was deeply set in the ground, it seems that this grave was a later feature than the nearby alignment. Its capstone did oversail this feature.

Grave 8a (Fig.2; Fig.3:8a)
The position of this cist was relatively close to cist 8 in the north-eastern sector. Built on the grey layer, it was evidently secondary but covered by cairn stones. A relatively small grave, it measured 63cm east-west, 44cm north-south and 27cm high. Each end was made of one slab whereas the side walls were composed of two slabs, one on top of the other. The floor was paved with small slabs individually averaging 24cm by 6cm thick. The capstone was 105cm long and 94cm wide. A Bowl (E65: 30) lay on its side at the western end and some cremated bone (E65: 42) was present on the paving. Upon removal of some of the paving of small slabs on the floor a further deposit of cremated bone (E65: 43) was found partly lying on a large flat stone. The remains above the paving were those of at least two people – an adult and a

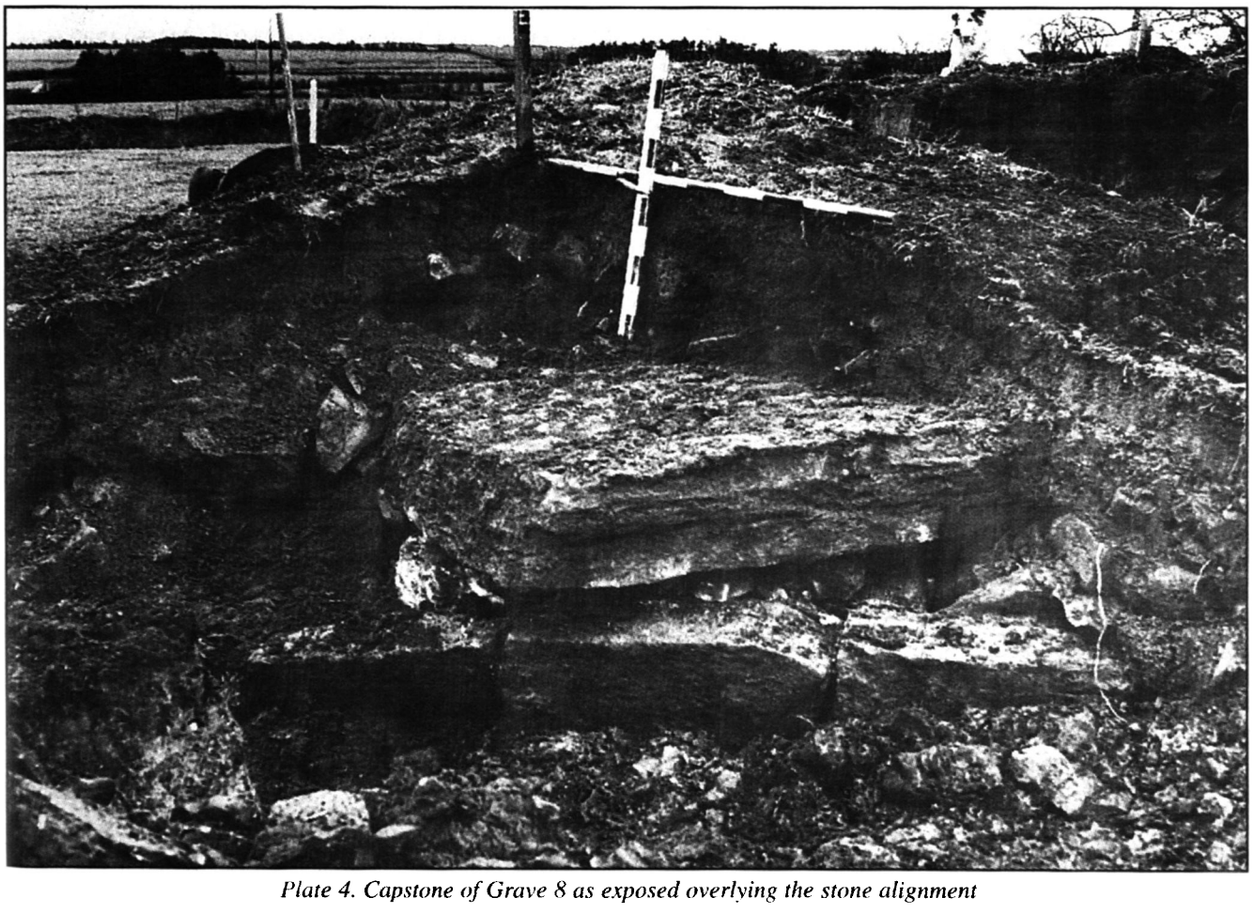


Plate 4. Capstone of Grave 8 as exposed overlying the stone alignment

Grave 8 (Fig. 2; Fig. 3:8; *Pl.* 4)
Grave 8 was a large cist, of almost megalithic proportions, orientated north-south; it was 117cm long, 52cm wide and 66cm in average height internally. The base of the northern end stone penetrated to a depth of 43cm into the soil below original ground level. The large capstone measured 2.25m north-south, 2m east-west and was 29cm thick. A Bowl (E65: 44) stood mouth upwards in the centre of the cist, surrounded by a spread of cremated bone (E65: 45) on the cist floor. The remains were those of one individual. Like Grave 8a (below)

juvenile aged about 8-9 years. Five unburnt animal bones were found with this cremation; two of these are rodent bones which may represent a recent intrusion. The deposit found under the paving represented the remains of three individuals, namely two adults and a juvenile. Anatomical examination has suggested that the two deposits, above and below the paving, are the remains of the same people. The paving slabs at the western end were locked in position by the end slab so the cremation below had been placed there before the cist was built.

Grave 9 (Fig.2)
This unprotected burial pit in the south-east sector contained some undecorated potsherds of Vase Urn class (E65: 23; not illustrated) and a small deposit of cremated bone (E65: 24) representing an adult. Two very small unburnt fragments of bone were also present and one has been identified as a lamina of the vertebra of an infant.

Grave 10 (Fig.2)
This pit burial was also located in the south-east sector of the monument. It had been inserted into the grey leached soil mantling over the cairn stones and lay at a depth of 72cm below the surface. The contents of the pit included a pottery vessel of the Vase Urn class (E65: 25) found inverted on a stone slab. The vessel was somewhat fragmented and removal of part of the base revealed a large deposit of cremated bone (E65: 26) within the vessel. Midway in this deposit a crumpled fire-burnt bronze dagger together with its rivets and bone pommel (Fig. 7) were found. A large deposit of charcoal was also found on the southern side of the vessel; this was preserved for eventual radiocarbon analysis (GrN-9709). The cremation is that of a young male adult and it is suggested that the bronze dagger and its bone pommel which were subjected to intense heat were on the cadaver during the cremation process.

Grave 11 (Fig.2)
A burial in a small stone-filled pit consisted of a small deposit of cremated bone (E65: 31) which represents the remains of one adult individual. This pit was located to the north of and at a slightly higher level than the capstone of Grave 8 inside the stone kerb on the eastern side of the cairn.

Grave 12 (Fig.2)
An unprotected pit burial located a short distance west of Grave 8. It lay at a depth of 50cm below the surface of the mantling mound and contained a small deposit of cremated bone (E65: 35) which represents the remains of one adult. A cockle shell and a small crinoid were also present in the deposit.

Grave 13 (Fig.2; Fig.3:13)
This was a cist located in the north-western sector in an off-central position relative to the cairn and clay mantling of the mound. It was situated below the original ground level and was covered by a large and heavy capstone which was also below the original ground surface. The cist orientation was north-south and this grave measured 84cm long, 57cm wide and 52cm high internally. The floor was paved with a slab which was 13cm thick. Two well-preserved Bowls (E65: 47 and 48) were found standing mouth upwards side by side close to the western side wall at the northern end of the cist. A large deposit of cremated bone (E65: 49) lay on the floor slab. The remains of at least four individuals, two adults and two juveniles, have been identified. Twenty fragments of animal bones were also present; four were the unburnt bones of rodents probably representing recent intrusions and the remaining sixteen fragments, which were burnt, come from larger animals.

The stone alignment (Fig. 2; *Pl.* 4)
In the south-eastern part of the cairn the normal stone edging was absent. In its stead there was a series of five large upright slabs placed edge to edge. They stood to a height of 40cm on average and varied in length from 142cm to 85cm. The series terminated at its northern end by a stone lying flat which measured 82cm by 56cm. A paving of flattish stones of small size measuring 15cm by 12cm by 6cm and 30cm by 16cm by 10cm was present along the north-east side of the alignment. The grey soil stratum of the mantling of the mound was undisturbed over the position of the slabs. This suggests that the alignment may be a primary feature; its original significance was not established. During conservation of this monument after excavation the stones of the alignment and Grave 8 were retained in their original positions.

Twenty small fragments of unburnt human bone and one fragment of calcined human bone (E65: 32) were found within, i.e. to the west of the stone alignment below the level of the grey leached stratum and below the level of Grave 8a and east of it. The identifiable remains of the unburnt material appeared to be from a juvenile aged between five and ten years and the single burnt bone has been identified as portion of the long bone of an adult.

FINDS
Bowl E65: 1 (Fig.4) from Grave 1: 9.8cm high, 12.6cm in diameter at the internally bevelled mouth and 8cm in diameter at the base. There is false relief below the rim followed by reserved lozenge and comb impressions; a central constriction bears two plain incised lines and, on the lower body, are another reserved lozenge and false relief. The base is decorated with an eight-pointed star-like design.

Bowl E65: 2 (Fig.4) from Grave 2: 8.5cm high, 11.8cm in diameter at the mouth and 5.6cm in diameter at the base. A short length of the internally bevelled rim bears incised lines; two incised lines occur below the rim followed by a wide band of slanting whipped cord impressions and two further incised lines in the central body area. There are fine comb impressions and a poorly executed band of false relief on the lower body; the base is plain.

Bowl E65: 3 (Fig.4) from Grave 2: 9.5cm high, 10.8cm in diameter at the mouth and 8cm in diameter at the base. The rim is bevelled internally and decorated with slanting lines of comb impressions. The upper body is also decorated with slanting comb impressions and an impressed line of false relief; the central body constriction bears two spaced horizontal grooved lines. The lower body has a wide band of slanting comb impressions bordered by false relief and triangular impressions occur around the outer edge of base.

Bowl E65: 9 (Fig.4) from Grave 3: 8.7cm high, 11.2cm in diameter at the mouth and 7cm in diameter at the base. The rim is slightly everted and bevelled internally. The upper body bears a wide band of almost vertical comb impressions bordered above and below by a line of false relief and a slight constriction at the centre bears two spaced incised lines. The lower body has further bands of false relief and horizontally arranged comb impressions. There is a star-shaped design with comb and triangular impressions on the base.

Bowl E65: 30 (Fig.5) from Grave 8A: 8.9cm high, 11.7cm in diameter at the mouth and 6cm in diameter at the base. The internal bevel of the rim bears a line of comb impressions. The external surface of the rim is decorated with a line of

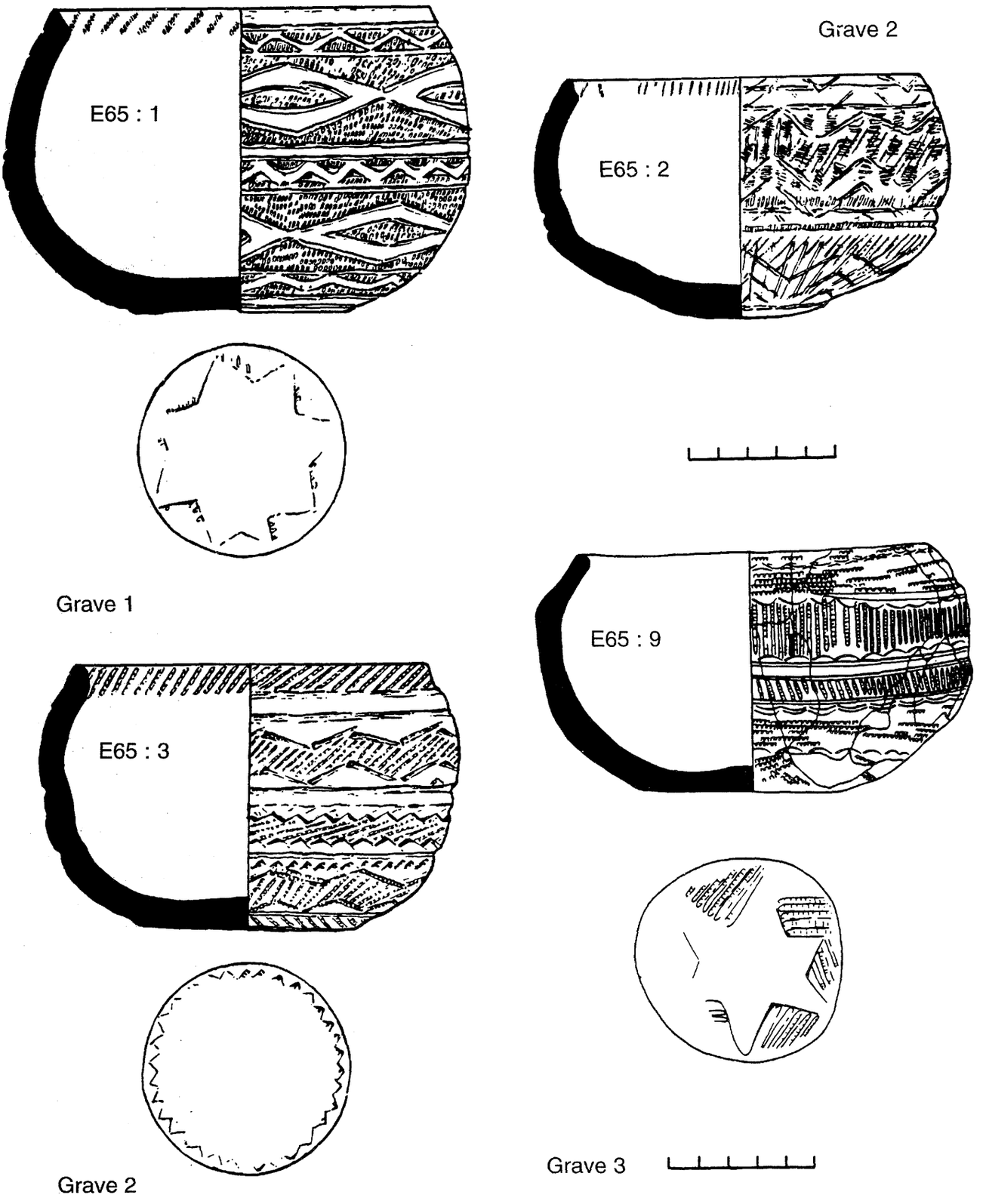


Fig 4. Above: Bowls from Graves 1 and 2; below: bowls from Graves 2 and 3.

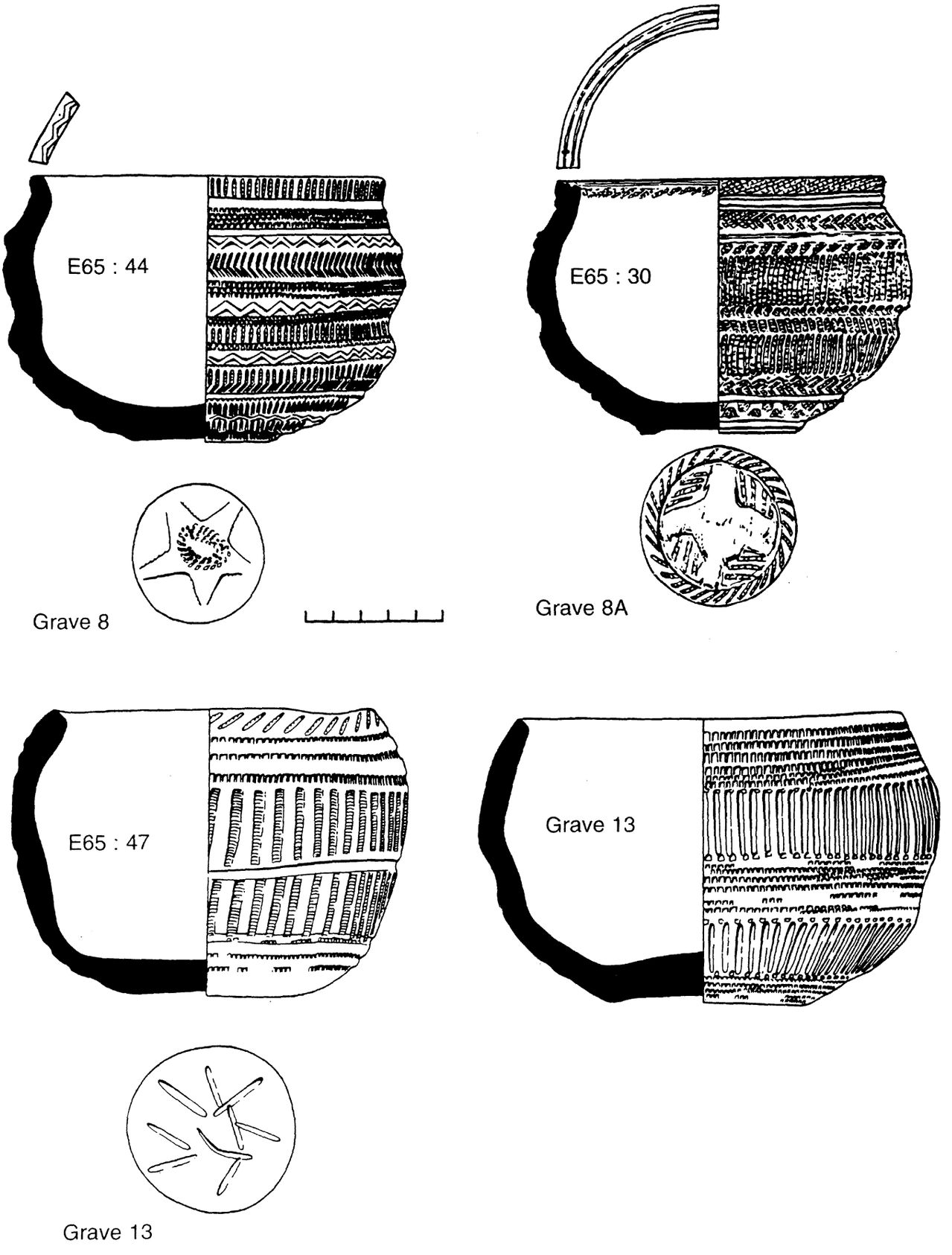


Fig 5. Above: Bowls from Graves 8 and 8a; below: two Bowls from Grave 13.

slanting comb impressions and the upper body has further slanting and vertical lines of comb impressions separated by incised horizontal lines. There is a central constriction bearing an impressed line of false relief and the lower body has a further frieze of comb impressions and two lines of false relief near the base. An impressed cruciform design decorates the base.

Bowl E65: 44 (Fig.5) from Grave 8: 9.2cm high, 17 cm in diameter at the mouth and 6cm in diameter at the base. The flat rim bears a line of false relief; on its external surface the rim has vertical lines of comb impressions and the neck bears a set of parallel horizontal lines of combing. The upper body bears almost vertical comb impressions. The central body constriction also bears comb impressions bordered above and below by a band of false relief. The lower part of the body has further bands of comb impressions separated by a deeply impressed groove line encircling the vessel. The base bears a well executed five-pointed star-shaped design with comb impressions and it is bordered by a line of false relief.

Bowl E65: 47 (Fig.5) from Grave 13: 9.9cm high, 11cm in diameter at the mouth and 8.6cm in diameter at the base. The external surface of the slightly internally bevelled rim bears a slanting row of whipped cord impressions, and below this are horizontal grooved lines bearing similar impressions. The main decoration on the body consists of two panels, one above and one below the central area, which bear whipped cord impressions. The base bears a fairly crude star-like design.

Bowl E65: 48 (Fig.5) from Grave 13: 10.2cm high, 13.6cm in diameter at the mouth and 7cm in diameter at the base. The rim is slightly bevelled internally and its external surface is decorated with five horizontal lines of comb impressions. Above and below the central constriction is a wide band of plain scored vertical grooves and, closer to the base, four further rows of comb-impressed lines encircling the vessel. The base is plain.

Potsherd E65: 12 (Fig.6) from Grave 5: a small plain potsherd, portion of the rim of a small vessel, possibly a cup. The rim displays a slight internal bevel. It is 1.3cm high and 7mm in maximum thickness.

Bone pendant (?) E65: 13 (Fig.6) from Grave 5: this object is 1.7cm long, 1.1cm wide and 5mm in diameter.

Vase Urn E65: 17 (Fig.6) from Grave 6: this vessel is represented by some 23 sherds of extremely friable pottery. There is decoration of scored lines on the flat rim and also on the internal and external surfaces of the rim; none occurs on sherds representing the body and base of the vessel. The rim is 1cm thick and a sherd representing part of the shoulder area is 5cm in maximum dimensions and 1.3cm thick. The ware has a black core with large grits.

Cup E65: 16 (Fig.6) from Grave 6: a miniature bowl-shaped cup 4.7cm high, 4.5cm in diameter at the rim and 2.7cm in diameter at the base. Decoration on the outer surface takes the form of a series of twelve spaced horizontal groves encircling the vessel from rim to base; plain flat base.

Vase Urn E65: 23 from Grave 9: this vessel is represented by seven sherds; the largest measures 5cm by 3cm and is 1.1cm in thickness. Large grits are present in the core of all the sherds. Not illustrated.

Vase Urn E65: 25 (Fig.7) from Grave 10: the vessel is fragmented and has not been reconstructed. Both the internal and external surfaces of the rim and neck are decorated with oblique incised lines. The average thickness of the ware is 1cm. Large grits are present in the core. Two low cordon-like features are present on the upper body sherds.

Bronze Dagger E65: 28 (Fig.7): the bronze dagger and its bone pommel were found among the cremated bones within the inverted Vase Urn (E65: 25) in grave 10. This crumpled dagger is of the grooved six-riveted type, with five rivets still extant. Three of these remain in their original rivet holes, while two others are fused to the blade. The rivets are, on average, 12mm long, 3mm in diameter at centre and 5mm in diameter at the expanded ends. With the writer's permission a note of this discovery together with an illustration of the dagger was included in Harbison's catalogue (Harbison 1968, 51).

Bone pommel E65: 29 (Fig.7): the bone pommel is made from a single piece of bone which is now somewhat eroded. It is 45mm long and 15mm thick. It has a flat oval top and curved sides. It has been the subject of a detailed study by Ron Hardaker, who suggests that the method of attachment represents a more complex version of the trough principle in that a narrow tenon projects from the floor of the pommel trough to the base of the pommel creating two mortised receptacles which would probably have accommodated a double hilt-end tang (Hardaker 1974). He considers that the pommel tenon would have entered a corresponding socket in the hilt end, while the pin attachment was by means of two alternate diagonal perforations drilled through the tenon, the pins presumably driven through the hilt-end tangs before the hilt plates were added. Hardaker is of the opinion that the pinning must have been a difficult affair, as the tenon perforations would have been obscured by the hilt-end tags. Two small indentations are visible, one in the upper corner of each of the pommel receptacles caused probably by the original drilling of the diagonal pin-holes or less probably by the actual pinning process. This method of attachment was designed so that no attachment pins would be visible on the outer surface of the pommel.

Iron-rich slag and furnace bottom (E65:7): a deposit of iron-working (?) slag, a furnace bottom and some charcoal was discovered in the northern part of the mound. It was located just below the surface, about 2m in from the edge of the tumulus and about 2.5m from the cairn edge. The deposit measured 50cm by 60cm and extended to a depth of 30cm.

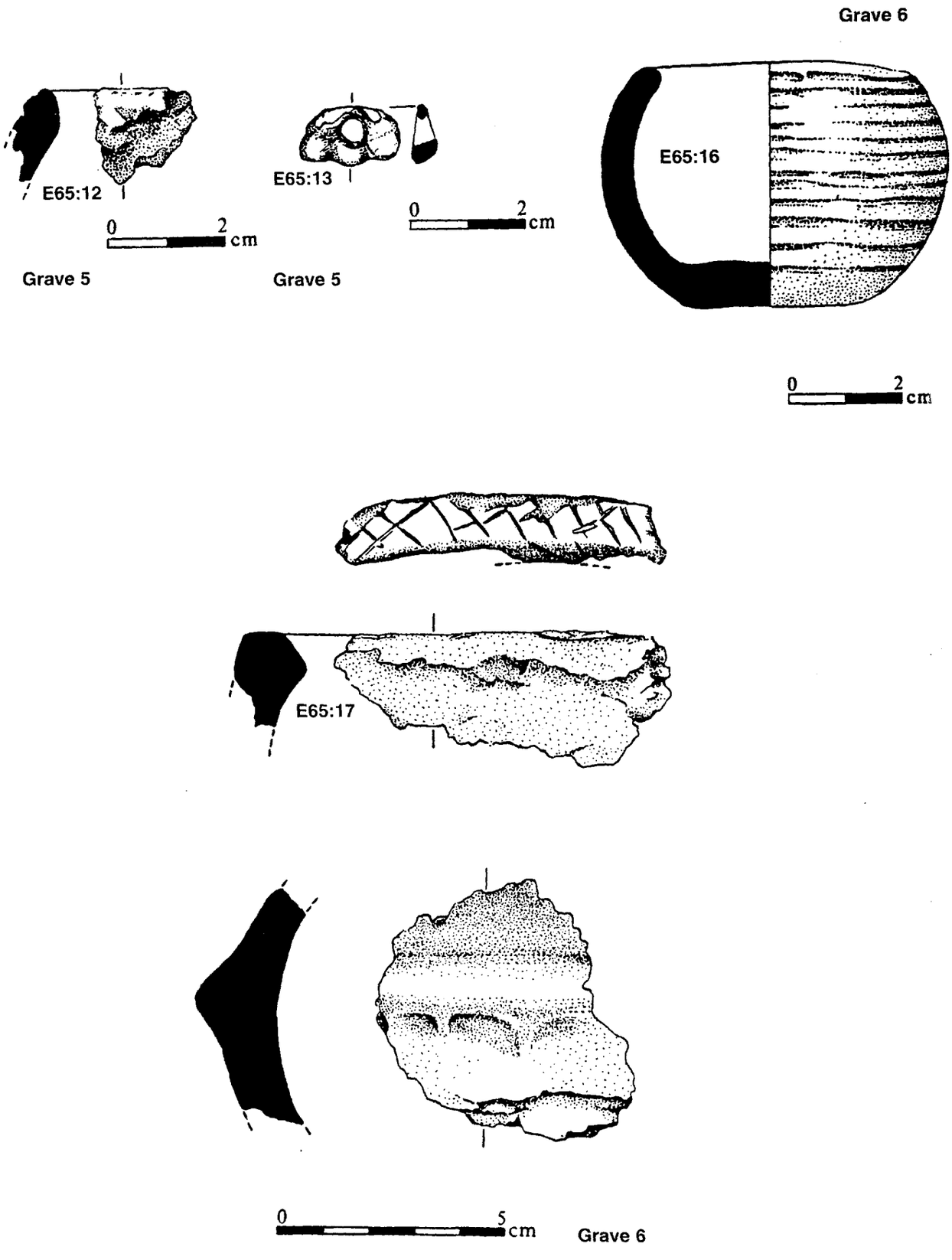


Fig 6. Above: rim sherd possibly from a miniature cup and bone pendant from Grave 5 and cup from Grave 6; below: sherds of Vase urn from Grave 6.

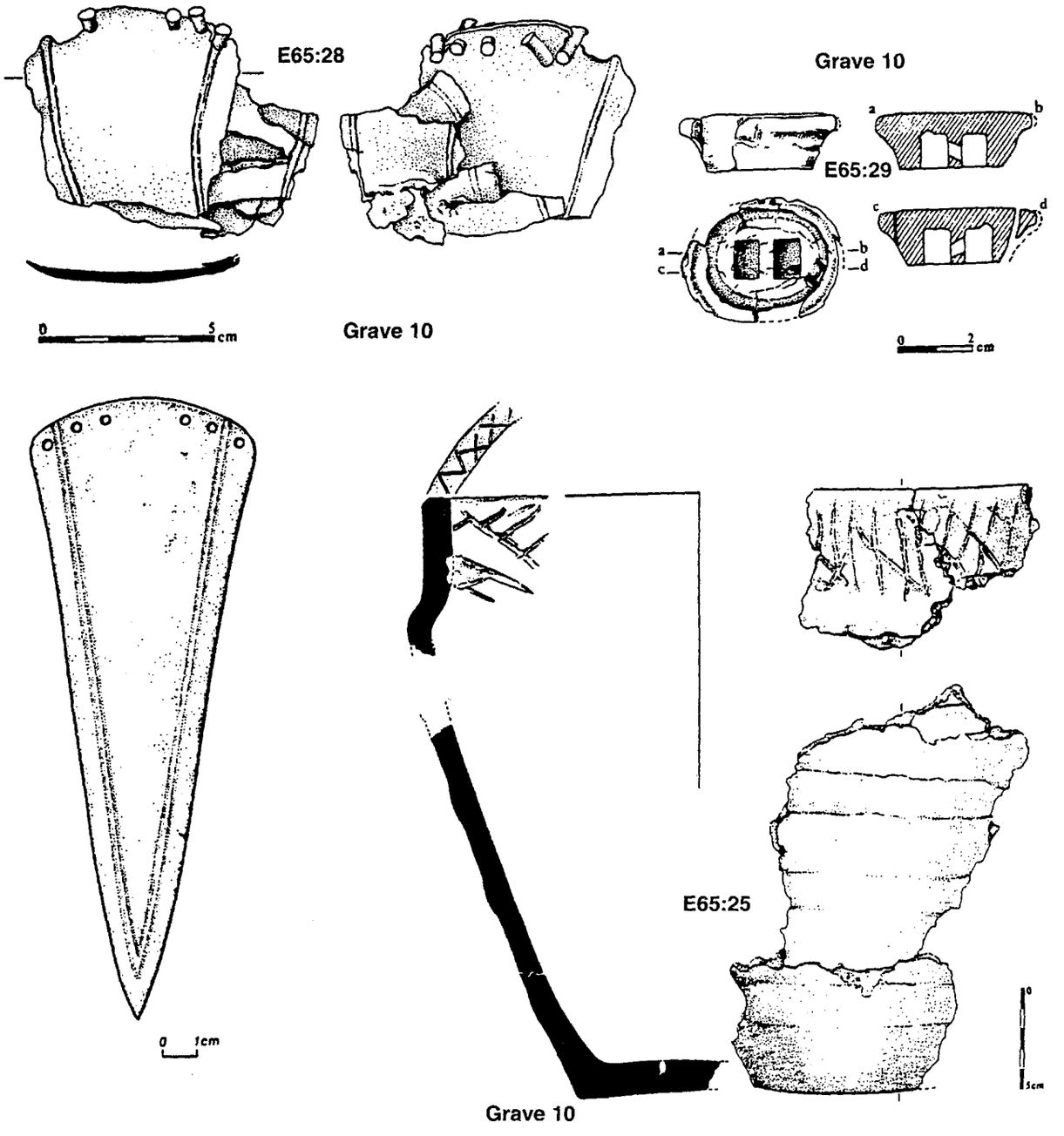


Fig 7. Above: bronze dagger and its bone pommel; below: suggested reconstruction of the dagger (after Ó Ríordáin and Waddell) and Vase Urn from Grave 6.

DISCUSSION

The Grange site has been discussed by Waddell (1990) in an examination of Early Bronze Age cemetary mounds in Ireland. Sites comparable to Grange in the number of graves and pottery types present include Mount Stewart, Co. Down (Evans and Megaw 1937), Corrower, Co. Mayo (Raftery 1960), Crouck, Co. Tyrone (Davies 1935) and the secondary phase of Fourknocks I, Co. Meath (Hartnett 1957). At Grange, four of the cists (Graves 1, 8, 8a, 13) contained bowls associated with cremations and in only two cists (Graves 2 and 3) were bowls associated with unburnt remains. However, no special significance can be attached to the ratio of cremated to unburnt burials as the contemporary use of both rites has been recorded on a number of sites and, on occasion, in the same grave as at Ballicknahee, Co. Offaly, Oldtown, Co. Kildare, and Ballybrennan, Co. Westmeath (Waddell 1990, 20).

The Bowls from the Grange site have been classified as follows: the vessels from Grave 1 (E65: 2 and3) and Grave 13 (E65: 47 and 48) and the single example from Grave 3 (E65: 4) are bipartite bowls. The vessel from Grave 8 (E65: 44) is a necked bipartite bowl, as is the bowl from Grave 8A (E65: 30) (Ó Ríordáin and Waddell 1993, 39-44). The small rimsherd (E65: 12) found in Grave 5 appears to have belonged to a miniature, so-called pygmy, cup. Some twenty examples of these cups have been found in cists and in eight instances the cup was the only pottery vessel present in the grave (Kavanagh 1977, 73). The perforated bone disc (E65: 13) found in Grave 5 in association with the rimsherd of a cup may have been used as a pendant or amulet. Other non-pottery associations of pygmy cups include a quoit-shaped faience bead from Knockboy, Co. Antrim, an amber bead (now lost) from Dromara, Co. Down, a bronze awl, a riveted bronze dagger and a white pebble from Annaghkeen, Co. Galway, and a flint flake from Clogherny, Co. Tyrone (Kavanagh 1977, 93-5).

On stratigraphical grounds the pit burials at Grange (Graves 6, 7, 9-12) are later insertions into the mantling mound. In the three graves (Graves 6, 9, 10) in which pottery was associated with cremations the sherds are identifiable as of the vase urn class. In addition Grave 6 contained a cup. The association of these cups with vase urns has also been recorded from other sites including Ballynahow, Co. Cork, Knockoneill, Co. Derry, Moyhora, Castlecomer, Co. Kilkenny, and Clonshannon, Co. Wicklow (Kavanagh 1977, 93-95). With regard to the date of the cist burials from the site the majority of radiocarbon dates now available suggest a time span of about 3800-3600 BP for most bowls (and vases). The radiocarbon carbon date of 3480 ± 35 BP (GrN-9709) for the vase urn from the secondary pit burial (Grave 10) provides a terminus ante quem for the bowl types from the Grange site (Ó Ríordáin and Waddell 1993, 39). Finally, the grooved bronze dagger, also from Grave 10, is considered to belong to the Armorico-British Type A dagger class of the earlier phase of the Wessex funerary tradition (Gerloff 1975, 70, pl. 11; Ó Ríordáin and Waddell 1993, 36).

THE RADIOCARBON DATES

(A. L. Brindley, Vakgroep Archeologie, Rijksuniversiteit Groningen)

All living matter incorporates carbon during its lifetime via the food chain. Natural carbon consists of three isotopes, two stable (12C and 13C) and one unstable or radioactive (14C) which are constantly produced in the atmosphere. The amount of radiocarbon taken in is in equilibrium with that of the environment (atmosphere, fresh water or sea). After death, radiocarbon ceases to be incorporated and instead starts to decay at a known rate (50% of a given amount of 14C decays in 5570 years). Radiocarbon dating is based on the measurement of the 14C still present in a sample. There are two methods used to measure 14C for dating purposes, 'conventional' radiocarbon dating and AMS dating. In conventional dating the activity of 14C, i.e. the amount of radioactive decay, is measured. The AMS method (accelerator mass spectrometry) measures the actual number of 14C atoms in a sample.

Radiocarbon dating is a statistical process. Each result is presented as a measured age and a standard deviation. The real radiocarbon age lies with 68.3% certainty within plus or minus one standard deviation range. This certainty increases to 95.3% with two and to 99.7% with three standard deviations. The size of the standard deviation depends on, amongst other things, the size of the sample and the equipment used in the laboratory.

Because the level of radiocarbon in the atmosphere has varied during the past and still varies and the decay rate of 14C is not precisely known, age determinations based on 14C cannot be expressed in calendar years. Instead, they are given in radiocarbon years which cannot be converted to calendar years by subtracting 1950. In order to convert radiocarbon years to calendar ages, calibration curves have to be used. These are based on the radiocarbon dating of long series of tree rings of known calendar age. The resulting curve shows increasing differences between calendar ages and radiocarbon ages the further one goes back in time. Furthermore, the curve is made up of a series of irregular steep and horizontal sections of various magnitude known as wiggles. Both the main curve and the wiggles reflect the changes in the global levels of 14C.

The result of calibrating depends to a large degree of the shape of the curve. A smooth, steep section of the curve will yield short ranges in calendar years, a horizontal section in long ones. Obviously, small standard deviations (which can be controlled to some extent by the archaeologist and physicist) influence the length of the ranges in calendar years as well, but the shape of the calibration curve remains the main factor.

The chief archaeological characteristics of each date arise from the precise relationship of the dated matter to the subject of the dating exercise; the sample may be older than the context in which it is finally deposited (e.g. re-used or long used objects), it may have an age of its own (such as wood where the date may be that of the time the wood started growing, rather than the date of its use) or there may be a time lapse between the deposition of the sample and the activity which is to be dated (i.e. charcoal under a mound or incorporated in mound material or in a ditch fill). All these characteristics must be taken into account before the date can be interpreted whether within an excavation framework, the dating of individual artifacts or any comparison of dates can be carried out. The actual or most likely date can be identified by comparison with other dated material, typological or stratigraphical information or wiggle matching.

Three samples were dated from Grange, Co. Roscommon. These were selected from the museum archive for inclusion within an extensive radiocarbon dating

programme of artifacts, especially Bronze Age pottery, being carried out by the writer in association with J. N. Lanting (Groningen). They were not selected primarily to date activity and use of this cemetery. The results have been calibrated following Van der Plicht and Mook (1989). Details are as follows:

Grave 2
OxA-2761 3620 ± 80 BP
Bone sample E65:41
β13C=-23.1‰
One-sigma calibration
2130....2074 cal. BC
2044....1890 cal. BC
Two-sigma calibration
2268....2256 cal. BC
2202....1864 cal. BC

Grave 3
OxA-2664 3770 ± 70 BP
Bone sample E65:10
β13C=-22.8‰
One-sigma calibration
2326....2132 cal. BC
2072... .2046 cal. BC
Two-sigma calibration
2458....2416 cal. BC
2408....2032 cal. BC

Grave 10
GrN-9709 3480 ± 35 BP
Charcoal sample E65:27
One-sigma calibration
1878....1862 cal. BC
1852....1836 cal. BC
1824....1792 cal. BC
1788....1754 cal. BC
Two-sigma calibration
1890....1738 cal. BC
1712....1700 cal. BC.

The bone samples were processed by the accelerator mass spectrometry method at the Oxford laboratory and were included in a section of the dating programme supported by a grant from the National Heritage Council. The charcoal sample was processed in Groningen by the conventional method courtesy of the Centrum voor Isotopen Onderzoek, Rijksuniversiteit, Groningen.

The Bone Samples

Both bone samples are derived from skeletons and can therefore be considered as category A status on Waterbolk's categorisation of sample association and own age; i.e. the dates achieved are on samples integral to the act of burial and have a negligible own-age, they reflect the date of burial exactly (Waterbolk 1971). The calibrated ranges are given above. More precise dating of the two graves in relation to each other and to the cemetery in general depends on one's understanding of the associated grave goods and the stratigraphical relationship or otherwise between the two graves.

The Charcoal Sample

A limited number of identifications of the charcoal samples were carried out by A. Moloney (Irish Archaeological Wetland Unit). While the complete range of wood species present is not known, fragments of hazel, alder and ash were identified in this sample. All the wood that could be identified was from small branches with an average age of 8 to 10 years. The date is probably not older than the act of burial or the associated grave gifts.

It is possible that Graves 2 and 3 and Burial 10 all date to within a comparatively short period of 280 years (2130-1850 cal. BC). Although Graves 2 and 3 could have been used shortly after one another around 2130 cal. BC, they may have been more widely spaced while – if the date from Grave 10 falls towards the younger end of its range, towards 1700 cal. BC – Graves 2 and 3 and Burial 10 might have taken place over a rather more protracted period of nearly 500 years.

THE HUMAN REMAINS

(Barra Ó Donnabháin, Department of Archaeology, University College Cork)

SUMMARY

The tumulus at Grange contained the remains of at least 25 people. These were interred in 14 formal graves and two token deposits. Fragments of a skull found underneath the mound may represent a dedicatory deposit. Of the 14 graves, 12 contained cremations while there were unburnt skeletons in the other two. Six of the graves contained multiple burials but in three of these the second individual's remains seem to be just token deposits. Of the 25 individuals identified, nine (36%) were juveniles, 14 (56%) were adults while the ages of the remaining two people could not be estimated. It was possible to determine the sex of only seven of the adults. All of these were males. A gender bias may have operated in determining access to burial at the site. The inclusion of faunal remains, particularly the hooves of some domesticated animals, aperars to have formed an inherent part of the mortuary ritual. While this has traditionally been viewed as representing food refuse, it could also be interpreted in terms of totemic associations between certain social groups and particular animal species.

Pathological evidence suggested that adults lived physically active lives characterised by strenuous labour and that adolescents were introduced to adult work practices at an early age. Some individuals suffered periodic bouts of biological stress and there was evidence to suggest that this may have been seasonal. The distribution of degenerative changes in the adult males suggested an habitual activity such as the regular portage of heavy loads using the head and neck.

The bodies in the cremation deposits had been burned soon after death. Those who buried their dead at the site had developed high standards in cremation technology. The retrieval of remains after cremation was more varied and was not always meticulous. The remains were not deliberately crushed after collection. Some cremated remains may have been stored elsewhere prior to their final deposition at the site. There was no obvious correlation between grave type or artifactual associations and factors such as age, the mode of corpse disposal or the efficiency of remains retrieval. The uniformity in efficient cremation technology and the possible maintenance of a gender bias point to a general continuity in burial traditions at the site.

Table 1: Summary of Cremation Data

Burial	E65:6 Grave 1	E65:11 Grave 4	E65:12 Grave 5	E65:15 Grave 6	E65:19 Grave 7	E65:45 Grave 8	E65:42 Grave 8A-above	E65:43 Grave 8A-under	E65:24 Grave 9	E65:26 Grave 10	E65:31 Grave 11	E65:35 Grave 12	E65:49 Grave 13
Weight	1549	70	1960	477	1022	1463	1061	712	53	1954	438	940	3691
MNI	2	1	1	1	2	1	2	3	2	1	1	1	4
Sex	J,J	?	M	M	?M,?	M	A,J	A,A,J	?,J	M	?M	M	2A,J,I
Age	15-18,I	?	A	YA/MA	OA	MA/OA	A,8-9	2A,c. IO	A,I	YA	A	A	2A,9-10, 6-12 mo
Firing	M	W	W	W	W	W	M	M	W	W	W	W	W
Animal remains?	No	No	Yes	No	Yes	Yes	Yes	No	No	No	No	No	Yes
Number of fragments	c.2100	162	c.2200	N/A	c.1150	c.1330	c.1600	c.1600	56	c.3000	630	1280	c.6220
Petrous temporal:	L & R		L & R		L		2R	3L, 2R		L & R	L & R	L & R	3L
Orbit, lateral margin:	L & R		L & R		L & R	R		L & R		R		L	+
Orbit, superior margin:	L & R		L & R		L & R	R		L & R		R	R	L	+
Occipital condyle:		R	R			L		+					
Cranial vault:	+	+	+	+	+	+	+	+	+	+	+	+	+
Zygomatic:	L		L & R	L		L & R	2L	R		L	L	R	+
Maxilla and/or palate:	L		L & R				L	+		+			+
Mandibular condyle:	R		L & R		R	L	R	2L, 1R		L & R		L & R	3R, 2L
Mandible (other):	+		+	+		+	+	+	+	+	+	+	+
Teeth:	+		+	+	+	+	+	+	+	+	+	+	+
Dens axis:	+		+		+	+		2		+			+
Atlas:	+		+		+	+	+	+		+			2
Cervical vertebrae:	+		+				+	+		+	+		+
Thoracic vertebrae:	+		+		+					+		+	+
Lumbar vertebrae:	+		+			+	+	+		+		+	+
Sacrum:	+		+			+		+					+
Pelvis:	+		+		+	+	+			+	+		+
Head of humerus:	+												
Head of radius:	+		+		+		+	+		L & R			
Head of ulna:								+		R			L
Head of femur:	+		+					+		+			L & R
Head of tibia:	+				+		+			L & R			
Head of fibula:													
Distal humerus:	+		+	+	+	+	+			L & R		+	+
Distal radius:			+										+
Distal ulna:	+		+								+		
Distal femur:	+		+		+	+		+		+			+
Distal tibia:	+												L
Distal fibula:	+				L					R			
Patella:			+			+	+	+		R		+	+
Carpals:			+		+	+	+	+		+		+	+
Metacarpals:	+		+	+	+	+	+	+		+	+	+	+
Hand phalanges:	+		+	+	+	+	+	+	+	+	+	+	+
Tarsals:	+		+		+	+	+	+	+	+		+	+
Head of MTI:	+		+		+	+	+	+		+			+
MT2 - MT5:	+		+		+	+	+	+		+	+	+	+
Foot phalanges:	+		+		+	+	+	+	+	+			+
Ribs:	+	+	+	+	+	+	+	+	+	+	+	+	+
Scapula:	+		+	+	+	+	+	+		+		+	+
Clavicle:	+		+		+	+	+	+				+	+

The following abbreviations are used in Table 1: (a) MNI = minimum number of individuals; (b) In the 'Sex' column: A = adult whose sex cannot be determined; J = juvenile, sex not determinable; (c) In the 'Age' column: I = infant (0-2 years), YA = younger adult (18-35 years), MA = middle aged adult (35-55 years), OA = older adult (55+ years); (d) In the 'Firing' column: W = well-fired, M = moderate underfiring.

INTRODUCTION

Twenty-two discrete collections of bone were recovered. Two of these (E65: 4 and 5) were gathered at the time of the discovery of the site and their provenance is uncertain. The remaining 20 bone groups were retrieved during the subsequent excavation of the site. Most of the material, 15 of the 22 bone groups, had been cremated. All of the collections of cremated bones contained human remains. Of the seven groups of unburnt bones, three (E65: 20, E65: 22 and E65: 34) contained animal bones only. Some of the collections of human remains also contained a small number of fragments of animal bone.

There were eight cists in the mound, two (Graves 2 and 3) contained unburnt skeletal material and Bowl pottery (Grave 2 contained two pots while there was one in Grave 3). Five of the remaining six cists (Graves 1, 5, 8, 8A and 13) contained substantial deposits of cremated bone. Bowls were found in all of these cists except Grave 5 where a small rimsherd, possibly that of a miniature cup, was found. The eighth cist, Grave 4, contained a small deposit of cremated bone and had no associated artifacts.

There were six pit burials at the site, all of which contained cremations. In three of these, no artifacts were associated with the human remains (Graves 7, 11 and 12). The other three pit burials (Graves 6, 9 and 10) contained Vase Urns. Among this latter group, a cup was found with the burial in Grave 6 while a bronze dagger with a bone pommel was found in Grave 10. The dagger had been buried and was presumably on the body at the time of its incineration.

MATERIALS AND METHODS

None of the unburnt skeletons was complete. This was probably because of the poor state of preservation of the unburnt bone. The inhumations in Grave 2 were disturbed when the site was discovered and this may have further contributed to their fragmentary and incomplete state. The deposits of cremated bone varied considerably in size, from 3691g (Grave 13) to 53g (Grave 9). The size of individual bone fragments also varied greatly both within and between bone groups. The largest fragment encountered had a maximum length of 146.9mm (a fragment of the shaft of a humerus from Grave 5) while the average fragment was only about 10mm in length. Each cremation also contained many minute pieces of bone and bone dust.

None of the material was washed though this may have been done at the time of the excavation or when the material was moved to the National Museum. All of the cremations were passed through a series of sieves (10mm, 5mm, 3.35mm and 1mm mesh size) and the collection within each size category was weighed. Each fragment was then examined and identifiable portions of bone were sorted according to the body part from which they came. Stones, soil debris, charcoal and animal bones were removed during this procedure. In the case of multiple burials, the remains of individuals were separated where possible. One cremation deposit, E65:15 (Grave 6), was not available for inspection. Fortunately, this material had been examined by the author for a previous study (Ó Donnabháin and Brindley 1990) and it was possible to use the notes taken at that time.

Demographic analysis of cremated remains is more problematic than is the case with unburnt skeletal material. The duplication of bones is used to deduce the number of individuals in a deposit. Obvious disparities in age between adults and juveniles can also be used. The methods for determining the age and sex of individuals from their skeletal remains were developed for use with well-preserved, unburnt material. As a result, estimations of age and sex are made with diffidence.

DESCRIPTION OF THE REMAINS

In the case of the cremated material, it would not be feasible to produce comprehensive lists of the identified fragments in each deposit. Furthermore, long lists of the bones identified would be of little value. As a result, the descriptions given below are brief and note only the more interesting features of each bone deposit. Information about the dentition, pathological changes, skeletal anomalies and associated artifacts is also presented. These data are summarised in Table 1 for the 12 larger cremation deposits. The three smaller collections of burnt bone and the unburnt material are dealt with in the verbal descriptions alone. The following data are contained in Table 1: the weight of each deposit and the minimum number of individuals contained therein; the age and sex of each individual (where these can be determined); the efficiency of the actual cremation process; the presence or absence of certain anatomical elements and the presence or absence of animal remains.

Grave 1 (E65: 6)

This cist contained a Bowl and a cremation. The cremation contains 1549g of calcined bone; four small fragments of unburnt bone were also found. The pieces of unburnt bone are from the skeleton of an infant. None of the cremated bone belongs to a child of this age. As this cist was uncovered prior to the systematic excavation of the site, it is possible that these fragments of unburnt bone represent a recent addition to the cremation deposit as a number of bone fragments were collected by those who made the discovery. However, two of the undisturbed graves (Graves 7 and 9) also had similar small deposits of unburnt material added to the cremation so it seems likely that this mixing was deliberate and occurred in antiquity. All of the cremated fragments represent the remains of one individual: a 15-18 year old subadult. The largest fragment is a piece of the shaft of a fibula (maximum length 108.7mm) and there are many relatively large pieces of bone, including many intact vertebral centra. The following teeth were present in the jaws at the time of death:

						1	2	3	4	5	6
4	3	2	1			1	2				

The remaining tooth positions are not available for inspection.

All of the lumbar vertebrae and at least six of the thoracic vertebrae are present. Large Schmorl's nodes occur on the lumbar vertebrae and on some of the thoracic elements. These indicate that this subadult had engaged in heavy physical labour in the years before his/her death. These activities had produced severe strains in the lower back resulting in the herniation of the nucleus pulposus of the intervertebral disc.

Most of the fragments were very well-burned and have the chalky-white colour of calcined bone. Many of these calcined fragments are warped and have the characteristic cracking and checking of bone burned at high temperatures. Many fragments are also warped and distorted. Some long

Table 2: GRAVE 1
DISTRIBUTION OF SKELETAL ELEMENTS

n = number of fragments identified
g = weight of identified fragments
% = percentage of identified total

Skeletal element	n	g	%
Frontal	5	8	0.8
Parietal	9	11	1.1
Occipital	1	2	0.2
Temporal	9	10	1.0
Facial	8	9	0.9
Alveolar	8	9	0.9
Teeth	27	5	0.5
Cranial	205	120	11.7
Head	272	174	16.9
Vertebrae	107	100	9.7
Innominates	46	68	6.6
Ribs	150	62	6.0
Scapula/clavicle	46	25	2.4
Thorax	303	255	24.8
Femur	11	53	5.2
Tibia	13	61	5.9
Fibula	11	24	2.3
Humerus	7	28	2.7
Radius	4	6	0.6
Ulna	5	12	1.2
Patella	0	0	0.0
Hands/feet	85	41	4.0
Long bones	191	374	36.4
Limbs	327	599	58.3

Table 3: GRAVE 5:
DISTRIBUTION OF SKELETAL ELEMENTS

n = number of fragments identified
g = weight of identified fragments
% = percentage of identified total

Skeletal element	n	g	%
Frontal	4	20	1.6
Parietal	10	54	4.4
Occipital	4	23	1.9
Temporal	14	33	2.7
Facial	18	16	1.3
Alveolar	14	26	2.1
Teeth	35	11	0.9
Cranial	123	186	15.2
Head	222	369	30.2
Vertebrae	89	120	9.8
Innominates	25	126	10.3
Ribs	161	66	5.4
Scapula/clavicle	13	35	2.9
Thorax	288	347	28.4
Femur	14	80	6.5
Tibia	2	12	1.0
Fibula	3	26	2.1
Humerus	7	59	4.8
Radius	4	14	1.1
Ulna	4	9	0 7
Patella	1	2	0.2
Hands/feet	47	30	2.5
Long bones	92	276	22.6
Limbs	174	508	41.5

Table 4: GRAVE 7:
DISTRIBUTION OF SKELETAL ELEMENTS

n = number of fragments identified
g = weight of identified fragments
% = percentage of identified total

Skeletal element	n	g	%
Frontal	3	9	1.5
Parietal	3	17	2.8
Occipital	3	15	2.4
Temporal	4	14	2.3
Facial	3	4	0.7
Alveolar	3	5	0.8
Teeth	18	5	0.8
Cranial	96	128	20.7
Head	133	197	31.9
Vertebrae	24	17	2.8
Innominates	1	1	0.2
Ribs	47	23	3.7
Scapula/clavicle	5	17	2.7
Thorax	77	58	9.4
Femur	5	55	8.9
Tibia	6	32	5.2
Fibula	2	6	1.0
Humerus	2	10	1.6
Radius	3	6	1.0
Ulna	0	0	0.0
Patella	0	0	0.0
Hands/feet	21	16	2.6
Long bones	101	238	38.5
Limbs	140	363	58.7

Table 5: GRAVE 8:
DISTRIBUTION OF SKELETAL ELEMENTS

n = number of fragments identified
g = weight of identified fragments
% = percentage of identified total

Skeletal element	n	g	%
Frontal	2	19	1.6
Parietal	5	36	3.0
Occipital	7	52	4.5
Temporal	9	19	1.6
Facial	12	27	2.3
Alveolar	4	29	2.4
Teeth	3	1	0.1
Cranial	117	206	17.4
Head	159	390	32.9
Vertebrae	33	32	2.7
Innominates	6	19	1.6
Ribs	31	15	1.3
Scapula/clavicle	5	16	1.4
Thorax	75	82	6.9
Femur	8	126	10.6
Tibia	7	64	5.4
Fibula	2	14	1.2
Humerus	2	16	1.4
Radius	2	9	0.8
Ulna	2	20	1.7
Patella	2	10	0.8
Hands/feet	45	63	5.3
Long bones	128	390	32.9
Limbs	196	712	60.1

bone fragments are black or grey. This incomplete incineration may be due to muscle-shadowing. All body parts are represented in the deposit, including many of the smaller skeletal elements. The distribution of skeletal elements in each body part is summarised in Table 2. There were no animal remains included in the deposit.

Grave 2 (E65: 41)

This cist was also uncovered at the time of the initial discovery of the site and was roughly centrally located in the tumulus. The disturbance of the grave may account for the fragmentary and incomplete nature of the human remains therein. The cist contained two Bowls and the unburnt remains of two individuals. One of these was a middle-aged or older adult male while the other was a 6-7 year old child. Neither skeleton is complete and the bones are in very poor condition. The adult's skeleton is more complete than that of the juvenile. The following bones are present: fragments of the skull vault (most of which came from the left side of the head: the skull probably lay on its left side); fragments of the right scapula; the medial end of the right clavicle; the shaft of the right humerus and the distal end of the left; the shafts of both radii and the distal end of the right; the proximal end of the shaft of the left ulna; a portion of the left ilium; the right pubis; the shaft and distal end of the left femur (a sample for radiocarbon dating has been cut from this bone); a portion of the left patella; the right scaphoid; the right first, third and fifth metacarpals; two hand phalanges; the right talus, calcaneus, cuboid, and navicular as well as fragments of the five right metatarsals, the third and fourth left metatarsals and three foot phalanges. These bones are all in a very poor condition. None of the dental remains of this individual were recovered.

The form of the external occipital protuberance and of the gonion angle of the left side of the mandible suggest that this was a male. The presence and severity of degenerative joint disease in this individual suggest that this adult was middle-aged (35-55 years) or even an older adult (55+ years). Unfortunately, most of the joints of the skeleton are not available for inspection because of the poor preservation. Of those that are available, many are arthrotic. This individual had mild arthrosis in the right wrist and right foot. The left knee had moderately severe arthrosis while there were severe degenerative changes in the vertebrae of the neck.

The remains of the juvenile are less complete than those of the adult. The following bones are present: fragments of the mandible; three of the maxillary teeth; the right clavicle; the distal end of the right humerus; the proximal end of the left femur; two lumbar vertebrae; portions of the body of the sternum; nine hand phalanges; the lateral four right metatarsals; the second left metatarsal and three foot phalanges.

The following teeth were present in the jaws at the time of death (the teeth in bold print had not erupted at the time of death):

1	**1 2**
7 6 d	b c 4 d e 6 7

The remaining tooth positions are not available for inspection. The state of eruption of the teeth indicate that this child was between six and seven years old at the time of death. No pathological changes or anomalies were noted in this skeleton. There were no animal remains in the cist.

Grave 3 (E65: 10)

This cist contained a Bowl and the crouched skeleton of a seven year old child. The skeleton is poorly preserved and the following bones are present: the skull; both scapulae; an unsided shaft of a humerus; both ilia; both femora; an unsided shaft of a fibula; six ribs; two unidentified metacarpals and three hand phalanges. The following teeth were present in the jaws at the time of death (unerupted teeth in bold print):

6 e d 4 c 3 2 1	**1 a 2 3 c 4 d e 6**
7 6 e d b 1	1 2 b c 4 d e 6 7

The remaining tooth positions are not available for inspection. The only pathological change noted in the remains was linear enamel hypoplasia on the two maxillary central incisors. These defects indicate that the child suffered some biological stress between the second and fourth years of life. The unburnt bones of a hoof of a pig were also found with this skeleton.

Grave 4 (E65: 11)

This small cist contained only 70g of cremated bone. No artifacts were found with the burial. As no skeletal elements occur twice, the remains appear to be those of one individual. Unfortunately, the collection is so small (only 162 fragments) it is not possible to determine either age or sex. The largest fragment recovered measures 50.1mm and is a portion of an unidentified long bone. The bones were well burnt and many are quite warped and distorted. The deposit is dominated by fragments of long bone shafts and portions of the cranium (50% and 47.7% of the identified total respectively). None of the smaller bones of the body are represented in the deposit nor were there any animal remains included with the cremation.

Grave 5 (E65:12)

This cist contained 1960g of cremated bone and a pottery rimsherd (E65: 12) possibly that of a miniature cup. A small bone pendant was also recovered. The remains from the grave are those of one individual – an adult male. It is not possible to be more specific about age and the sex is indicated by the morphology of the supraorbital ridges and the mastoid processes. The remains were very efficiently cremated. All fragments were totally calcined in the fire and many were warped and distorted by the heat and the weight of the pyre. The largest fragment is a piece of the shaft of a humerus and it has a maximum length of 146.9mm. There are many large fragments in this collection. These larger pieces of bone include portions of the cranium, many of the long bones and the vertebrae. Many of the centra of the latter are intact. The following teeth were present in the jaws at the time of death:

8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8
8 7 6 5 4 3 2 1	1 3 4 5 6 7 8

The remaining tooth position is not available for inspection. Both mandibular condyles were recovered as were the corresponding articular surfaces of the temporals. Both temporo-mandibular joints were mildly arthrotic.

Degenerative changes were also evident in the cervical and thoracic vertebrae. In the neck, at least three of the posterior joints were arthrotic whereas a mild degree of vertebral osteophytosis occurred on three thoracic vertebrae. A relatively large collection (88 fragments weighing 158g) of animal remains was found with this deposit. These remains were also calcined and were presumably burned along with the corpse rather than added to the deposit at a later stage. The only identifiable fragments among these are all cattle bones. These included a metacarpel, a magnum, a sesamoid, a naviculo-cuboid and three first phalanges. The retrieval of bones after cremation was carried out efficiently. All body parts are represented in the deposit and many of the smaller bones of the hands and feet were recovered. The distribution of identified bones is summarised in Table 3.

Grave 6 (E65: 15)

This bone deposit consisted of 477g of calcined bone and was recovered from an urn that had been placed in an unlined pit. A miniature cup had been placed in the Vase Urn with the bones. The remains were those of one individual: an adult male. The sex of this person was indicated by the form of nuchal crest of the occipital. The largest fragment had a maximum length of 62mm whereas the average fragment was between 10mm and 20mm long. All of the remains were completely calcined. The deposit was dominated by long bone fragments. Unfortunately, these remains were not available at the time of writing and could not be weighed in order to quantify the distribution of the identified fragments according to the body part from which they came.

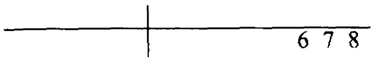
Only two tooth sockets were present. These were in a portion of the mandible. It was not possible to determine which side of the mandible these were from, but the sockets were probably for the first and second molars. No anomalies or pathological changes were noted in the remains. Fragments of animal bone were not found in this cremation.

Grave 7 (E65: 19)

This cremation was found in a simple unlined pit and there were no ceramics or other artifacts found in association with the bones. The cremation contains 1022g of calcined bone. Six very small fragments of unburnt human bone were also found. These latter included two fragments of ribs, one small portion of a vertebra, one small, unsided fragment of an innominate and two unidentified fragments. It is not possible to determine the age or sex of the individual from whom these small, unburnt fragments are derived. The deposit of calcined bone represents the remains of one individual. The form of the supraorbital ridges suggests that this person may have been a male. The state of fusion of the endocranial sutures and the degree of wear on the few tooth crowns recovered suggest that this may have been an older adult (55+ years). The bones were all very well burned and are uniformly calcined white. Many fragments are warped and distorted. All body parts are represented in the deposit and many of the smaller bones of the body were retrieved. The distribution of identified fragments per body part is summarised in Table 4. None of the alveolar bone with tooth sockets was recovered but the roots of incisors, canines, premolars and molars are present. Two bone fragments – the dens of the axis and an unsided proximal end of a radius – have evidence of mild degrees of degenerative joint disease. Three possible fragments of animal bone (weighing 2g) were found in this deposit. It was not possible to identify these bones.

Grave 8 (E65: 45)

This, the largest cist in the tumulus, contained a Bowl and a cremation. Some large deposits of calcium carbonate had formed in the cist since it was last used. Some of the bones had become encased in this material and these were extracted by hand. The cremation consists of 1463g of well-burnt bone. All of the remains are calcined and many of the bone fragments are warped and distorted. Many large pieces are included in the deposit and the largest present has a maximum length of 118mm. The remains are those of one individual. The morphology of the nuchal crest, the mastoid processes and of the sciatic notch suggest that this was a male. The presence of severe degenerative changes in the lower back (see below) might suggest that this was a middle-aged or older adult. The following teeth were present in the jaws at the time of death:



The remaining tooth positions are not available for inspection. Only three tooth roots are present in the deposit.

At least four of the five lumbar vertebrae were recovered. All of these had Schmorl's nodes and moderate to severe degrees of vertebral osteophytosis. None of the posterior lumbar joints was affected. These degenerative changes are severe and probably indicate that this man had led a life characterised by vigorous physical activity that involved lifting and carrying heavy loads. The presence of Schmorl's nodes indicates that he was introduced to these work practices while still an adolescent. Two possible fragments of calcined animal bone were found in the cremation. These could not be identified. This bone deposit is dominated by large fragments of burnt bone. Table 5 shows the distribution of skeletal elements retrieved in relation to the identified total. Cranial and long bone fragments comprise over 90% of the total. Very few of the smaller bones of the body were retrieved. Only three tooth roots were recovered. In this case, the retrieval of bone after the cremation seems to have been less comprehensive than in some of the other deposits.

Grave 8A (E65: 42 above paving)

This stone-lined cist was located in the north-east quadrant of the tumulus and the deposit of cremated bone lay on stone paving. A second deposit (E65: 43) was found underneath the paving stones and is described below. It seems likely that both deposits represent the same cremation. There were no associated artifacts. The bone group that lay on the paving of the cist consists of 1061g of cremated bone. The remains are those of at least two people. One was an adult whose sex cannot be determined while the other was a juvenile who was aged about 8-9 years at the time of death. The majority of fragments seem to represent the remains of the adult. The right petrous portion of the temporal and the left zygomatic are duplicated in the deposit. Many long bone fragments with unfused epiphyses also occur. It is not possible to be more specific about the age and sex of the adult. Some of the teeth of the juvenile were recovered. These include a first molar, the roots of which were nearly complete at the time of death. This suggests the age range given above. The largest

Table 6 : GRAVE 8A (ABOVE)
DISTRIBUTION OF SKELETAL ELEMENTS

n = number of fragments identified
g = weight of identified fragments
% = percentage of identified total

Skeletal element	n	g	%
Frontal	2	2	0.2
Parietal	21	31	4.3
Occipital	10	15	2.1
Temporal	12	15	2.1
Facial	10	6	0.8
Alveolar	16	9	1.3
Cranial	345	220	30 5
Head	432	302	41.9
Vertebrae	66	22	3.1
Innominates	11	20	2.8
Ribs	91	29	4.0
Scapula/clavicle	7	23	3.2
Thorax	175	91	12.6
Femur	5	15	2.1
Tibia	3	11	1.5
Fibula	4	12	1.7
Humerus	4	23	3.2
Radius	2	4	0.6
Ulna	4	11	1.5
Patella	1	1	0.1
Hands/feet	45	29	4.0
Long bones	118	222	30.8
Limbs	186	328	45.5

Table 7 : GRAVE 8A (UNDER)
DISTRIBUTION OF SKELETAL ELEMENTS

n = number of fragments identified
g = weight of identified fragments
% = percentage of identified total

Skeletal element	n	g	%
Frontal	2	2	0.5
Parietal	14	24	5.7
Occipital	4	5	1.2
Temporal	7	19	4.5
Facial	12	9	2.1
Alveolar	10	5	1.2
Cranial	243	111	26.4
Head	307	180	42 8
Vertebrae	73	28	6.7
Innominates	0	0	0.0
Ribs	82	24	5.7
Scapula/clavicle	3	3	0.7
Thorax	158	55	13.1
Femur	10	17	4.0
Tibia	3	16	3.8
Fibula	1	1	0.2
Humerus	1	7	1.7
Radius	2	7	1.7
Ulna	3	6	1.4
Patella	2	4	1.0
Hands/feet	45	24	5.7
Long bones	68	104	24.7
Limbs	135	186	44.2

Table 8: GRAVE 9:
DISTRIBUTION OF SKELETAL ELEMENTS

n = number of fragments identified
g = weight of identified fragments
% = percentage of identified total

Skeletal element	n	g	%
Frontal	0	0	0.0
Parietal	0	0	0.0
Occipital	0	0	0.0
Temporal	0	0	0.0
Facial	0	0	0.0
Alveolar	1	5	11.6
Teeth	1	1	2.3
Cranial	5	8	18.6
Head	7	14	35.6
Vertebrae	0	0	0.0
Innominates	0	0	0.0
Ribs	4	1	2.3
Scapula/clavicle	0	0	0,0
Thorax	4	1	2.3
Femur	0	0	0.0
Tibia	1	7	16.3
Fibula	0	0	0.0
Humerus	0	0	0 0
Radius	0	0	O O
Ulna	0	0	0,0
Patella	0	0	o o
Hands/feet	3	2	4 7
Long bones	9	19	44.2
Limbs	13	28	58.1

Table 9: GRAVE 10:
DISTRIBUTION OF SKELETAL ELEMENTS

n = number of fragments identified
g = weight of identified fragments
% = percentage of identified total

Skeletal element	n	g	%
Frontal	5	15	1.2
Parietal	23	80	6.3
Occipital	5	30	2.4
Temporal	20	43	3.4
Facial	11	12	1.0
Alveolar	20	29	2.3
Teeth	56	8	0.6
Cranial	200	170	13.4
Head	340	387	30.5
Vertebrae	104	66	5.2
Innominates	20	49	3.9
Ribs	109	28	2.2
Scapula/clavicle	7	14	1.1
Thorax	240	157	12.4
Femur	8	35	2.8
Tibia	16	70	5.5
Fibula	11	21	1.7
Humerus	8	46	3
Radius	5	16	1.3
Ulna	6	30	2.4
Patella	1	8	0.6
Hands/feet	120	76	6.0
Long bones	229	421	33.2
Limbs	404	723	57.1

fragment recovered has a maximum length of 73.5mm (portion of the shaft of a tibia) whereas the average fragment size is closer to 10mm. In the remains of the adult, portions of alveolar bone suggest that the following teeth were present at the time of death:

2 1	1 2

Unfortunately, none of the remaining tooth positions were available for inspection. None of the tooth sockets from the skull of the juvenile were recovered. However, some calcined tooth roots from that individual were identified. These include the first molar mentioned above, a deciduous second molar and an unerupted permanent premolar. No anomalies or pathological changes were noted in the remains of either individual in this deposit.

These bones were not as efficiently burned as most of the other cremation deposits recovered from the site. About 30% of bone fragments are moderately underfired and are grey/black in colour rather than the characteristic chalk-like white of efficiently burned bone. Interestingly, the remains of both the adult and the juvenile share this firing pattern. This may suggest that they were cremated in the same pyre rather than burned separately and their remains mixed at a later date. In the adult, most of the underfired bones are fragments of long bone. In the juvenile, the skull and vertebrae are less well fired than the limbs. This may be the result of the different positioning of the individuals in the pyre. The remaining 70% of bone fragments was well-burned and many of those fragments were warped and distorted by the heat and weight of the pyre. If the burning of the corpses was less than efficient, the retrieval of burnt bone appears to have been reasonably meticulous. All body parts are represented in the deposit and many of the small bones of the wrists and feet were recovered. Table 6 summarises the distribution of identified fragments by body part. Five unburnt non-human bones were found with this cremation. Two of these are from small birds whereas the remainder could not be identified.

Grave 8A (E65: 43 under paving)

The deposit found under the paving stones consists of 712g of cremated bone. The remains of at least three people are present in this bone group. Two of these were adults while the third was a juvenile who was aged about ten years at the time of death. There are four petrous portions of the temporal in the deposit. One of these is from a left temporal while three are from the right. One of the former belongs to a juvenile while the remainder are from adults. This is the only indicator that the remains of two adults are present. The disparity between the adult remains and those of the juvenile is obvious. It is not possible to be more specific about the age and sex of the adult individuals. There is no duplication of remains between this deposit and that found over the paving in the cist. The average fragment size in both groups is similar. In the deposit under the paving, the largest piece of bone has a maximum length of 77.5mm and is a portion of the shaft of a tibia. Furthermore, the burning pattern of both deposits is similar and this is unlike the pattern found in any other deposit at the site. When the identified fragments in each deposit are expressed as percentages of the identified totals (compare Table 6 with Table 7) the figures are very close to one another. The age-profiles for both deposits are also similar and it seems most likely that the two deposits represent the remains of the same people.

As was the case with the larger deposit from this grave, the bone group found underneath the paving contains only small fragments of alveolar bone and it is not possible to determine which teeth were present in the jaws at the time of death of either of the three individuals present. A small number of tooth roots were recovered. Only molars and premolars are present among these teeth. At least four of these belong to the juvenile. These indicate that this child was about ten years old at the time of death. In the adult remains, no anomalies or pathological changes were encountered. In those of the juvenile, the anomaly noted was the presence of multiple Harris lines – growth arrest lines – in a fragment of the distal femur of this child. These suggest that this juvenile suffered periodic bouts of some unspecified form of biological stress. The lines are so numerous and evenly spaced that they might suggest that stress occurred on a seasonal basis. Again, about 30% of the bone fragments in this deposit are moderately underfired. The remaining 70% are calcined white and many are warped and distorted. In the adult remains, most of the less well burned fragments are portions of long bones though some of the vertebrae and bones of the hand are also underfired. All body parts are represented in the deposit and many of the smaller bones of the body were retrieved. This is especially so in the case of the juvenile, many of whose vertebrae and small bones of the hands and feet are present. These data are summarised in Table 7. Animal bones were not found.

Grave 9 (E65:24)

This grave consisted of a small, unlined pit that contained some undecorated sherds of a Vase Urn and a small cremation. The latter consists of only 53g of burnt bone. There were also large lumps of a calcium carbonate-like material adhering to the bones. The latter were removed from this by hand. Some bone may remain embedded in this material. Two very small fragments of unburnt bone were also found: one is tiny and unidentifiable, the other is the lamina of the vertebra of an infant. The cremated remains are those of one individual: an adult whose sex cannot be determined. It is not possible to be more specific about the age of this individual. The largest fragment in the deposit has a maximum length of 61.1mm and is a portion of the shaft of an unidentified long bone. No tooth sockets were recovered for this individual. The only tooth root recovered is a canine. No pathological changes or skeletal anomalies were noted in the remains. All were completely calcined and most were warped and distorted by the heat of the pyre. This small deposit is dominated by long bone fragments though many portions of the cranium were also retrieved. Many bones are not represented. These data are summarised in Table 8. Animal remains were not found.

Grave 10 (E65: 26):

This pit burial contained the fragments of a Vase Urn, a cremation and a bronze dagger with a bone pommel. The dagger had been subjected to intense heat and was presumably on the cadaver during the cremation process. The cremation consists of 1954g of burned bone. The remains are those of one individual. The form of the supraorbital ridge, nuchal crest, mastoid processes and of the sciatic notch all suggest that this was a male. The form of the endocranial sutures and the absence of degenerative changes suggest that

Table IO: GRAVE 11:
DISTRIBUTION OF SKELETAL ELEMENTS

n = number of fragments identified
g = weight of identified fragments
% = percentage of identified total

Skeletal element	N	G	%
Frontal	4	7	2.5
Parietal	7	14	5.0
Occipital	0	0	0.0
Temporal	4	3	1.1
Facial	3	6	2.1
Alveolar	6	9	3.2
Teeth	7	2	0.7
Cranial	86	82	29.1
Head	117	123	43.6
Vertebrae	3	1	0.4
Innominates	1	1	0.4
Ribs	10	3	1.1
Scapula/clavicle	0	0	0.0
Thorax	14	5	1.8
Femur	3	8	2.8
Tibia	1	5	1.8
Fibula	0	0	0.0
Humerus	0	0	0.0
Radius	1	3	1.1
Ulna	0	0	0.0
Patella	0	0	0.0
Hands/feet	8	4	1.4
Long bones	83	134	47.5
Limbs	96	154	54.6

Table 11: GRAVE 12:
DISTRIBUTION OF SKELETAL ELEMENTS

n = number of fragments identified
g = weight of identified fragments
% = percentage of identified total

Skeletal element	N	G	%
Frontal	2	7	1.0
Parietal	3	3	0.4
Occipital	1	2	0.3
Temporal	12	24	3.5
Facial	4	5	0.7
Alveolar	7	7	1.0
Teeth	14	5	0.7
Cranial	133	70	10.2
Head	176	123	18.0
Vertebrae	8	6	0.9
Innominates	1	2	0.3
Ribs	16	4	0.6
Scapula/clavicle	4	8	1.2
Thorax	29	20	2.9
Femur	3	20	2.9
Tibia	8	32	4.7
Fibula	2	4	0.6
Humerus	5	39	5.7
Radius	1	3	0.4
Ulna	2	3	0.4
Patella	1	1	0.2
Hands/feet	11	5	0.7
Long bones	265	434	63.5
Limbs	298	541	79.1

Table 12: GRAVE 13:
DISTRIBUTION OF SKELETAL ELEMENTS

n = number of fragments identified
g = weight of identified fragments
% = percentage of identified total

Skeletal element	N	G	%
Frontal	7	23	1.2
Parietal	25	38	2.0
Occipital	5	10	0.5
Temporal	22	48	2.6
Facial	37	29	1.6
Alveolar	34	44	2.4
Teeth	128	27	1.5
Cranial	446	388	20.8
Head	704	607	32.6
Vertebrae	169	134	7.2
Innominates	14	50	2.7
Ribs	251	118	6.3
Scapula/clavicle	14	50	2.7
Thorax	448	352	18.9
Femur	10	55	2.9
Tibia	8	42	2.3
Fibula	10	49	2.6
Humerus	4	24	1.3
Radius	6	24	1.3
Ulna	8	14	0.8
Patella	1	9	0.5
Hands/feet	152	78	4.2
Long bones	254	610	32.7
Limbs	452	905	48.5

this was a younger adult. The largest fragment in the deposit is a piece of long bone shaft and has a maximum length of 106.7mm and there are many relatively large pieces of bone. The following teeth were present in the jaws at the time of death:

8 7 6 5	2 1 | 1

The remaining tooth positions are not available for inspection. This individual had a diastema between the lower central incisors and a large torus on both lingual surfaces of the mandible. The right orbit was recovered. This has a mild degree of cribra orbitalia. There is also a mild degree of porotic hyperostosis on some of the cranial fragments. Both of these conditions are probably manifestations of iron-deficiency anaemia. This individual also had a healed fracture in the midshaft of an unidentified metacarpal. All of the remains were very thoroughly cremated. All of the fragments are calcined and many are warped and distorted. All body parts are represented in the deposit. Many of the small bones of the wrist, hands and feet were retrieved. These data are summarised in Table 9. Animal remains were not found.

Grave 11 (E65: 31)

This cremation was found in a small stone-filled pit adjacent to the capstone of Grave 8 and consists of 438g of calcined bone. No artifacts were found with the bones. The remains are those of one adult individual. The form of the supraorbital ridge suggests this person may have been male. It is not possible to be more specific about age. The largest fragment is a piece of the shaft of a long bone and has a maximum length of 58.2mm. None of the tooth sockets are present in this bone group. A number of tooth roots are present. These are from molars and premolars only. No anomalies or pathological conditions were noted in the remains. All of the bones are calcined and warped, suggesting an efficient cremation process. This deposit is unusual in that some of the remains have a weathered appearance and from its size it is clear that not all of the remains of this adult are represented. This small deposit is dominated by fragments of long bone and of the cranium. A few of the smaller bones of the body were also retrieved. These data are summarised in Table 10. No animal remains were found.

Grave 12 (E65: 35)

Like Grave 11, this pit burial was adjacent to the capstone of the large cist, Grave 8 but did not contain stones. No artifacts were buried with the bones. The burial deposit was a cremation weighing 940g. The remains are those of one individual: an adult. The form of the supraorbital ridge and of the mastoid processes indicate that this was a male. The largest fragment in the deposit has a maximum length of 93.3mm and is a portion of the shaft of a humerus. None of the tooth sockets were recovered. However, the roots of incisors, canines, premolars and molars are present in the deposit. No pathological conditions or skeletal anomalies were noted in the remains. All of the bones were calcined and had been thoroughly burned. Many were warped and distorted by the heat and weight of the pyre. As was the case with the bones in Grave 11 nearby, many of the bones in this deposit have a weathered appearance. The retrieval of bones was biased in favour of long bone fragments. This is clear from Table 11 which summarises the data on the body parts represented. However, some of the smaller bones of the body were also retrieved. A fossil cockle shell and a small crinoid were found with the bones. Animal remains were not found.

Grave 13 (E65: 49)

This grave was a rectangular cist which contained two Bowls and the largest deposit of cremated bone found at the site – 3691g. The remains of at least four people are present in the deposit. Two of these were adults and two were juveniles. The form of one of the supraorbital ridges suggests that one of the adults was a male. The state of epiphyseal fusion and the dentition suggest that one of the juveniles was aged about 9-10 years at the time of death. The presence of a few deciduous molar crowns suggest that the other juvenile was aged between six and twelve months. There was duplication of the following skeletal elements: the frontal bone (two adults), the left petrous portion of the temporal (two juveniles, one adult), the mandible (two adults, one juvenile), the teeth (1 adult, 2 juveniles), the femur (adult and juvenile), the metacarpals (adult and juvenile), the first cervical vertebra (one adult, one juvenile), the right scapula (one adult, one juvenile) and the right innominate (adult and juvenile). The largest fragment in the bone group has a maximum length of 86.4mm (portion of the shaft of a fibula). There are many other large fragments in the deposit. Portions of two adult mandibles are present as is a piece of a maxilla. These suggest that the following teeth were present in the jaws of at least one of these individuals at the time of death:

	6 5 4 3 2 1 |
7 6 5 4 3 2 1 | 1 2 3	5 6 7 8

The two adult individuals may be represented in these alveolar remains. The remaining tooth positions are not available for inspection. The following teeth were present in the jaws of the older child at the time of its death (the tooth in bold print had not erupted at the time of the child's death):

	1 | 1 1 2 3 d **4** e

The second juvenile's dentition is represented by some deciduous molar crowns. The only pathological change noted in the remains is on one of the lumbar vertebrae of one of the adults. This bone has a large Schmorl's node on one of its surfaces. This condition is produced by the herniation during adolescence of the core of the intervertebral disc. It indicates that the individual involved subjected his back to compressive forces, such as would occur with the lifting and carrying of heavy loads. All but just a few of the bones in this deposit are totally calcined and many are warped and distorted. The few bones that are not totally calcined are moderately underfired. There is no distinction between the remains of the different individuals in terms of burning patterns. All were efficiently cremated.

The youngest juvenile (aged 6-12 months at death) is represented mostly by just its dental remains. This is not surprising as the bones of a child of that age would not be fully calcified and might not survive the cremation process. All body parts of the other three individuals seem to be represented. The retrieval of cremated bone was meticulous. Many of the smaller bones of the hands, wrists and feet were

recovered as were many small fragments of the ribs. Table 12 summarises the distribution of identified fragments by body part. Twenty fragments of animal bone were found in this deposit. Four of these had not been burnt and may be frog bones. These probably represetn a more recent intrusion into the cist. The remaining 16 fragments come from larger mammals and had been burnt. It was possible to identify three of these fragments. These were all cattle bones and consisted of a metacarpel, a second phalanx and third phalanx.

Bones Adjacent to the Stone Alignment (E65: 32)

The label accompanying this bone group states that the bones were 'found within [the] stone alignment below grey "leach" band and below level of Grave 8A and east of it.' The remains consist of 20 small fragments of unburnt human bone and one fragment of calcined human bone. The calcined fragment is a portion of the long bone of an adult. The unburnt remains are very poorly preserved and it is not possible to identify many of these. They seem to all be from a juvenile: probably aged between five and ten years. It was possible to identify the following: the shaft of a humerus, the distal epiphysis of a femur, a right scapula and a number of metatarsals. No pathological changes or skeletal anomalies were noted.

Miscellaneous Bones

A small collection of bones (E65: 4) was gathered by some local people at the time of the discovery of the site. The remains were reported to have been found in the vicinity of Grave 2. The collection contained a mixture of both human and animal remains. The animal remains consist of two small unidentifiable and unburnt fragments of bone. The human remains are cremated and consist of 27 small fragments (37g). Of these, 16 fragments (22g) are portions of long bone shafts. The remaining 11 fragments (15g) are from a skull. There is no duplication of skeletal elements so one individual seems to be represented in the remains, though the small size of the collection must be stressed. The remains are probably those of a adult and the calcined nature of the bone fragments indicate that the corpse had been efficiently burned soon after death. The provenance of these remains is uncertain. The grave in the vicinity of which they are reputed to have been found, namely Grave 2, did not contain any cremated remains so they are more likely to have come from the cremation deposit in Grave 1 which was discovered at the same time.

Another small collection of remains (E65: 5) was recovered at the time of the discovery of the tumulus and its provenance is also uncertain. The bones were said to have been found over Grave 2. The collection contains both cremated and unburnt bones. Of the nine fragments of unburnt bone, seven are animal bones which could not be identified. Some of these have the characteristic marks produced when rodents gnaw on dried bone. The two unburnt human bones belong to an infant. These are the petrous portion of the right temporal and the shaft of a long bone, possibly the femur. The human bones had not incurred any rodent damage. The 25 fragments (50g) of cremated human bone in this collection represent the remains of at least one adult individual. As is the case with the previously described unprovenanced collection (E65: 4), fragments of long bone shafts predominate in the group, accounting for 19 of the fragments (42g). The remaining six pieces of bone are all portions of the skull vault. Grave 2 contained the unburnt remains of an adult male and a 6-7 year old child and there were no animal bones: these unprovenanced remains are clearly not from the same collection.

Other miscellaneous bone groups examined include a small collection consisting of 17 unburnt fragments of animal bone (E65: 20); a group containing nine fragments of unburnt animal bone (E65: 22); and two small unburnt fragments of animal bone (E65: 34). None of the animal bones could be identified to species. A label accompanying another bone group (E65: 46) states that they were 'found near [the] base of [the] cairn between Graves 2 and 8'. The remains consist of six unburnt fragments of a human skull and one unidentified skull fragment that may belong to an animal. The six pieces of human bone all belong to the right portion of the frontal bone of an adult. The frontal was broken in antiquity. It is not possible to determine the sex of this individual. No skeletal anomalies or pathological changes were noted.

DISCUSSION

If the two cremation deposits in Grave 8A are accepted as representing one burial event of the remains of the same group of people, the site contained 14 formal graves. The two small unprovenanced deposits of cremated bones could have come from Grave 1 and will not be considered further. The skull fragments (E65: 46) at the base of the mound and the unburnt remains of the juvenile (E65: 32) found within the alignment of stones and adjacent to Grave 8A appear to represent token deposits. Of the 14 formal graves, two contained unburnt skeletons only, while there were cremations in the remaining 12 graves. Six graves (42.8%) contained the remains of more than one individual. However, in three of these cases (Graves 1, 7, and 9) only a few small, unburnt fragments of a second individual were found with the cremation. In Graves 1 and 9 these unburnt bones belonged to infants while the few fragments in Grave 7 could not be identified but seemed to be human. These are probably more accurately described as token deposits rather than multiple burials. Graves 2, 8A and 13 were multiple burials (i.e. 21.4% of total number of graves) in that each contained the substantial remains of at least two individuals. In Grave 2, none of the remains were burnt whereas the bodies in Graves 8A and 13 had been cremated. When the small, unburnt token collections are included, the minimum number of individuals at the site is 25. Twenty-three of these were interred in Graves 1-13 while the skull found at the base of the cairn and the unburnt juvenile found in the vicinity of Grave 8A bring the total to 25.

Given the problems that occur with demographic analyses of cremated material, it would be unwise to over-interpret these data. However, some general points can be made.

Age and Sex

Both adults and children merited burial at the site. The nine juveniles (i.e. <18 years) comprise 36% of the total MNI. The inhumation of a seven year old in Grave 3 is the only instance in which a child was buried alone. In all of the cremations where juvenile remains occur, the bones of the children were mixed with those of at least one adult.

Of the minimum of 14 adults identified in the bone groups, it was possible to suggest the sex of nine. All of these were males or probable males. This might suggest that a

gender bias operated in determining which members of the community or communities merited burial there. There does not seem to have been any discrimination based on age in terms of access to this burial ground. The presence of juveniles has been mentioned above. The adults buried at the site included younger, middle-aged and older individuals.

Pathology

The most common pathological change noted in the remains was Degenerative Joint Disease. This is the result of the normal 'wear and tear' exerted on the joints by everyday activities. The condition is, therefore, directly related to age and can reflect specific activity patterns. At least six individuals had the condition. The back was affected in all cases while a few individuals had problems in other joints as well. In most cases, the joint surfaces were destroyed during the cremation process so the condition was probably more prevalent than these data suggest. The distribution and severity of Schmorl's nodes and vertebral osteophytosis suggest that these people led vigorous, physically active lives. In particular, the presence of Schmorl's nodes suggests that their daily activities involved lifting and carrying heavy loads. The presence of multiple Schmorl's nodes in the vertebrae of the 15-18 year old interred in Grave 1 suggests that adolescents were introduced to adult work practices at a relatively early age. The treatment of this individual after death might also suggest that this subadult was already regarded as a full member of the community.

Apart from the lower back, the neck seems also to have been at risk of developing degenerative changes. Three of the adult males had arthrotic changes in the posterior joints of the vertebrae of the neck. Similar patterns have been encountered in Neolithic groups from Annagh, Co Limerick (Ó Donnabháin 1994) and from Poulnabrone, Co. Clare (Lynch and Ó Donnabháin 1994). The evidence was more conclusive at these latter sites where the material was not burned. The distribution and severity of the pathological changes in the neck suggested that the condition was related

Table 13: SUMMARY OF BURIAL ASSOCIATIONS

C = cremation; I = inhumation; FV = Food Vessel; U = urn; PC = pygmy cup;
YA = younger adult; MA = Middle-aged adult; OA = older adult; A = adult; I = infant;
NHB = non-human bone; EFV = Enlarged Food Vessel;
DJD = Degenerative Joint Disease; LEH = linear enamel hypoplasia;
HL = Harris lines; CO = cribra orbitalia; PH = porotic hyperostosis; HF = healed fracture

Grave	Type	Rite	Age	Sex	Artifiacts	NHB	Pathology
1	Cist	C	I, 15-18	? , ?	FV	No	DJD
2	Cist	I	OA, 6-7	M, ?	2FV	No	A: DJD
3	Cist	I	7	?	FV	Yes	LEH
4	Cist	C	?	?	None	No	None
5	Cist	C	A	M	Pygmy, cup rim?	Yes	DJD
6	Pit	C	YA/MA	M	U, PC	No	None
7	Pit	C	I, OA	?, ?M	None	Yes	DJD
8	Cist	C	MA/OA	M	FV	Yes	DJD
8A	Cist	C	2A, 9-10	?,?,?	None	Yes	9-10: HL
9	Pit	C	I, A	?, ?	U / FV	No	None
10	Pit	C	YA	M	U, dagger	No	CO;PH;HF
11	Pit	C	A	?M	None	No	None
12	Pit	C	A	M	None	No	None
13	Cist	C	1, 9-10, 2A	M, ?,?,?	2FV	Yes	DJD

Table 14: SKELETAL RETRIEVAL BY BODY PART

% = percentage of identified total
FV = Food Vessel; U = Urn; PC = Pygmy Cup
EFV = Enlarged Food Vessel; NHB = non-human bone

Grave number	Head %	Thorax %	Limbs %	Weight	Grave Type	Artifacts	NHB
1	16.9	24.8	58.3	1549	Cist	FV	None
4	47.7	2.3	50.0	70	Cist	None	None
5	30.2	28.4	41.5	1960	Cist	Pygmy cup rim?	Yes
6	N/A	N/A	N/A	477	Pit	U, PC	None
7	31.9	9.4	58.7	1022	Pit	None	Yes
8	32.9	6.9	60.1	1463	Cist	FV	Yes
8A above	41.9	12.6	45.5	1061	Cist	None	Yes
8A under	42.8	13.1	44.2	712	Cist	None	None
9	35.6	2.3	58.1	53	Cist	U/FV	None
10	30.5	12.4	57.1	1954	Pit	U, dagger	None
11	43.6	1.8	54.6	438	Pit	None	None
12	18.0	2.9	79.1	940	Pit	None	None
13	32.6	18.9	48.5	3691	Cist	2 FV	Yes

to a specific habitual activity such as the regular portage of heavy loads using the head, neck and upper back.

The only evidence of trauma found in the remains was the healed fracture in a metacarpal of the younger adult male whose inurned remains were found in Grave 10. The commonest causes of this type of hand fracture are a fall on the hand or a blow to the knuckles as occurs in boxing (Adams 1983). As this was the individual buried with the bronze dagger, it is tempting to relate his injury to the latter possible cause.

All of the other pathological changes noted in the remains (linear enamel hypoplasia, cribra orbitalia, porotic hyperostosis and Harris lines) are non-specific indicators of biological stress. They suggest that at least some members of the communities from which these individuals were drawn were subjected to occasional bouts of systemic stress. The distribution of Harris lines in the 9-10 year old in Grave 8A suggests that, in the case of this child at least, this stress may have been seasonal. Factors such as malnutrition, infectious disease or micro-organism infestation may have produced these conditions. However, given the small sample involved and the defective nature of the evidence provided by cremated remains, it would be unwise to speculate about general health status. Little can be said about the dental pathology of these people as the cremation process destroys much of the evidence. However, it is worthy of note that in all of the tooth sockets examined, there was not a single case of antemortem tooth loss nor were any periodontal bone defects encountered.

Disposing of the Dead: the Unburnt Skeletons

Grave 3 contained the crouched skeleton of a juvenile. The bones were in articulation when excavated and this was clearly a primary burial. The unburnt remains of two people – an adult and a child – were found in Grave 2 which, unfortunately, was disturbed when the site was discovered and it is not possible to say if the fragmentary skeletons in that grave represent primary or secondary depositions or to determine the sequence of burial. The remains of the juvenile (E65: 32) found at the base of the cairn were very fragmentary. The skeleton is far from complete and the bones do not seem to have been in articulation when excavated. This may represent the secondary deposition of a skeleton or of a portion thereof. The portion of a skull (E65: 46) found at the base of the cairn was broken in antiquity. This find is not without parallel: fragments of the parietal bones of a young adult were found on the old ground surface under the cemetery cairn at Longstone, Co Tipperary (Ó Donnabháin unpublished). These parietals were the only unburnt remains found at the site and their mode of burial was suggestive of a dedicatory deposit. The frontal at Grange may have served a similar function.

The Processing of the Dead: Burning the Corpse

Table 13 provides a summary of the burial rite that obtained in each grave along with relevant data on demography, grave type, as well as artifactual and animal bone associations. There is no obvious patterning in the distribution of artifacts or in grave type that would explain why some bodies were cremated and others were interred unburnt or why five of the cremations and one inhumation contained more than one individual. It is worthy of note that both graves which had more than one pot contained multiple individuals. However, not all multiple burials contained ceramics.

Where the corpse was cremated, this was done efficiently. In all cases cremation was carried out soon after the death of the individual. This can be determined by the burning patterns of the bones: the burning of the fat in the soft tissue surrounding fresh bone raises the temperature in a pyre and produces the characteristic cracking that is seen in all of the cremations from this site. The complete incineration of a body is not something that is easily achieved and would have required care and planning. In a modern crematorium, bodies are placed in gas-fired furnaces and usually take between one and two hours to burn. This is a controlled environment where temperature and oxygen intake can be regulated. In the Bronze Age, a number of variables could have had an effect on the efficacy of the operation. Weather conditions would have to be favourable. Rain would dampen fuel and the pyre itself. Wind could produce too much or too little draught. Sufficient fuel would have to be gathered to maintain high temperatures for several hours. The choice of fuel would have been important: material that produced too much ash could reduce the oxygen intake and smother the fire. Temperatures probably varied across a pyre with the centre being hotter than the periphery. To ensure that all body parts were burned, it may have been necessary to regularly rake the ashes at the periphery of the pyre and push incompletely fired bones back into the hottest part of the conflagration. This clearly demands a lot of planning, fuel and human resources that would not have been necessary if the body were simply inhumed unburnt. The fact that it was done efficiently every time suggests that the complete incineration of a cadaver was an important element in the burial tradition that obtained at the site. Unfortunately, no pyre material was recovered with the remains. This may reflect the care with which the bones were retrieved from the ashes. Whatever material the latter was constructed from, it seems that in all cases at Grange the corpses were placed under or in the middle of the pyre rather than on top of it. This is because of the degree of warping and distortion seen in the bones. This does not occur in cremations carried out at modern crematoria and it seems to be a function of the weight of the pyre.

The Retrieval of Bone Fragments

The efficient cremation of an adult human body usually produces between 1600 and 3500g of calcined bone, with an average of about 3000g (McKinley 1989). The weight of calcined bone depends on the stature and build of the individual and the cremated bone will weigh roughly the same as the dry, unburnt skeleton of the same person. While many bones break in the heat of the pyre or furnace, large fragments usually survive from all parts of the body. Vertebrae and the small bones of the hands and feet often remain virtually intact while long bones and the bones of the pelvis break into just a few pieces each. Skulls usually shatter in the conflagration but can often be reconstructed, at least partially. In modern crematoria, burnt remains such as these are mechanically crushed to produce more innocuous 'ashes'.

At Grange, while the complete combustion of bones was always achieved, the retrieval of bone fragments after the pyre had cooled varied in its efficiency. Only four of the deposits fall within the range of the weights produced by the cremation of an adult human body – Graves 1, 5, 10, and 13. The last of these contained the remains of four individuals,

Table 15: CREMATION FRAGMENTATION:

PERCENTAGE OF TOTAL WEIGHT OF EACH DEPOSIT PER MESH SIZE

Grave	10 mm	5 mm	3.35 mm	1 mm	<1 mm
1	65.7	23.5	3.7	4.1	2.9
4	57.1	34.3	4.3	2.9	1.4
5	72.7	15.5	3.2	4.14.6	
7	70.8	21.9	2.8	2.4	2.0
8	83.3	15.3	0.8	0.3	0.4
8A above	67.3	29.2	1.8	0.8	0.9
8A under	57.3	38.8	1.9	0.8	1.1
9	84.6	13.5	1.0	1.0	0.0
10	66.8	23.9	4.9	3.1	1.3
11	67.6	28.8	2.3	1.1	0.2
12	67.4	30.4	1.2	0.5	0.4
13	62.8	28.5	4.4	2.8	1.6

two of whom were adults. In order to try to quantify the efficiency of bone retrieval, identified bone fragments from each body part were weighed and expressed as a percentage of the identified total (see Tables 2-12). Table 14 summarises these data where the body is divided into three major parts: the head, thorax and the limbs. It also lists the weight of the cremations, the grave type and any associated artifacts. In an average adult skeleton (roughly the same weight as a total cremation) the percentages of the total weight attributable to each of the three major divisions listed in Table 14 would be: head 18.2%, thorax 23.1% and limbs 58.7%. It seems from Table 14 that there is no correlation between the efficiency of the retrieval of remains and either of the four parameters listed: the weight of the deposit, the grave type, artifactual associations or the presence or absence of animal remains. Other, less tangible factors could be involved. It has already been noted that few of the cremation deposits contain the weight of bone expected if the bones were efficiently collected and interred. The deposits at Grange may represent subsamples of each entire cremation and portions of each collection may have been retained for burial elsewhere or for some other use. The smaller cremation deposits recovered at the site such as those in Graves 4 and 9 are more suggestive of token burials. These could be subsamples of larger collections disposed of elsewhere rather than the result of a less than meticulous attempt at bone retrieval. The remains in Graves 11 and 12 may provide evidence of remains being stored prior to their ultimate disposal. Some of the calcined remains in both of these deposits were weathered. This may indicate that the remains from those two graves at least were deposited elsewhere for some time before being buried in the tumulus. However, taphonomic factors cannot be discounted in this case either. The microenvironment of this section of the mound could possibly have produced this effect though if that were the case, it might be expected in the other deposits as well.

Animal Remains

The animal bones encountered during the analysis of the human remains were examined by Dr Finbar McCormick of Queens University Belfast. Unfortunately, only a few could be identified at species level due to the fragmentary state of the remains. Animal bones were found with five of the cremations and with the unburnt body in Grave 3. The bones found with the latter skeleton were the unburnt remains of the hoof of a pig. The animal remains in the cremations had all been burnt except for the bird bones found above the paving in Grave 8A and the possibly intrusive frog bones found in Grave 13. Of the cremated animal remains, the only bones that could be identified were in Graves 5 and 13. In both cases, the bones were portions of the hooves of cattle. There is no clear discernible pattern in terms of which burials merited the inclusion of animal remains as these were found across the range of grave types found at the site. Animal remains were found both with burials that had ceramic associations and those that did not. However, neither of the urn burials had associated animal remains.

It is probably significant that all of the mammal bones that could be identified, whether burnt or unburnt, were the remains of the hooves of animals. In a survey of the occurrence of faunal remains in prehistoric burials from Ireland, McCormick (1986) found that the remains were often identified at species level and information about which parts of animal carcasses had been deposited was frequently absent. He also found that it was difficult to determine, particularly in older excavations, whether or not the animal remains represented deliberate acts of deposition. In the tumulus at Grange, the inclusion of faunal remains, particularly the hooves of animals that were exploited as sources of meat, appears to have formed an inherent part of the mortuary ritual. Where a cadaver was to be cremated, these animal parts were added to the pyre. Traditionally, animal remains included with prehistoric burials have been interpreted as representing food refuse. However, the deposition of the more inedible portions of animal carcasses has been noted in a number of prehistoric contexts (O'Sullivan et al 1985, McCormick 1986) and McCormick (ibid) has suggested that this may represent token offerings of the more important sources of meat. The use of animal bones, particularly the astragali of sheep/goat, as gaming pieces has also been suggested (ibid) though this seems unlikely at Grange as each context produced the remains of complete hooves. An alternative interpretation may be found in the belief systems of many traditional societies which associate different social groups with a particular plant or animal species. It is possible that the belief systems of some of those who buried their dead at Grange incorporated such totemic associations.

The Crushing of Remains

The modern practice of crushing cremated remains has been mentioned. In his pioneering work on the analysis of cremations from archaeological sites, Gejvall (1963) suggested that this was sometimes done in the past to facilitate the deposition of the remains in an urn. None of the remains from Grange appear to have been deliberately crushed. All cremations contained relatively large fragments of bone and the average fragment size was similar regardless of ceramic associations. Of the three inurned cremations – Graves 6, 9 and 10 – two (Graves 6 and 9) consisted of small, possibly token deposits that would have not have needed large containers. The urn in Grave 10 contained 1954g of bone, including many large fragments. Manchester (quoted in McKinley 1989) devised a method of quantifying fragment sizes whereby the cremation is passed through a series of sieves as described above. This was applied to the remains from Grange and the results are presented in Table 15.

These data confirm the subjective impression of a certain degree of uniformity in fragment size across the site. The inurned cremations do not differ to any great extent from those deposits that were not placed in such pots.

The quality of the ceramics recovered from the mound at Grange suggests that those who used the site were skilled in the industrial use of fire. The evidence provided by the human remains supports this assertion. Cremation technology was highly developed and this high standard of efficiency of burning was maintained throughout the period of use of the site. The maintenance of a gender bias through time has also been suggested. These indicators of continuity in cultural practices have interesting implications if the burials represent a long temporal span. They imply a general continuity in at least some elements of the burial tradition while changes occurred in other elements such as ceramic styles.

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