CHAPTER 27

Cremated bone
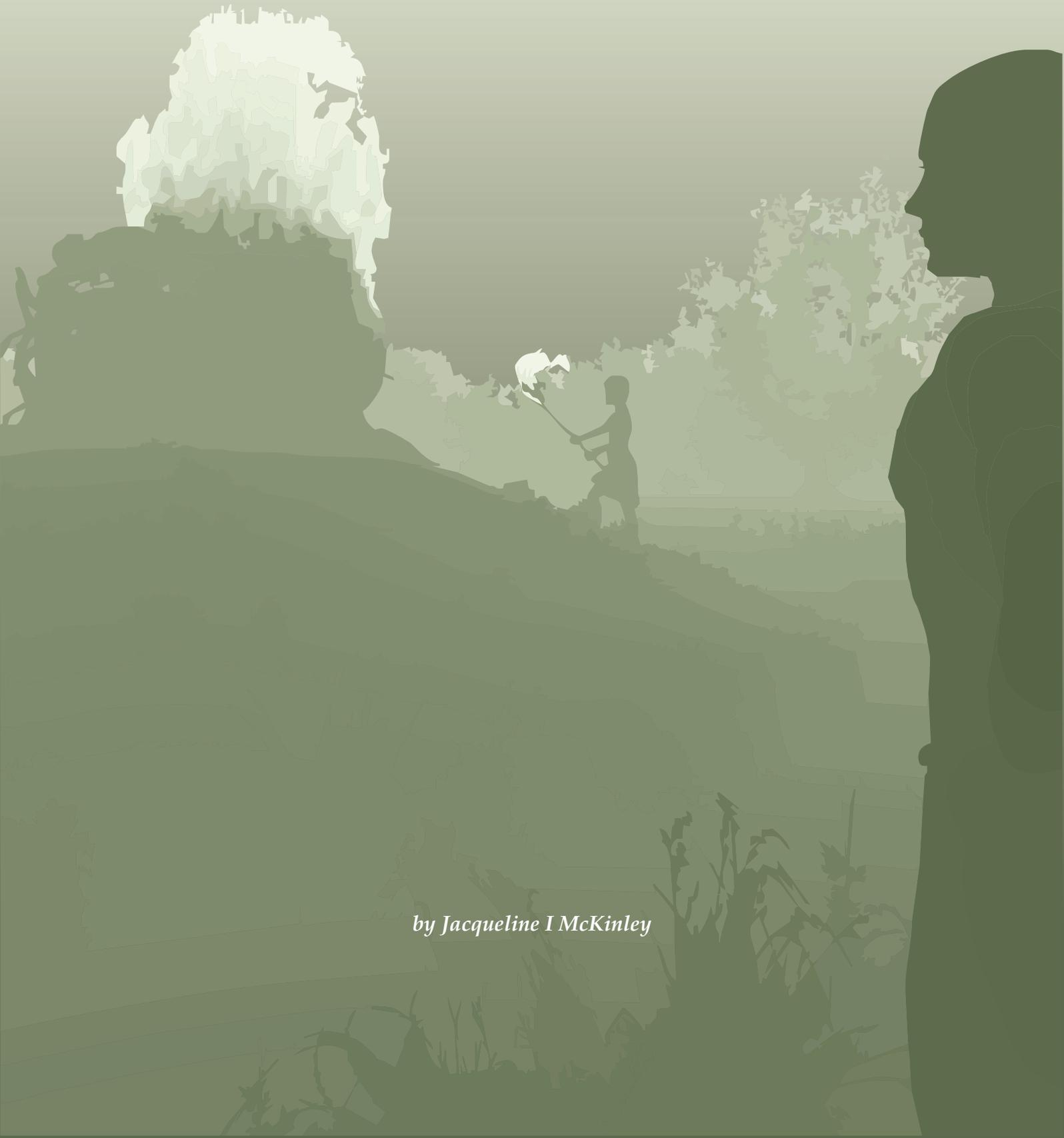
by Jacqueline I McKinley

27   Cremated bone

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Cremated human bone from 137 contexts was received for analysis, including 117 contexts from the MTCP site to the east of the present airport (BAAMP99 four contexts, BAAMP00 113) and 20 from the LTCP site on the west side of the airport (BAACP99 three contexts, BAACP00 17).

The deposits cover a broad temporal range from the Middle Bronze Age to the mid Romano-British period. All except one of the 46 Middle Bronze Age contexts were recovered from the MTCP site (Fig. 4.28), where most were associated with the ring ditch situated in the north-eastern area of the site; the one Late Bronze Age feature, also from the MTCP site, lay in an isolated position. The 21 Late Iron Age/early Romano-British contexts were split between the LTCP (12) and MTCP (9) sites (Figs 6.6-6.7, 6.16, 7.7-7.9, Plate 7.5). All except one of the 40 Romano-British contexts are from the MTCP site. Two other deposits, one from the MTCP site and one from the LTCP site, were undated.

The deposit types include 11 burials from the LTCP site and 28 from the MTCP site. Those from the former comprise the remains of four urned, five unurned and one burial of uncertain form, all of Late Iron Age/early Romano-British date, and one undated unurned burial. The burials from the MTCP site include 13 urned (two later Iron Age/early Romano-British, ten early Romano-British and one mid Romano-British), 10 unurned (two Late Iron Age/early Romano-British, seven early Romano-British and one mid Romano-British), and three of uncertain form (one Late Iron Age/early Romano-British and two early Romano-British). The categorisation of two other Late Iron Age and early Romano-British deposits is uncertain. The nature of the Bronze Age deposits is unclear but most included fuel ash and all were redeposited.

The fill of one grave (332014) from the MTCP site contained unburnt bone fragments from a young infant, probably redeposited.

Methods

Ten deposits (six from BAAMP00 and four from BAACP00) had been excavated as a series of between two and nine sub-contexts (spits or other internal sub-divisions) to allow greater detail of the burial formation process to be studied. These divisions were maintained throughout analysis (the weights of bone from these contexts are shown together in Table 27.1 but separately within the archive).

Recording and analysis of the cremated bone followed the writer's standard procedure (McKinley 1994a, 5-21; 2000a; 2004a). The small fraction residues (1 mm and 2 mm) were scanned by the writer; identifiable fragments were recovered and included within the recorded bone weights. A subjective note of the quantity of bone remaining amongst the unsorted residue was made and is presented in the archive.

Age was assessed from the stage of skeletal and tooth development (Beek 1983; Scheuer and Black 2000), and the degree of age-related changes to the bone (Brothwell 1972; Buikstra and Ubelaker 1994). Sex was ascertained from the sexually dimorphic traits of the skeleton (Bass

1987; Buikstra and Ubelaker 1994). The variable integrity of the attributed sex is denoted in Table 27.1 as; '??'most likely, '?' probable, and un-questioned.

Results

A summary of the results from analysis is presented in Table 27.1. Full details are in the archive.

Disturbance and Condition

Most of the cremation graves had suffered some level of disturbance as a result of either plough damage, the insertion of land drains or animal activity. The insertion of land drains generally affected only one part of the grave fill and may not have impinged on the remains of the burial itself. Plough damage generally resulted in truncation of the upper levels of the grave fill, but the severity of the damage and the affect on the remains of the burial varied. The surviving grave depths at the LTCP site ranged from 0.07 m to 0.40 m and the remains of unurned burials within graves of a minimum depth of 0.17 m survived undisturbed (denoted by * in Table 27.1). There is no record of the depth of most of the graves excavated on the MTCP site but from the few where measurements are given the range is similar to that from the LTCP site at between 0.06 m and 0.35 m; graves are otherwise described as 'very shallow', 'truncated' or 'disturbed'. Undisturbed urned and unurned burials were recovered from graves of between 0.18 m to 0.35 m in depth (* Table 27.1). In many cases, bone was visible at excavation surface level and it is likely that at least some bone will have been removed and lost from many graves. Disturbance to burials, even where little or no bone loss occurs, may result in pressure damage to the bone, reducing the size of the surviving bone fragments.

The majority of the bone is visually in good condition. A few fragments of bone (generally individual fragments) from 11 contexts (8%) appear slightly worn and/or chalky, with slight root marking in one instance; this includes fragments from a tree throw and one of the Bronze Age ring ditch deposits. In most cases, the affected bone is poorly oxidized (see below) which may have contributed to its slightly poorer level of preservation, though the contexts from which most of these fragments derived also contained other poorly oxidised bone which did not appear worn. There is only one instance (330053/5) where all the bone from a context appears worn and chalky. The implication is that the burial environment from which these worn fragments derived was slightly more acidic than elsewhere, suggesting the micro-environment within individual deposits could vary slightly.

Trabecular bone (the first to be lost in soil conditions adverse to bone survival; McKinley 1997a, 245; Nielsen-Marsh *et al.* 2000) is generally moderately or well represented within deposits. Of the *c* 18% of burials where trabecular bone is well represented most were urned and half – urned and unurned – were undisturbed. The natural geology within the area – as with much of Essex - comprises boulder clay with gravel patches, the acidic nature of which may be expected to result in low recovery of trabecular bone but such is not the case either at Stansted or at the nearby contemporaneous site at Strood Hall (McKinley 2004b). The additional protection afforded by an urn (forming a physical barrier between the bone and the soil matrix) appears to have been a significant factor in good bone survival, as does the lack of disturbance; disturbance potentially exposing the burial to a more aggressive burial microenvironment. The presence of fuel ash in *c* 41% of the grave fills may also have had a moderating effect on the natural soil acidity and have assisted in bone survival.

Although present, trabecular bone is not particularly well represented within the deposits from the Middle Bronze Age ring ditch, where all the bone was redeposited. The condition of the bone does not suggest prolonged exposure or repeated disturbance and redeposition; the one deposit comprising bone of chalky appearance was from the ditch re-cut. The nature of the original deposits is, however, uncertain, the quantities of bone in individual context is generally very small and in this instance there many be numerous additional factors affecting the quantity of trabecular bone observed (see *formation processes* below).

Demographic Data

The remains of a minimum of 48 individuals were identified within the cremated bone assemblage including; 12 from BAACP and 36 from BAAMP (Tables 27.2 and 27.3). One of the early Romano-British burials from BAAMP (330039) and one of the Late Iron Age/early Romano-British burials (5075) from BAACP may each have include bone fragments from a second individual but the evidence is not conclusive.

The Bronze Age deposits all comprise small quantities of bone and appear to represent redeposited material; all were in relatively deep features (0.21-0.31 m) but two had clearly been disturbed and some bone may have been lost. With the exception of the minimum of four individuals represented by the material from the ring ditch (Table 27.1), the deposits were widely dispersed and it is unlikely, given the distances involved, that any derived from the same original deposit and/or cremation. The minimum number of eight individuals from the assemblage as a whole is based on minimum number counts, assessed age and spatial distribution. One deposit may represent a disturbed and redeposited burial (334060) but the presence of the non-burial contexts indicate that cremation was undertaken in the area and burials derived from the same cremation as these deposits may exist in the vicinity or have been destroyed (see *formation processes* below). Large numbers of mostly urned Middle Bronze Age cremation burials have been recovered in association with ring ditches from Essex, including individual cemeteries containing up to 40 graves (Brown 1996, 26-29).

A minimum of 16, possibly 17, individuals were identified from the Late Iron Age/early Romano-British burials. Of the ten burials of this date from the LTCP site, seven formed a single-phased group associated with a series of small rectilinear enclosures, two others each lay within individual square mortuary enclosures some distance to the south-west, whist a singleton lay in a partially silted droveway ditch to the north-east. No immature individuals were identified within the small group from the LTCP area. Few of the adults could be attributed a closer age range than >18 yr., but the group includes at least two mature adults and one of >30 yr. It was possible to attribute sex to only three individuals (37%), including one female, one possible female and one possible male. The absence of immature individuals within the group is a little anomalous and may indicate an age-dependant distinction being made in the place of burial. The graves within the mortuary enclosures contained the remains of adults, both likely to be female, a few fragments of skull vault from one (5073) appearing to have derived from a second, younger individual. If such small quantities of immature bone was all that was routinely included in a burial, particularly those representing deposits from a dual cremation (see below), this may be one factor affecting the apparent dearth of immature individuals within the assemblage as a whole. The singleton buried within the ditch fill also represented the remains of an adult female (grave 143075). The small group-size and distribution of the graves seems typical for the late Iron Age period in this area, Whimster

(1981, 362-371) listing 43 sites in Essex where small groups or individual burials have been recovered, though some larger cemeteries did exist eg Mucking (30 burials; Sealy 1996, 58).

The six late Iron Age/early Romano-British burials from the MTCP area were interspersed amongst early Romano-British burials, together forming a small cemetery of 15 graves on the northern margins of the site, indicating a continuity of use and probably of population across the temporal range. A second, slightly smaller group of 11 early Romano-British burials lay to the south, with two 2nd-3rd century graves – the latest from the area – situated towards the eastern margins of the group.

As at the LTCP site there is a dearth of immature individuals, with just one infant in the northern group (328009, an early Romano-British dual burial), and one early Romano-British juvenile/subadult in each group, both >9 yr. (Tables 27.1 and 27.3). The one other young infant identified was represented by a single unburnt tooth crown redeposited in a Romano-British cremation grave fill; it may have been redeposited from an earlier phase or indicate differential treatment of the dead dependant on age. Although low, the proportion of immature individuals in the groups (*c* 11%) is similar to that observed in some other contemporaneous cremation cemeteries, for example; 13% from the Iron Age phases at King Harry Lane, St. Albans, Hertfordshire (Stirland 1989) and 12% from Westhampnett, West Sussex (McKinley 1997b); 8% and 13% from the early Romano-British cremation cemeteries at Puckeridge/Skeleton Green, Hertfordshire and Cirencester, Gloucestershire (Wells 1981) and King Harry Lane (Stirland 1989); 9% and 14% from the similarly multi-period cemeteries excavated at Stansted 1986-91 (Garland 2004, table 68) and at Strood Hall, Great Dunmow (McKinley 2004b). A variety of possible factors have been suggested to explain the relatively low proportions of immature individuals in these cases. The bone from Stansted is generally well preserved and there is no evidence to suggest loss of immature bone due to preferential destruction. The figures may indicate a low fertility rate, cultural factors resulting in the burial of young individuals elsewhere or, as discussed above, a masking of their presence within dual cremation burials.

The adults include both males and females, with close to even numbers of each being identified, though it should be noted that only 43% of adults were sexed. A broad age range is represented amongst the adults with at least one (early Romano-British) individual of over 45 years and eight (35% of adults) of more than 30 years.

The size and form of the grave groups on the MTCP site are similar to those observed in the earlier excavations at Stansted, where a total of 43 late Iron Age and Romano-British cremation burials, distributed as several small groups of up to 14 or as singletons, were found on the west side of the airport (Havis and Brooks 2004, fig 5).

An attempt at estimation of population size is hampered by the potentially broad temporal range and the probability that all members of the population were not being disposed of in the cemetery (ie immature individuals placed elsewhere?). There is some temporal overlap between these small cemeteries and they probably served individual households/farmsteads across the temporal range, the burial rate varying over time.

Pathology

A few minor pathological lesions were observed in the remains of 15 individuals (*c* 31% of the population) including; two Late Iron Age/early Romano-British, 11 early and one mid Romano-British, and the undated individual (Table 27.1).

Ante mortem tooth loss was observed in two of 18 dentitions (one female and one male), 12.5% of maxillary and 8% of mandibular; with the loss of a single molar in each instance. A small carious lesion was observed in the cervical region of one tooth root (female). Evidence for dental caries is rarely recovered from cremated bone assemblages due to the characteristic shattering of tooth crowns in cremation (McKinley 1994a, 11) and the calculation of rates would be misleading. Slight periodontal disease (alveolar resorption due to a gum infection) was observed in two dentitions (female and male).

Lesions related to some form of joint disease were observed in the remains of eight individuals; seven early and one mid Romano-British. Lesions indicative of osteoarthritis (Rogers and Waldron 1995) were observed in one joint surface of one early Romano-British female (328015). Degenerative disc disease, resulting from a breakdown in the intervertebral disc, generally reflects wear-and-tear and is related to age. Two individuals (early Romano-British) each had slight lesions in one cervical vertebra (*c* 4% vertebrae). Where they occur alone, osteophytes (new bone on joint surface margins) are largely seen as age-related. Slight lone lesions were seen in six individuals (five early and one mid Romano-British) across a range of spinal (four individuals) and non-spinal (four individuals) joints (Table 27.1); more than one joint was affected in two individuals.

Exostoses (new bone at tendon/ligament insertions) and various types of destructive lesions (including pitting) may develop in response to a number of conditions and it is not always possible to ascertain the specific cause of individual lesions (Rogers and Waldron 1995). Pitting, probably reflective of the early stages of degenerative joint disease, was observed in the remains of two individuals. Exostoses were observed at between one and three sites in three individuals; all were lone lesions and are most likely to be indicative of repetitive minor muscle stress.

Pyre Technology and Cremation Ritual

Efficiency of cremation

Most of the cremated bone from the majority of the deposits was white in colour, indicating a high level of oxidation (Holden *et al* 1995a and b). Some colour variation – hues of grey and blue to black (charred) – indicative of different levels of oxidation (*ibid.*) was, however, observed in variable quantities of bone fragments from most graves including 50% of the Late Iron Age/early Romano-British graves, 85% of the early Romano-British and both mid Romano-British graves. Bone from four of the Middle Bronze Age deposits also showed some variation in oxidation.

In *c* 31% of cases only a few bone fragments from a single skeletal element show variable oxidation; in *c* 28% of cases two skeletal areas are involved with some including several different skeletal elements; three skeletal areas are affected in 25% of cases; and all areas of the skeleton, often including all the major elements, in 13%. The bones of the lower limb are most frequently affected (*c* 38% of cases), elements of skull and upper limb less so (*c* 24% and 23%

respectively), and the axial skeleton relatively rarely (8% cases); the latter may be misleading since the trabecular bone of the axial skeleton may have been subject to preferential destruction whilst in the ground (see above). Less well oxidised bone may also have been subject to preferential loss due to soil acidity (see *condition*). The vault was most frequently subject to lower levels of oxidation amongst the skull fragments, particularly the endocranial surface and the diploe. In the upper limb, variations were most commonly observed in the humerus and ulna, with the bones of the hand being involved in only one Middle Bronze Age deposit and one early Romano-British burial. In the lower limb variations were most commonly seen in the femur. Variable oxidation across a single bone fragment was observed in several cases. Extensive poor levels of oxidation were seen in all periods including; two Middle Bronze Age deposits (316133 and 316136) from the southern segment of the ring ditch (probably the same individual), where some foot bones were either unburnt or just slightly scorched; one of the Late Iron Age/early Romano-British deposits (*c* 14% of those affected); half of the affected early Romano-British and both mid Romano-British case. Both males and females appeared to be similarly affected. There is no apparent distinction between the phases other than in the proportion of burials affected, or between the northern and western cemetery groups on the MTCP site.

Numerous intrinsic and extrinsic factors may affect the efficiency of cremation, a combination of which may come into effect in any one case. The incomplete oxidation of individual bone fragments is likely to reflect a specific factor late in the cremation process: for example, a bone fragment falling outside the confines of the pyre or falling through the pyre and becoming partly or fully buried within the fuel ash (cutting-off the heat and/or oxygen supply). Both observations could indicate a lack of tending of the pyre throughout the cremation process. Incomplete oxidation of specific skeletal areas may reflect intrinsic and/or extrinsic factors. For example: poor oxidation of the skull vault may be related to the peripheral position of the head on the pyre (insufficient heat), to the deceased wearing a leather/fur hat or hood (cutting off oxygen), or the head lying on a solid surface (deflecting the flame and cutting off oxygen supply); lack of oxidation to the feet may indicate a short pyre; crossing (and possibly, by implication, binding) the hands and forearms across the chest would shield them form the heat source for some time longer than other parts of the body; the mass of soft tissues around the hips and thighs slows down exposure of the underlying bone to burning. An overall shortfall suggest a more general problem; insufficient fuel for cremation, a cut-off in oxygen supply as may result if the individual was wrapped in or laid on a skin/fur, or curtailing of the process (inclement weather).

Although variability in degrees of oxidation is relatively common within the mortuary rite, the percentage of Romano-British burials containing bone with varying levels of oxidation is high in comparison with some other contemporaneous cemeteries eg up to *c*. 66% from the East London cemeteries (McKinley 2000b, 268-269), *c* 23% from the rural cemetery at Westhampnett (23%; McKinley 1997a), and *c* 5% from the northern-frontier cemetery at Brougham, (McKinley 2004c). Similarly high levels of poor oxidation were observed at the contemporaneous cemetery at Strood Hall (McKinley 2004b) and together the figures may reflect a regional variation in mortuary practice. Although variations in levels of oxidation were observed in the bone from the earlier excavations at Stansted, the skull apparently being most frequently involved as here, no figures are given (Garland 2004, 249).

Weights of bone for burial

The weights of bone recovered from individual burials varied from a minimum of 3.9 g from a heavily disturbed burial of unknown form (late Iron Age/early Romano-British) to a maximum of 1408.6 g from an undisturbed urned burial (early Romano-British), both from the MTCP site (Tables 27.1 and 27.4). The type of burial and level of disturbance represent primary factors in the average weights of bone recovered (McKinley 1994b); as demonstrated here by the noticeably higher average from the early Romano-British urned burials compared with the unurned ones and from the undisturbed burials compared with the rest (Table 27.4). The number of individuals within the burial and the sex of the individual appear to have no significance with regard to the quantity of bone. The one conclusive dual cremation/burial has a weight of 525.7 g, which is not the highest in its group (early Romano-British urned burials). The maximum bone weight from the assemblage as a whole (1408.6 g) was from the grave of an adult male, but the next highest weight (1220.5 g) was recovered from a the grave of a female.

The weight of bone recovered from the undisturbed urned adult burials represents *c* 13-88% (ERB) and 20.9% (MEB) of the average expected weight of bone from an adult cremation (McKinley 1993); that from the unurned burials *c* 15.6 – 51.7% (LIA/ERB) and 76.3% (MRB).

Comparison with other contemporaneous cemeteries is hampered by the low proportion of undisturbed deposits and the unknown level of bone loss from the rest. The maximum bone weights from the late Iron Age and Romano-British graves are generally in the upper ranges of weights of these dates and commensurate with those from Strood Hall and the earlier Stansted excavations, both of which had greater numbers of undisturbed deposits (Stirland 1989; McKinley 1997a, 68-9; 2004b; 2004c tables 6.5 and 6.6; Garland 2004, table 68). Cremation burials of any period very rarely, if ever, contained all the bone which would have remained at the end of cremation (McKinley 1997c; 2000a and c) and wide ranges in bone weights are common. It is currently unclear why such great variations existed; one potentially significant factor may be the 'status' of the individual, whatever criteria that may be measured by – wealth, occupation, or the esteem in which they were held.

Fragmentation

Numerous intrinsic factors may affect the size of cremated bone fragments including the nature of the material, the burial conditions, levels of disturbance and excavation/post-excavation processing of the bone (McKinley 1994a; 2000a; 2004c, 298). Here, as expected given the natural soil acidity and common disturbance to deposits, the recorded size of bone fragments is relatively small with most bone being recovered from the 5mm sieve fraction (Table 27.5). The increased bone fragmentation resulting from disturbance and the protection afforded by an urn being demonstrated by the figures for most periods (Table 27.5). There is no conclusive evidence to suggest deliberate fragmentation of the bone occurred prior to burial.

Skeletal elements

Bone fragments are classified as 'identifiable' only where they can be allocated to a specific bone. The ease with which this can be done depends on the level of fragmentation and on the area of the skeleton represented, eg small fragments of skull are more morphologically distinctive than small fragments of long bone shaft. Where only small quantities of bone

survive within a deposit the proportional amount of 'identifiable' bone may give a bias view of the skeletal elements present.

A wide range of between 14-53% of the bone from individual burials could be classified to skeletal element; 14-46% for the later Iron Age/early Romano-British, 23-55% for the early Romano-British and 27-35% for the mid Romano-British, with a slightly shorter range of 26-53% for the undisturbed burials. In general there appears to have been a 'normal' distribution of skeletal elements – some identifiable fragments from all four skeletal areas being present in most burials. Most variation was observed in the skull and axial skeleton categories. There is no convincing evidence to suggest that specific skeletal areas were being preferentially included or excluded from the burials.

Tooth roots and the small bones of the hands and feet are commonly recovered from cremation burials of all periods. Between one and 25 of these small skeletal elements (as distinct from small fragments of bone) were recovered from the majority of burials (*c*. 89%). The average frequency of occurrence is similar across the temporal range (Table 27.6). Although such elements occur with slightly greater frequency in the remains of unurned as compared with urned burials across the date range, the grave from which the greatest number of such small skeletal elements was recovered (328052) contained the remains of an urned burial. It is believed that the frequent presence of these bones may be linked with the mode of recovery employed to collect bone from the pyre site for burial, with *en masse* recovery followed by subsequent winnowing rather than the hand recovery of individual fragments (McKinley 2004b; 2004c, 300-1). The variability of their presence in the burials from Stanstead suggests a consistent mode of recovery of bone for burial was not necessarily followed for different cremations.

Pyre goods

Small quantities (0.2-4.5 g) of cremated animal bone were recovered from three late Iron Age/early Romano-British (18.7%), seven early Romano-British (36.8%) and one mid Romano-British burial (50%). Species identifications are given elsewhere (see Bates, CD Chapter 32), but included the bird (?chicken) and immature pig commonly observed in Romano-British burials (eg Rielly 2000, table 26, 76; Harman 1985). Unburnt animal bone – representing the remains of grave goods as opposed to pyre goods - was also recovered from three of the Late Iron Age/early Romano-British and three of the early Romano-British graves.

The inclusion of cremated animal remains in Late Iron Age and Romano-British burials is relatively common, and there are close similarities between the periods in terms of frequency of occurrence and the species recovered. There is limited British data for the Iron Age, but pig and domestic fowl tend to feature strongly both here and elsewhere in Europe (Menial 1993; McKinley *et al.* 1997). There is a wide range in the number of Romano-British burials containing cremated animal bone within individual cemeteries (McKinley 2004c, 331-2). At Strood Hall, *c* 54% of the late Iron Age/Romano-British burials contained cremated animal bone (McKinley 2004b). Some of the animal bone recovered from the earlier burials from Stansted was cremated but most was unburnt (ie representing the remains of grave goods) and there is no clear indication of how many burials contained cremated bone (Hutton, 2004b; Havis and Brooks 2004, table 54, 251-253).

Dual cremation

Only one burial – from the early Romano-British grave 328008 – conclusively contained the remains of two individuals, an infant and an adult, possibly male. Expressed as a percentage of the number of burials (5.5%) this is within the range commonly identified from all periods in which the rite was used (McKinley 1994a, 100-102; 1997c; 2000b, 272; 2004c, 303-4). A possible second dual burial was discussed above (see *demography*), and, as has been observed elsewhere, the true number may have higher particularly where a young immature individual was cremated with an adult (eg McKinley 1994a, 102). No dual burials were recorded amongst the *c*. 35 subject to osteological examination from the earlier excavations at Stansted (Garland 2004, 248-9).

Redeposited pyre debris

Variable quantities of fuel ash – most, if not all, representing redeposited pyre debris - were recovered from the fills of 15 graves and 21 of the Bronze Age deposits. Pyre debris was most commonly observed in the Late Iron Age/early Romano-British graves (50%) where it occurred exclusively in association with the unurned burials (77%). A smaller proportion of the early Romano-British graves contained pyre debris (36.8%), its presence in this phase being slightly more common in association with urned burials (42.9%) in comparison with the unurned ones (30%). Neither of the mid Romano-British deposits included pyre debris. The inclusion of pyre debris within grave fills is common throughout most of the temporal range and British geographic areas (McKinley 1997c; 2000c, 41-42; 2004c, 304-306), and is indicative – amongst other things - of the proximity of the pyre site to the place of burial.

In at least four graves fuel ash was described as 'occasional' or as 'flecking' and it is possible that its inclusion was incidental rather than deliberate (the close proximity of the pyre site to the place of burial would make the former as feasible as the latter). In at least four other graves the quantities of fuel ash were substantial and clearly represented deliberate deposits. Elsewhere there was no clear statement of the quantities of fuel ash observed and the interpretation is, consequently, inconclusive.

The distribution of the fuel ash within the grave fill is not always clear either due to a lack of recording, or a lack of clarity resulting from disturbance or, with some of the unurned burials, visual distinction between the remains of the burial (bone concentration) and the deposit of pyre debris; the latter having intermingling with the former in the period between deposition and excavation. Where contexts had been excavated in spits and or blocks, however, it was often possible to broadly distinguish between the deposit types in analysis. In the undated grave 107058 the bone was concentrated (79%) in the upper 0.06 m of the 0.12 m deep fill; though it does not appear that pyre debris was deposited in the base of the grave, rather that the lower 0.06 m may have formed a deep interface. In the undisturbed Late Iron Age/early Romano-British grave 143075, the bone was concentrated in the lower 0.02 m on the west side of the cut (83%), the rest of the bone being dispersed throughout the pyre debris within the grave fill with a possible concentration in the east. The burial in grave 151004 was recorded as being made in the south-west quadrant and surrounded by a charcoal rich fill; the bone was concentrated (78%) in the central 0.10 m of the 0.16 m deep cut, suggesting the original presence of an organic container. In grave 349136 the pyre debris appears to have been deposited over the burial comprising the unurned bone overlain by the ceramic grave goods. In the undisturbed Late Iron Age/early Romano-British grave 332009, the bone was concentrated (75%) in the central 0.08 m of the 0.18 m deep cut suggesting that pyre debris may have been deposited both

before and after the burial was made, probably within a bag of some sort. In most cases it appears that the pyre debris was deposited over or around the formal burial.

Just over half of the contexts containing cremated bone from the Bronze Age ring ditch included some fuel ash, the lower levels comprising charcoal-rich fills. The formation processes and probable nature of these deposits is discussed below. The other three Bronze Age deposits all contained some fuel ash. Small quantities of both bone and fuel ash were recovered from cut 115001, but animal disturbance rendered interpretation of the nature of the deposit inconclusive. Cut 334059 contained a clearly redeposited matrix which may originally have been an *in situ* burial with redeposited pyre debris. Cut 323008 contained a charcoal rich fill in two levels with only 20.2 g of bone deriving from two individuals. This deposit has the appearance of a formal deposit of pyre debris; deposit of this type have been recognised both within the Bronze Age and later periods (McKinley 1997a, 139; 2004c, 304-306). It is not clear why such deposits were made; from a purely practical view point, clearance of the pyre site would have maintained a 'tidy' cemetery but there are features of these deposits which suggest they were made as a formal part of the mortuary rite (*ibid.*).

Formation processes

Although the Bronze Age ring ditch was slightly shallower on the west side than elsewhere in its circuit (range 0.52-0.78 m depth), most of the cremated bone was recovered from the lower fills (peat layers and lower levels of mound redeposition) and it is unlikely that much, if any, bone was lost from the west side as a result of truncation (Figs 4.28, 4.30-4.31). The largest quantity of bone from a single segment was recovered from the south-west of the ditch (segment 316130; 270.4 g) with similar quantities being recovered from northern and eastern segments (309238, 320143, 320131, 320111; 117.8-132.1 g). Only small quantities of bone were recovered from the western segments (0.3-36.9 g). Although the ring ditch was excavated in its entirety, only a sample of segments were subject to hand excavation, the rest being removed by machine under constant archaeological supervision (see Chapter 4). The lack or absence of bone from other than the north-east machine excavated section may be genuine, but it is possible that some bone – which occurred in only small quantities anyway – was missed.

The deposits from the ring ditch containing cremated bone all ultimately derived from the mound material which was redeposited, via weathering, in the ditch fill over what appears to have comprised a *c* 200 year period. The early silting is likely to have occurred as a series of rapid influxes with intervening periods of waterlogging. This early phase coincides with the larger deposits of bone and more frequent fuel ash inclusions. With a single exception (from the later re-cut), none of the bone appears particular worn or abraded suggesting its reburial was rapid and that it had not previously undergone repeated disturbance. A minimum of four individuals could be identified from the deposits (Table 27.1). The neonatal remains were confined to the north-east segment (320131). The infant remains were apparently confined to the north-east quadrant (320131, 320111) though some bone fragments from the south may potentially have derived from this individual. The juvenile remains were mostly from the west (309288) though fragments from this individual may also have been recovered from segments to the north and south. The adult remains were predominantly from the eastern half. There was no apparent distribution of particular skeletal elements in any one part of the ring ditch.

The question remains as to the nature of the deposits from which this material derived. The activity to which they related appears to have been concentrated in the south, east and north of the mound. Given the broad distribution outlined above and provided the minimum numbers

are not totally misleading, it is likely that the material derived from a variety of deposit types relating to individual cremations. Pyre debris may have been redeposited within or scattered throughout the mound construction. Burials, with or without redeposited pyre debris may also have been incorporated within the mound material rather than being cut into the underlying subsoil. The pyre sites may also have lain on the partially constructed mound, to subsequently be covered by further mound material. Whilst the small number of individual indicated, bone distribution and potential mix of deposit types may suggest a rapid development of the ring ditch and mound associated with the cremation of these four individuals, a note of caution is needed. In total, very little bone was recovered (297.6 g) and although there were no identifiable duplicate fragments relatively little distinctive skeletal elements were present and the remains could have derived from a larger number of individuals.

The formation process of some of the late Iron Age and Romano-British burials containing pyre debris has been discussed above (see *redeposited pyre debris*). Where further detail of the formation processes within individual burials could be assessed (via spit or block excavation of contexts) there appeared to be no horizontal distribution of skeletal elements, rather a random mix throughout the depth of the deposits. In several cases, joins between bone fragments recovered from different spits were noted; eg between spits 3 and 4 in grave 328052, and between spit 4 and bone from spits 5 and 6 in grave 332009. Joins between bone fragments from different deposit types were also observed in two graves, eg between bone from the redeposited pyre debris and the formal burial in graves 330033 and 349136. The implication here is for mixing of the bone prior to burial – as may occur where the bone was collected from the pyre site by raking and winnowing as outlined above, or if there was transference of material between receptacles (one for collection and another for burial) – as opposed to bone being placed in the burial receptacle as it was collected from the pyre site by hand with recovery commencing at one end of the pyre site and progressing to the other (eg head to foot end).

Variable levels of disturbance in at least 11 graves had resulted in the redeposition of some bone in ceramic vessels included as grave goods (eg graves 330008, 330018, 330041); there are no conclusive cases of genuine dual distribution of bone (ie joint urned and unurned) within any of the graves.

Table 27.1: Summary of results from analysis of cremated bone
KEY: * - undisturbed/only slightly disturbed; u. – urned; un. – unurned; rpd - redeposited pyre debris

context	cut	deposit type	phase	bone weight	age/sex	pathology	pyre goods
BAAMP 99							
1724	1718	un. burial	ERB	342.4 g	adult *c* 30-50 yr.	exostoses – iliac crest	
BAACP 99							
5075	5073	u.burial	LIA/ERB	549.5 g	1) adult >35 yr. ??female ?2) infant/juvenile *c* 3-10 yr.		unbunt animal bone (?grave good)
5078	5080	u.burial	LIA/ERB	240.1 g	adult >18 yr. ?female		0.2g animal bone
BAACP 00							
107056/7	107058	un. burial + rpd	?	72 g	adult >18 yr.??female	*ante mortem* tooth loss	
113073-5	113072	un. burial + rpd/?rpd	LIA/ERB	42.8 g	adult >18 yr.	morphological variation – wormian bone	
115002	115001	redeposited ?rpd	MBA	7.1 g	subadult/adult >13 yr.		
146006	146005	u. burial	LIA/ERB	115 g	subadult/adult >13 yr.		Fe nails
143077 *	143075	un. burial + rpd	LIA/ERB	437.0 g	adult *c* 25-45 yr. female	dental caries	burnt & unburnt animal bone
150006/8	150007	un. Burial	LIA/ERB	148.1 g	adult >18 yr.		animal bone. Fe nail shank
150011	150009	u. burial?	LIA/ERB	44.4 g	adult >18 yr.		
150013	150012	un. burial ?+ rpd	LIA/ERB	209.1 g	adult >18 yr.??male		Fe nail
151007 *	151004	un. burial + rpd	LIA/ERB	249.4 g	adult *c* 23-45 yr.		
151009	151008	?burial ?+ rpd	LIA/ERB	205.3 g	adult >30 yr.		0.6g animal bone; Fe nail
BAAMP 00							
309242/44/46-8/ 59/66/91/93-5, 316086/88/92, 3160103/06/01/ 11/29/31/33/36/ 54/59, 320113/16-20/25/ 27/29/32/34-7/39/ 40/42/44/47/48	309238/53/65 /88, 316085/92, 316101/09/28 /30/59, 320150/11/28 /31/43/ 46	redeposited burials + rpd and/or rpd	MBA	297.6 g	minimum 4 individuals: 1) neonate 2) infant *c* 2-4 yr. 3) juvenile *c* 7-10 yr. 4) adult *c* 25-45 yr. ?female		*c.* 1.7g burnt animal bone possibly associated with cremated human bone
323007	323008	?rpd	MBA	20.2 g	1) subadult/adult *c* 13-35yr 2) infant *c* 0.5-5 yr.		1.4g animal; u/b or charred animal

context	cut	deposit type	phase	bone weight	age/sex	pathology	pyre goods
325035/7	325038	un. Burial	ERB	606.5 g	adult *c* 18-60 yr. ?female		0.8g ?animal bone
328007 ?*	328006	u. burial	ERB	205.8 g	adult >45 yr. ??female	osteophytes – mandibular condyle; degenerative disc disease – cervical	0.9g bird bone
328009 **?***	328008	u. burial	ERB	525.7 g	1) infant 0-3 yr. 2) adult >35 yr. ??male	osteophytes – auricular surface	
328013	328012	u. burial	LIA/ERB	207.5 g	subadult/adult >13 yr.		
328015	328014	un. Burial	ERB	227.6 g	adult >40 yr.	osteoarthritis – temporo-mandibular; osteophytes – thoracic/lumbar, metacarpal	copper alloy frags.
328031/3	328032	u. burial	ERB	633.6 g	adult *c* 35-45 yr. ?female	periodontal disease	.2g ?bird bone
328037	328036	un. burial + rpd	ERB	274.3 g	adult *c* 18-45 yr. ?female		copper-alloy frags.
328039 **?***	328038	un. Burial	ERB	358.1 g	juvenile/subadult c. 11-14 yr.	destructive lesion – proximal humerus	
328045/7/9/51	328044	u. burial + rpd	ERB	618.7 g	adult *c* 25-45 yr. ?male	osteophytes – axis	
328053-6 *	328052	u. burial	ERB	1408.6 g	adult *c* 25-45 yr. ?male	periodontal disease; pitting – rib facets; exostoses - patella	2.2g animal bone; fragments u/b animal in upper fill
33007/9	330008	u. burial	ERB	457.0 g	adult *c* 35-50 yr.	degenerative disc disease – cervical	
330011	330010	u. burial	LIA/ERB	111.4 g	adult >18 yr.		
330013	328018	u./un. burial + rpd	ERB	195.3 g	adult >18 yr.		
330017	330018	u. burial	ERB	371.5 g	juvenile/subadult *c* 9-15 yr.		worked bone objects; copper-alloy frag.
330021	330020	un. burial + rpd/?rpd	LIA/ERB	366.9 g	adult >35 yr. ??female		
330023/5	330022	u./un. Burial	LIA/ERB	3.9 g	subadult/adult >13 yr.		
330034/5	330033	un. burial ?+rpd	ERB	706.3 g	adult >40 yr.	exostoses – femur, iliac crest, patella	4.5g burnt & u/b animal (piglet)
330037	330036	?un. burial	LIA/ERB	100.9 g	adult >18 yr.		
330039	330038	u. burial + rpd	ERB	436.9 g	1) adult >30 yr. ??male ?2) subadult/adult (>13 yr.)	osteophytes – finger phalanx	burnt & unburnt animal bone (1.2g)

context	cut	deposit type	phase	bone weight	age/sex	pathology	pyre goods
330042/46/50-1 ?*	330041	un. burial	MRB	334.8 g	adult c. 20-45 yr. ??female		
330053/5	330052	u./un. Burial	ERB	135.7 g	subadult/adult >13 yr.		
330059	330058	redeposited	?	7.8 g	subadult/adult >13 yr.		
332010 /11*	332009	un. burial + rpd	LIA/ERB	827.4 g	adult >40 yr. male	*ante mortem* tooth loss – mandibular	2 frags. unburnt animal bone
332016/21	332014	?redeposited in grave fill	ERB	28.1 g	1) infant 6-9 mth. (unburnt) 2) adult >18 yr. (probably =332018)		
332018 ?*	332014	u. burial	MRB	1220.5 g	adult *c* 20-40 yr. ?female	osteophytes – atlas, thoracic/lumbar; pitting – rib facet	1.3g animal bone (inc. bird)
334060-3/5	334059	redeposited - ?crd	LBA	2.2 g	subadult/adult >13 yr.		min. .5g animal
349125	349124	?un. burial/?crd	ERB	174.1 g	subadult/adult		
349127/29/31	349126	u. burial	ERB	354.2 g	adult >18 yr.		
34133-4/45	349136	un. burial + rpd	ERB	313.5 g	adult >18 yr. ??male		
349147/49/53/54	349139	u. burial + rpd	ERB	267.1 g	adult *c* 30-50 yr.		frags. burnt & unburnt animal bone; glass frag.

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Table 27.2: Summary of demographic distribution for the LTCP site (BAACP99 and BAACP00) see Table 27.1 for more detailed definition of ages

	Bronze Age	Late Iron Age/early Romano-British	undated
infant/juvenile 3-10 yr		?1	
mature adult 25-45 yr.		2 (1F)	
mature/older adult >30 yr.		2 (1??F)	
adult >18 yr.		5 (1?F, 1M)	1??F
subadult/adult >13 yr.	1	1	
total	1	10/?11 (3F, 1M)	1

Table 27.3: Summary of demographic distribution for the mid-term car park (BAAMP) see Table 27.1 for more detailed definition of ages

	Bronze Age	Late Iron Age/early Romano-British	Romano-British
neonate 0-0.5 yr.	1		
infant 0-5 yr.	2		1 + *1 unburnt*
juvenile 5-12 yr.	1		
juvenile/subadult 9-15 yr.			2
young/mature adult 18-45 yr.			2 (1?F, 1??F)
mature adult 25-45 yr.	1?F		4 (2 ?F, 2 ?M)
mature/older adult >30 yr.		2 (1M, 1??F)	7 (2??M)
older adult >45 yr.			1 ??F
adult >18 yr.		2	4 (1?F, 1 ??M)
subadult/adult >13 yr.	2	2	2/?3
total	7	6 (1F, 1M)	23/?24 (7F, 5M) + *1 unburnt*

Table 27.4: Bone weight ranges and averages for different burial types and conditions by phase

burial type/ condition	LIA/ERB	ERB	MRB
urned burials			
overall	range: 44.4 – 549.5 g average: 237.2 g	range: 205.8 – 1408.6 g average: 527.9 g	
undisturbed (*)		range: 205.8 – 1408.6 g average: 713.4 g	334.8 g
unurned burials			
overall	range: 42.8 – 827.4 g average: 297.7 g	range: 227.6 – 706.3 g average: 404.1 g	
undisturbed (*)	range: 249.4 - 827.4 g average: 504.6 g	358.1 g	1220.5 g

Table 27.5: Summary of levels of fragmentation by period

burial type and condition	maximum fragment	sieve fraction distribution
Late Iron Age/early Romano-British		
overall	20-78 mm	33% majority in 10 mm fraction, 67% in 5mm fraction
undisturbed unurned	25-77 mm	majority in 5 mm fraction
early Romano-British		
overall	26-74 mm	40% majority in 10 mm fraction, 60% in 5 mm fraction
undisturbed urned	74 mm	majority in 10 mm fraction
mid Roman-British		
undisturbed urned	50 mm	majority in 10 mm fraction
undisturbed unurned	46 mm	majority in 5 mm fraction

Table 27.6: Frequency of occurrence of tooth roots and hand/foot bones per burial

phase	average no. tooth roots per burial	average no. hand/foot bones per burial
late Iron Age/ early Romano-British	2.2	3.2
early Romano-British	2.0	4.4
mid Romano-British	1	3.5

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