

Ancient Monuments Laboratory
Report 54/96

CREMATED BONE FROM ARDLEIGH,
ESSEX (1959-60 & 1979-80
EXCAVATIONS)

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Summary

Bone from 35 cremation burials was examined. There was no evidence of the presence of more than a single individual in any of the burials. Twenty one were adults (6 males, 5 females, the rest could not be sexed), one was an adult or adolescent and nine were sub-adults. The age and sex of the remaining four could not be determined. All remains were white in colour, indicating firing at high temperature. The uniformity of colour may indicate uniformity of firing of the remains, but it is possible that less well fired material may have originally been present but failed to survive the aggressive Ardleigh soil.

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Introduction

The site is a large Bronze Age cremation cemetery. Ring-ditches indicate the former presence of round-barrows. In the present report bone from 35 burials is examined. Fifteen were recovered by Felix Erith in 1959-60 (Erith & Longworth 1960). He followed the plough as the farmer worked the field and when an urn was located he lifted it and, subsequently, hand-excavated the contents. He recovered more than 100 burial urns in this fashion, but unfortunately all the material, except that from the 15 burials in the present report has since been lost.

Two parts of the cemetery were excavated in 1979-80 by the then Central Archaeology Unit (now Central Archaeological Service). Area 5 yielded a large ring-ditch, within which were several inhumation graves and one cremation. Due to the nature of soil conditions on site, no bone survived from the inhumations. The other area, known as Area 7, yielded 19 cremations. None were in urns. This was part of the same area worked by Erith 20 years before. The cremations probably represent some combination of un-urned burials not located by Erith and remaining bone from urned burials which were lifted in the 1959-60 work. This last means that some of the 1979-80 material could actually be from the Erith burials studied in this report (i.e. there may be duplication of some individuals). However by studying the locations (as far as they are known) of the particular burials which survive from the 1959-60 season this seems unlikely, although the possibility cannot be completely excluded (N. Brown, pers comm.). For the purposes of analysis it is assumed that no such duplication is present.

Methods

Age and sex were inferred where possible. In sub-adults age was estimated from epiphysial fusion (Flecker 1942) or simply from the general size and robusticity of the bones. In adults, cranial suture closure (Perizonius 1984) was used to provide

a very approximate indication of age at death. In adults, sex was inferred, where possible, from dimorphic aspects of the skull and pelvis (Brothwell 1981), otherwise from the general size and robusticity of the skeleton. No attempt was made to sex sub- adults.

For the 1959-60 material, the weight of bone from each burial was determined, and the mean fragment size estimated. Due to the nature of the 1979 remains, it was not thought worthwhile to determine precise figures for these parameters here, however approximate weighings were obtained as part of the assessment of this material, and these are given in the catalogue of burials, largely for the sake of completeness.

The burials were scanned for burnt animal bones but none was found.

Results

The results are given in full, burial-by-burial detail in the Appendix. Only a summary is presented in this section.

(i) Demography: There were 21 adults (i.e. individuals aged over about 18 years), of which 6 were probably male, 5 probably female, the rest could not be sexed. There was one adolescent/adult, and 9 sub-adults, of which at least two were under about 2 years old. In four instances neither sex nor age could be determined.

(ii) Quantification of the cremated bone: Summary statistics for weights of bone from the 1959-60 urns are given in Table 1.

Table 1: Weights of bone (in grams) from 1959-60 urns

<u>All burials</u>				<u>Adult burials only</u>			
N	Mean	Std dev	Range	N	Mean	Std dev	Range
12	271.1	337.7	13.4-1183.6	9	340.1	366.7	52.2-1183.6

(Note: in three burials bone weights were not determined because remains were received mixed with large quantities of extraneous material.)

On combustion, an adult corpse yields about 2.0 - 2.5kg of bone (Trotter & Hixon 1974). The Ardleigh burials are therefore substantially incomplete. A number of factors may be playing a part in this but it is not possible to determine which is the most important. Any bone deposited outside the urn would not have been lifted by Erith, and he excavated the contents by hand so smaller fragments may have been overlooked. In addition, some bone may have suffered destruction in the soil, and collection of remains from the pyre for burial in antiquity may

have been incomplete.

The 1959-60 burials are notable for the large size of many bone fragments (for details of mean fragment size from individual burials see Appendix). Mean fragment size was approximately double that in the 1979-80 burials and the latter are completely lacking in the large pieces, several centimetres long, which are often present in the urned material. This would seem to indicate that the 1979-80 material had undergone significant breakage in the soil which, due to the protected environment within the urn, the 1959-60 remains had not.

Bone colour and firing temperature

Shipman et al. (1984) have demonstrated that bone colour varies with firing temperature. The fragments from Ardleigh were, almost without exception, neutral white in colour. If Shipman and co-workers' results can be used to infer temperature, this means that the pyres reached in excess of about 940C. This is similar to temperatures attained in modern crematoria (Wahl 1982). That such high temperatures were reached should not surprise us - Stiner et al. (1995) have shown that temperatures of 900-1000C are reached in ordinary camp-fires, and once ignited, body fats may burn very fiercely - temperatures in excess of 1000C may be attained (Henderson et al. 1987).

The uniformity of colour might be taken to indicate uniformity of firing of the corpses. The degree of uniformity is perhaps surprising: bones tend to shatter on heating and fragments fall to hotter or cooler parts of the pyre; this would be expected to produce fragments of varying colours, reflecting the varying temperature in different parts of the pyre. Although there is little doubt that high temperatures were reached, the uniformity of firing at Ardleigh may be illusory. Thoroughly cremated bone survives well in the soil even when, as at Ardleigh, unburnt bone does not. Perhaps at Ardleigh, poorly fired bone fragments failed to survive in the soil, leaving the well fired material as the only surviving human remains from these burials.

References

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- Erith, F. & Longworth, I. (1960). A Bronze Age Urnfield on Vines Farm, Ardleigh, Essex. Proceedings of the Prehistoric Society 26; 178-192.
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Appendix: Catalogue of Burials

1959-60 excavations

Context	Sex	Age	Mean frag size (mm)	Estimated no of frags	Weight (g)
"No 1"	Male	17-19 years	20	1200	153.4
"No 8"	Unknown	Adult	18	100	52.2
"No 13"	Male	Adult	15	200	102.1
A7	Unknown	Adult	15	1000	-
A8	Unknown	Adult	15	6000	1183.6
A9	Unknown	Unknown	10	250	131.0
B7	Female	Adult	15	200	76.8
D13	Unknown	Adult	15	100	-
D25	Male	Adult	18	1200	514.5
E2	Male	young/middle adult	20	1200	529.9
E3	Unknown	infant/young child	15	35	13.4
F1	Male	older adult	20	500	289.1
G4	Unknown	Adult	25	40	59.5
H6	Unknown	Child	8	1000	-
H17	Unknown	Child	15	100	47.1

1979-80 excavations, Area 5

Context	Sex	Age	Mean frag size (mm)	Estimated no of frags	Weight (g)
750	Unknown	Adult/adolescent	8	50	12.5

1979-80 excavations, Area 7

Context	Sex	Age	Approximate quantity of bone
1195	Unkown	Adult	171g
7132	Unknown	Juvenile/infant	A few fragments
7145	Unknown	Infant	A few fragments
7147	Unknown	Young adult	298g
7168	Female	Young adult	288g
7194	Unknown	Unknown	A few fragments
7196	Female	Adult	70g
7213	Unknown	Child	150g
7217	Unknown	Unknown	20g
7238/7239	Male	Adult	48g
7241	Unknown	Unknown	30g
7243	Female	Adult	200g
7245	Female	Young adult	690g
7247	Unknown	Adult	240g
7249/7250	Unknown	Child	167g
7270	Unknown	Child/adolescent	160g
7291	Unknown	Young adult	230g
7310	Unknown	Infant	20g
7368	Unknown	Adult	20g

KEY: Approximate age ranges are as follows: Infant, 0-2 years; Child, 2-12 years; Adolescent, 12-18 years; Young adult, 18-35 years; Middle adult, 35-50 years; old adult, 50+ years.

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